ACE
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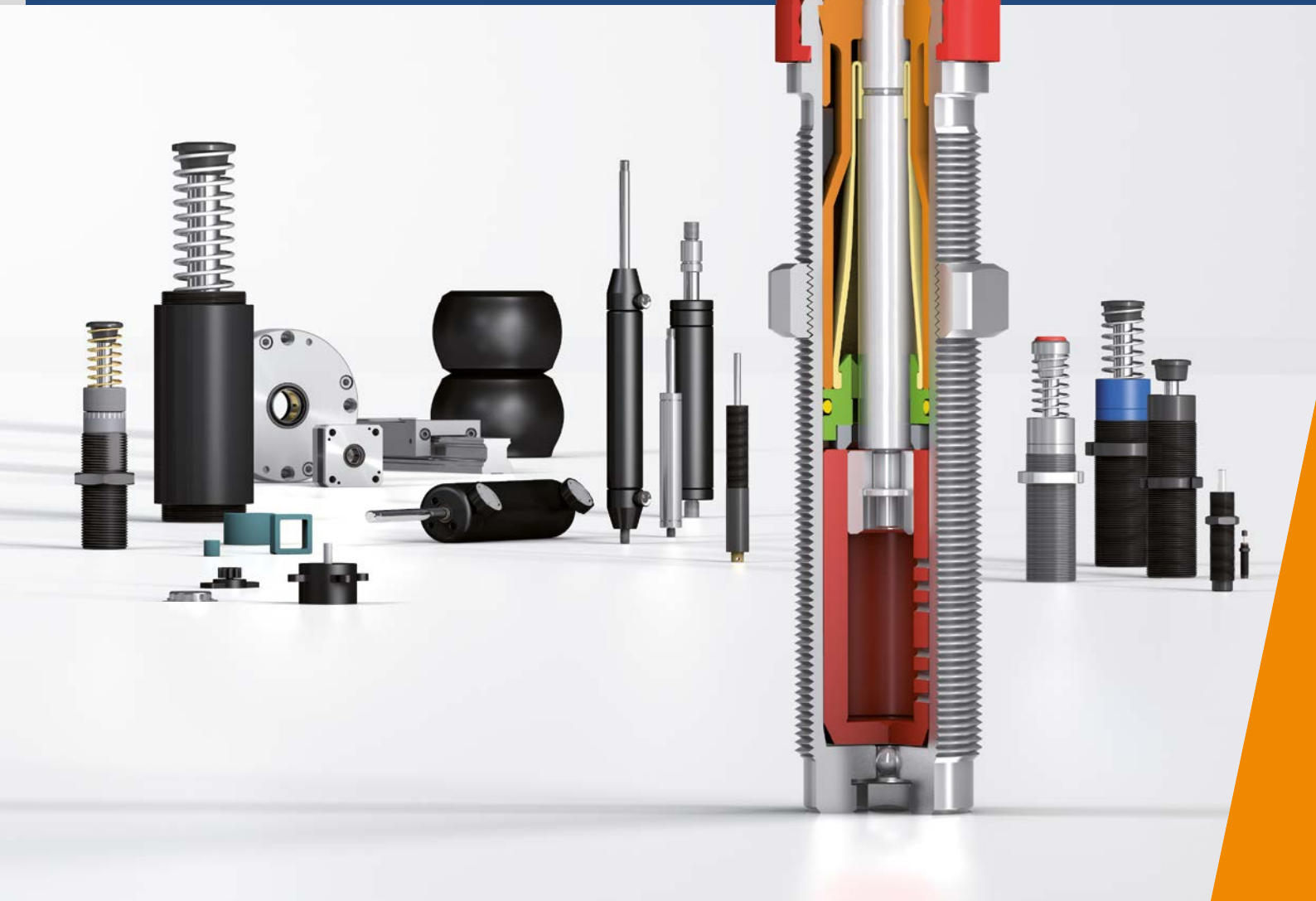
WHEN PERFORMANCE MATTERS

Damping Technology

ACE: Your partner for industrial shock absorbers, gas springs and vibration control

Main Catalogue 2017



ACE Product Variety

Concentrated competence on more than 300 pages

Issue 07.2017 – Specifications subject to change

Automation Control

Miniature Shock Absorbers, Industrial Shock Absorbers
Heavy Industrial Shock Absorbers, Pallet Stoppers
Profile Dampers, Damping Pads

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Optimum Tuning

Tailor-made solutions for any application

Kinetic energy is turned into heat by the universal use ACE damping solutions. This makes machines faster, quieter, more durable, lighter and therefore more competitive and profitable.

Here you will find the perfect selection of machine element, which turn damaging forces into harmless heat. These solutions from ACE smoothly decelerate moving loads. This involves the lowest possible strain on machines, which makes the damping products from ACE so valuable.

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Industrial Shock Absorbers

Standard-setting damping solutions

The name says it all: ACE Stoßdämpfer GmbH (“the ACE shock absorber company”). That ACE is considered the technology and market leader on a worldwide scale for small, medium-sized and heavy industrial shock absorbers is a result of the successful blend of quality, performance and the durability of the solutions.

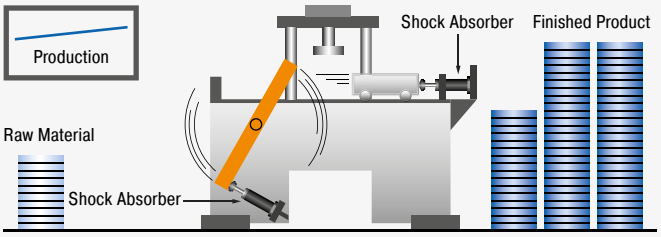
ACE provides the right shock absorber for every industrial purpose. Over 200 different models are available, from the smallest model with a 4 mm stroke up to the biggest with 406 mm.

Whether self-compensating or adjustable, with ACE dampers between 0.68 Nm/cycle and 126,500 Nm/cycle can be absorbed and effective weights between 500 g and 204 t can be decelerated with great precision.

In addition, ACE damping solutions impress with competent consulting, exemplary service and ideal matching accessories.

ACE demo showing a wine glass dropping free fall 1.3 m.
Decelerated by a shock absorber not a drop of wine is spilled.

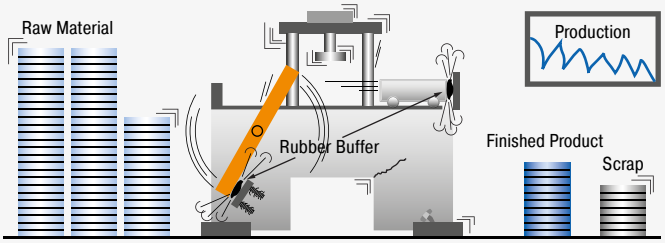
Stopping with Industrial Shock Absorbers



Your advantages using industrial shock absorbers

- Safe, reliable production
- Long service life of the machines
- Easy, inexpensive constructions
- Low operating costs
- Quiet, economical machines
- Less stress on the machine
- Profit improvement

Stopping with Rubber Buffers, Springs, Dashpots or Cylinder Cushions



Results using conventional dampers

- Loss of production
- Machine damage
- Increased maintenance costs
- Increased operating noise
- Higher machine construction costs

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Comparison of Different Damping Elements

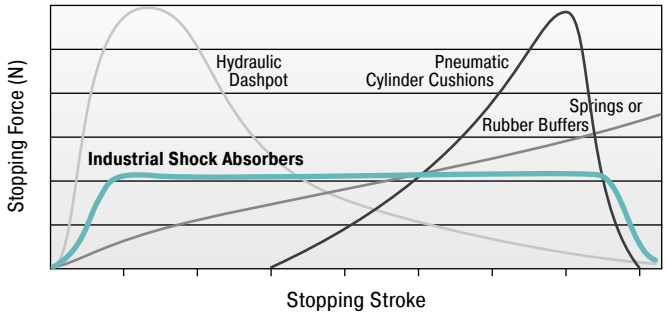
When it comes to slowing down moving masses with constant damping force through the stroke, the industrial shock absorber is the right choice. A comparison demonstrates the differences of the damping elements.

ACE Industrial Shock Absorbers (Uniform stopping force through the entire stroke)
The moving load is smoothly and gently brought to rest by a constant resisting force throughout the entire shock absorber stroke. The load is decelerated with the lowest possible force in the shortest possible time eliminating damaging force peaks and shock damage to machines and equipment. This is a linear deceleration force stroke curve and is the curve provided by ACE industrial shock absorbers. In addition they considerably reduce noise pollution.

Hydraulic Dashpot (High stopping force at start of the stroke)
With only one metering orifice the moving load is abruptly slowed down at the start of the stroke. The braking force rises to a very high peak at the start of the stroke (giving high shock loads) and then falls away rapidly.

Springs and Rubber Buffers (High stopping forces at end of stroke)
At full compression. Also they store energy rather than dissipating it, causing the load to rebound back again.

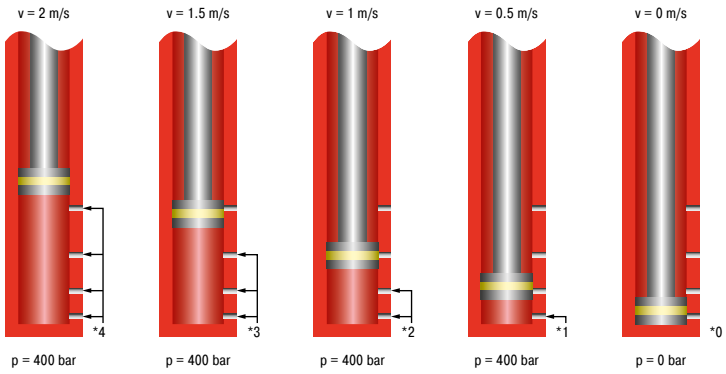
Air Buffers, Pneumatic Cylinder Cushions (High stopping force at end of stroke)
Due to the compressibility of air these have a sharply rising force characteristic towards the end of the stroke. The majority of the energy is absorbed near the end of the stroke.



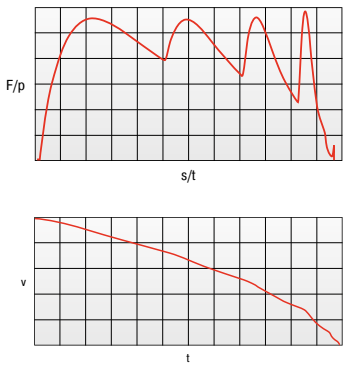
Comparison
The comparison shows the differences of the damping in a direct comparison of stopping force to stopping stroke.

General Function of the Pressure Chamber

If a moving mass hits the industrial shock absorber, the piston puts the oil in the pressure chamber into motion. The oil is pressed through the metering orifices, which converts the discharged energy into heat. The metering orifices are arranged on the stroke so that the mass is retarded with a constant damping force. The hydraulic pressure is maintained throughout the entire braking process nearly constant.



* The load velocity reduces continously as you travel through the stroke due to the reduction in the number of metering orifices (*) in action. The internal pressure remains essentially constant and thus the force vs. stroke curve remains linear.



F = force (N), p = internal pressure (bar)
s = stroke (m), t = deceleration time (s),
v = velocity (m/s)

Calculation Bases for the Design of Industrial Shock Absorbers

ACE shock absorbers provide linear deceleration and are therefore superior to other kinds of damping element.
It is easy to calculate around 90 % of applications knowing only the following five parameters:

1.	**Mass to be decelerated (weight)**	**m**	**[kg]**
2.	**Impact velocity at shock absorber**	**v_D**	**[m/s]**
3.	**Propelling force**	**F**	**[N]**
4.	**Cycles per hour**	**c**	**[/hr]**
5.	**Number of absorbers in parallel**	**n**	

Key to symbols used

W_1	Kinetic energy per cycle	Nm	[3] ST	tall torque factor (normally 2.5)	1 to 3
W_2	Propelling force energy per cycle	Nm	M	Propelling torque	Nm
W_3	Total energy per cycle ($W_1 + W_2$)	Nm	I	Moment of Inertia	kgm^2
[1] W_4	Total energy per hour ($W_3 \cdot c$)	Nm/hr	g	Acceleration due to gravity = 9.81	m/s^2
me	Effective weight	kg	h	Drop height excl. shock absorber stroke	m
m	Mass to be decelerated	kg	s	Shock absorber stroke	m
n	Number of shock absorbers (in parallel)		L/R/r	Radius	m
[2] v	Velocity at impact	m/s	Q	Reaction force	N
[2] v_D	Impact velocity at shock absorber	m/s	μ	Coefficient of friction	
ω	Angular velocity at impact	rad/s	t	Deceleration time	s
F	Propelling force	N	a	Deceleration	m/s^2
c	Cycles per hour	1/hr	α	Side load angle	°
P	Motor power	kW	β	Angle of incline	°

[1] All mentioned values of W_4 in the capacity charts are only valid for room temperature. There are reduced values at higher temperature ranges.

[2] v or v_D is the final impact velocity of the mass. With accelerating motion the final impact velocity can be 1.5 to 2 times higher than the average. Please take this into account when calculating kinetic energy.

[3] ST ≙ relation between starting torque and running torque of the motor (depending on the design)

In all the following examples the choice of shock absorbers made from the capacity chart is based upon the values of (W_3), (W_4), (me) and the desired shock absorber stroke (s).

Note:
When using several shock absorbers in parallel, the values (W_3), (W_4) and (me) are divided according to the number of units used.

Reaction force Q [N] $Q = \frac{1.5 \cdot W_3}{s}$

Stopping time t [s] $t = \frac{2.6 \cdot s}{v_D}$

Deceleration rate a [m/s^2] $a = \frac{0.75 \cdot v_D^2}{s}$

Approximate values assuming correct adjustment. Add safety margin if necessary.
(Exact values will depend upon actual application data and can be provided on request.)

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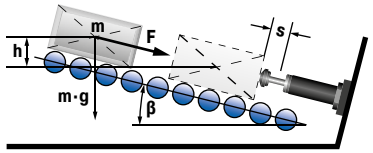
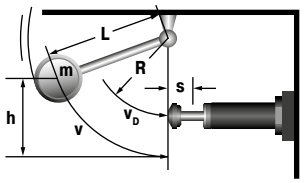
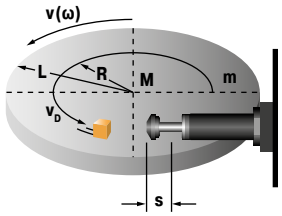
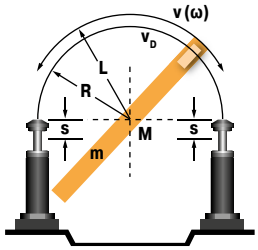
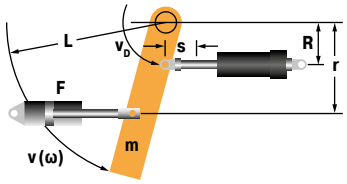
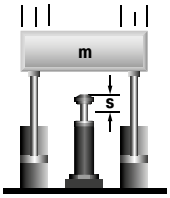
Application	Formulae	Example	
1 Mass without propelling force	$W_1 = m \cdot v^2 \cdot 0.5$ $W_2 = 0$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = v$ $me = m$	m = 100 kg v = 1.5 m/s c = 500 /hr s = 0.050 m (chosen)	$W_1 = 100 \cdot 1.5^2 \cdot 0.5$ = 113 Nm $W_2 = 0$ $W_3 = 113 + 0$ = 113 Nm $W_4 = 113 \cdot 500$ = 56 500 Nm/hr $me = m$ = 100 kg Chosen from capacity chart: Model MC3350EUM-2 self-compensating
2 Mass with propelling force	$W_1 = m \cdot v^2 \cdot 0.5$ $W_2 = F \cdot s$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = v$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 36 kg [1] v = 1.5 m/s F = 400 N c = 1000 /hr s = 0.025 m (chosen)	$W_1 = 36 \cdot 1.5^2 \cdot 0.5$ = 41 Nm $W_2 = 400 \cdot 0.025$ = 10 Nm $W_3 = 41 + 10$ = 51 Nm $W_4 = 51 \cdot 1000$ = 51 000 Nm/hr $me = 2 \cdot 51 : 1.5^2$ = 45 kg Chosen from capacity chart: Model MC600EUM self-compensating [1] v is the final impact velocity of the mass: With pneumatically propelled systems this can be 1.5 to 2 times the average velocity. Please take this into account when calculating energy.
2.1 for vertical motion upwards →	$W_2 = (F - m \cdot g) \cdot s$		
2.2 for vertical motion downwards →	$W_2 = (F + m \cdot g) \cdot s$		
3 Mass with motor drive	$W_1 = m \cdot v^2 \cdot 0.5$ $W_2 = \frac{1000 \cdot P \cdot ST \cdot s}{v}$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = v$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 800 kg v = 1.2 m/s ST = 2.5 P = 4 kW c = 100 /hr s = 0.100 m (chosen)	$W_1 = 800 \cdot 1.2^2 \cdot 0.5$ = 576 Nm $W_2 = 1000 \cdot 4 \cdot 2.5 \cdot 0.1 : 1.2$ = 834 Nm $W_3 = 576 + 834$ = 1 410 Nm $W_4 = 1410 \cdot 100$ = 141 000 Nm/hr $me = 2 \cdot 1410 : 1.2^2$ = 1 958 kg Chosen from capacity chart: Model MC64100EUM-2 self-compensating Note: Do not forget to include the rotational energy of motor, coupling and gearbox into calculation for W_1.
4 Mass on driven rollers	$W_1 = m \cdot v^2 \cdot 0.5$ $W_2 = m \cdot \mu \cdot g \cdot s$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = v$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 250 kg v = 1.5 m/s c = 180 /hr (Steel/Steel) μ = 0.2 s = 0.050 m (chosen)	$W_1 = 250 \cdot 1.5^2 \cdot 0.5$ = 281 Nm $W_2 = 250 \cdot 0.2 \cdot 9.81 \cdot 0.05$ = 25 Nm $W_3 = 281 + 25$ = 306 Nm $W_4 = 306 \cdot 180$ = 55 080 Nm/hr $me = 2 \cdot 306 : 1.5^2$ = 272 kg Chosen from capacity chart: Model MC4550EUM-2 self-compensating
5 Swinging mass with propelling force	$W_1 = m \cdot v^2 \cdot 0.5 = 0.5 \cdot I \cdot \omega^2$ $W_2 = \frac{M \cdot s}{R}$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = \frac{v \cdot R}{L} = \omega \cdot R$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 20 kg v = 1 m/s M = 50 Nm R = 0.5 m L = 0.8 m c = 1500 /hr s = 0.012 m (chosen)	$W_1 = 20 \cdot 1^2 \cdot 0{,}5$ = 10 Nm $W_2 = 50 \cdot 0.012 : 0.5$ = 1.2 Nm $W_3 = 10 + 1.2$ = 11.2 Nm $W_4 = 306 \cdot 180$ = 16 800 Nm/hr $v_D = 1 \cdot 0.5 : 0.8$ = 0.63 m/s $me = 2 \cdot 11.2 : 0.63^2$ = 56 kg Chosen from capacity chart: Model MC150EUMH self-compensating Check the side load angle, tan α = s/R, with regard to "Max. Side Load Angle" in the capacity chart (see example 6.2)
6 Free falling mass	$W_1 = m \cdot g \cdot h$ $W_2 = m \cdot g \cdot s$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = \sqrt{2 \cdot g \cdot h}$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 30 kg h = 0.5 m c = 400 /hr s = 0.050 m (chosen)	$W_1 = 30 \cdot 0.5 \cdot 9.81$ = 147 Nm $W_2 = 30 \cdot 9.81 \cdot 0.05$ = 15 Nm $W_3 = 147 + 15$ = 162 Nm $W_4 = 162 \cdot 400$ = 64 800 Nm/hr $v_D = \sqrt{2 \cdot 9.81 \cdot 0.5}$ = 3.13 m/s $me = 2 \cdot 162 : 3.13^2$ = 33 kg Chosen from capacity chart: Model MC3350EUM-1 self-compensating

Application	Formulae	Example
6.1 Mass rolling/sliding down incline 	$W_1 = m \cdot g \cdot h = m \cdot v_D^2 \cdot 0.5$ $W_2 = m \cdot g \cdot \sin\beta \cdot s$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = \sqrt{2 \cdot g \cdot h}$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 500 kg h = 0.1 m c = 200 /hr ß = 10 °C **$W_1 = 500 \cdot 9.81 \cdot 0.1$ = 490.5 Nm** **$W_2 = 50 \cdot 9.81 \cdot \sin(10) \cdot 0.075$ = 63.9 Nm** **$W_3 = 490.5 + 63.9$ = 554.4 Nm** **$W_4 = 554.4 \cdot 200$ = 11880.0 Nm/hr** Chosen from capacity chart: Model MC4575EUM-2 self-compensating
6.1a propelling force up incline →	$W_2 = (F - m \cdot g \cdot \sin\beta) \cdot s$	
6.1b propelling force down incline →	$W_2 = (F + m \cdot g \cdot \sin\beta) \cdot s$	
6.2 Mass free falling about a pivot point  $\tan\alpha = \frac{s}{R}$	$W_1 = m \cdot g \cdot h$ $W_2 = 0$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = \sqrt{2 \cdot g \cdot h} \cdot \frac{R}{L}$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 50 kg h = 1 m c = 50 /hr R = 300 mm L = 500 mm **$W_1 = 50 \cdot 9.81 \cdot 1$ = 490.5 Nm** **$W_2 = 0$** **$W_3 = 490.5 + 0$ = 490.5 Nm** **$W_4 = 490.5 \cdot 50$ = 24525.0 Nm/hr** Chosen from capacity chart: Model MC4550EUM-1 self-compensating Check the side load angle, tan α = s/R, with regard to "Max. Side Load Angle" in the capacity chart
7 Rotary index table with propelling torque 	$W_1 = m \cdot v^2 \cdot 0.25 = 0.5 \cdot I \cdot \omega^2$ $W_2 = \frac{M \cdot s}{R}$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = \frac{v \cdot R}{L} = \omega \cdot R$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 1000 kg v = 1.1 m/s M = 1000 Nm s = 0.050 m (chosen) L = 1.25 m R = 0.8 m c = 100 /hr **$W_1 = 1000 \cdot 1.1^2 \cdot 0.25$ = 303 Nm** **$W_2 = 300 \cdot 0.025 : 0.8$ = 63 Nm** **$W_3 = 28 + 9$ = 366 Nm** **$W_4 = 37 \cdot 1200$ = 36600 Nm/hr** **$v_D = 1.1 \cdot 0.8 : 1.25$ = 0.7 m/s** **$me = 2 \cdot 366 : 0.7^2$ = 1494 kg** Chosen from capacity chart: Model MC4550EUM-3 self-compensating Check the side load angle, tan α = s/R, with regard to "Max. Side Load Angle" in the capacity chart (see example 6.2)
8 Swinging arm with propelling torque (uniform weight distribution) 	$W_1 = m \cdot v^2 \cdot 0.17 = 0.5 \cdot I \cdot \omega^2$ $W_2 = \frac{M \cdot s}{R}$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = \frac{v \cdot R}{L} = \omega \cdot R$ $me = \frac{2 \cdot W_3}{v_D^2}$	I = 56 kgm² ω = 1 rad/s M = 300 Nm s = 0.025 m (chosen) L = 1.5 m R = 0.8 m c = 1200 /hr **$W_1 = 0.5 \cdot 56 \cdot 1^2$ = 28 Nm** **$W_2 = 300 \cdot 0.025 : 0.8$ = 9 Nm** **$W_3 = 28 + 9$ = 37 Nm** **$W_4 = 37 \cdot 1200$ = 44400 Nm/hr** **$v_D = 1 \cdot 0.8$ = 0.8 m/s** **$me = 2 \cdot 37 : 0.8^2$ = 116 kg** Chosen from capacity chart: Model MC600EUM self-compensating Check the side load angle, tan α = s/R, with regard to "Max. Side Load Angle" in the capacity chart (see example 6.2)
9 Swinging arm with propelling force (uniform weight distribution) 	$W_1 = m \cdot v^2 \cdot 0.17 = 0.5 \cdot I \cdot \omega^2$ $W_2 = \frac{F \cdot r \cdot s}{R} = \frac{M \cdot s}{R}$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = \frac{v \cdot R}{L} = \omega \cdot R$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 1000 kg v = 2 m/s F = 7000 N M = 4200 Nm s = 0.050 m (chosen) r = 0.6 m R = 0.8 m L = 1.2 m c = 900 /hr **$W_1 = 1000 \cdot 2^2 \cdot 0.17$ = 680 Nm** **$W_2 = 7000 \cdot 0.6 \cdot 0.05 : 0.8$ = 263 Nm** **$W_3 = 680 + 263$ = 943 Nm** **$W_4 = 943 \cdot 900$ = 848700 Nm/hr** **$v_D = 2 \cdot 0.8 : 1.2$ = 1.33 m/s** **$me = 2 \cdot 943 : 1.33^2$ = 1066 kg** Chosen from capacity chart: Model CA2x2EU-1 self-compensating
10 Mass lowered at controlled speed 	$W_1 = m \cdot v^2 \cdot 0.5$ $W_2 = m \cdot g \cdot s$ $W_3 = W_1 + W_2$ $W_4 = W_3 \cdot c$ $v_D = v$ $me = \frac{2 \cdot W_3}{v_D^2}$	m = 6000 kg v = 1.5 m/s s = 0.305 m (chosen) c = 60 /hr **$W_1 = 6000 \cdot 1.5^2 \cdot 0.5$ = 6750 Nm** **$W_2 = 6000 \cdot 9.81 \cdot 0.305$ = 17952 Nm** **$W_3 = 6750 + 17952$ = 24702 Nm** **$W_4 = 24702 \cdot 60$ = 1482120 Nm/hr** **$me = 2 \cdot 24702 : 1.5^2$ = 21957 kg** Chosen from capacity chart: Model CA3x12EU-2 self-compensating

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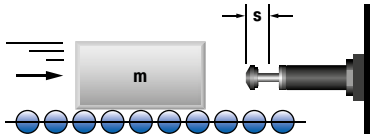
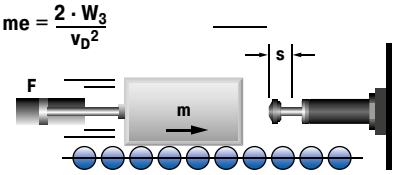
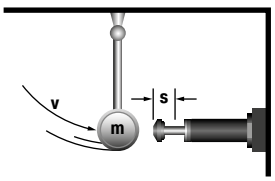
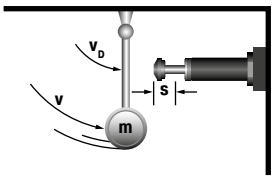
Effective Weight (me)

The effective weight (me) can either be the same as the actual weight (examples A and C), or it can be an imaginary weight representing a combination of the propelling force or lever action plus the actual weight (examples B and D).

Application	Example
A Mass without propelling force **Formula** **me = m** 	**m = 100 kg** v_D = v = 2 m/s $W_1 = W_3$ = 200 Nm $me = \frac{2 \cdot 200}{4}$ = **100 kg**
B Mass with propelling force **Formula** $me = \frac{2 \cdot W_3}{v_D^2}$ 	**m = 100 kg** F = 2000 N v_D = v = 2 m/s s = 0.1 m W_1 = 200 Nm W_2 = 200 Nm W_3 = 400 Nm $me = \frac{2 \cdot 400}{4}$ = **200 kg**
C Mass without propelling force direct against shock absorber **Formula** **me = m** 	**m = 20 kg** v_D = v = 2 m/s s = 0.1 m $W_1 = W_3$ = 40 Nm $me = \frac{2 \cdot 40}{2^2}$ = **20 kg**
D Mass without propelling force with mechanical advantage **Formula** $me = \frac{2 \cdot W_3}{v_D^2}$ 	**m = 20 kg** v = 2 m/s v_D = 0.5 m/s s = 0.1 m $W_1 = W_3$ = 40 Nm $me = \frac{2 \cdot 40}{0.5^2}$ = **320 kg**

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Self-Compensating Shock Absorbers

TYPES	Stroke mm	Energy capacity Nm/cycle	Effective Weight me min. kg	Effective Weight me max. kg	Page
MC5EUM-1-B	4	0.68	0.5	4.4	19
MC5EUM-2-B	4	0.68	3.8	10.8	19
MC5EUM-3-B	4	0.68	9.7	18.7	19
MC9EUM-1-B	5	1	0.6	3.2	19
MC9EUM-2-B	5	1	0.8	4.1	19
MC10EUMH-B	5	1.25	0.7	5	19
MC10EUML-B	5	1.25	0.3	2.7	19
MC25EUM	6	2.8	1.8	5.4	19
MC25EUMH	6	2.8	4.6	13.6	19
MC25EUML	6	2.8	0.7	2.2	19
MC30EUM-1	8	3.5	0.4	1.9	19
MC30EUM-2	8	3.5	1.8	5.4	19
MC30EUM-3	8	3.5	5	15	19
MC75EUM-1	10	9	0.3	1.1	19
MC75EUM-2	10	9	0.9	4.8	19
MC75EUM-3	10	9	2.7	36.2	19
MC75EUM-4	10	9	25	72	19
MC150EUM	12	20	0.9	10	21
MC150EUMH	12	20	8.6	86	21
MC150EUMH2	12	20	70.0	200	21
MC150EUMH3	12	20	181.0	408	21
MC225EUM	12	41	2.3	25	21
MC225EUMH	12	41	23.0	230	21
MC225EUMH2	12	41	180.0	910	21
MC225EUMH3	12	41	816.0	1,814	21
MC600EUM	25	136	9.0	136	21
MC600EUMH	25	136	113.0	1,130	21
MC600EUMH2	25	136	400.0	2,300	21
MC600EUMH3	25	136	2,177.0	4,536	21
SC25EUM-5	8	10	1	5	31
SC25EUM-6	8	10	4	44	31
SC25EUM-7	8	10	42	500	31
SC75EUM-5	10	16	1	8	31
SC75EUM-6	10	16	7	78	31
SC75EUM-7	10	16	75	800	31
SC190EUM-5	12	31	2	16	31
SC190EUM-6	12	31	13	140	31
SC190EUM-7	12	31	136	1,550	31
SC300EUM-5	15	73	11	45	33
SC300EUM-6	15	73	34	136	33
SC300EUM-7	15	73	91	181	33
SC300EUM-8	15	73	135	680	33
SC300EUM-9	15	73	320	1,950	33
SC650EUM-5	23	210	23	113	33
SC650EUM-6	23	210	90	360	33
SC650EUM-7	23	210	320	1,090	33
SC650EUM-8	23	210	770	2,630	33
SC650EUM-9	23	210	1,800	6,350	33
MC3325EUM-0	23.2	170	3	11	53
MC3325EUM-1	23.2	170	9	40	53
MC3325EUM-2	23.2	170	30	120	53
MC3325EUM-3	23.2	170	100	420	53
MC3325EUM-4	23.2	170	350	1,420	53
MC3350EUM-0	48.6	330	5	22	53
MC3350EUM-1	48.6	330	18	70	53
MC3350EUM-2	48.6	330	60	250	53
MC3350EUM-3	48.6	330	210	840	53
MC3350EUM-4	48.6	330	710	2,830	53
MC4525EUM-0	23.1	370	7	27	54
MC4525EUM-1	23.1	370	20	90	54
MC4525EUM-2	23.1	370	80	310	54
MC4525EUM-3	23.1	370	260	1,050	54
MC4525EUM-4	23.1	370	890	3,540	54
MC4550EUM-0	48.5	740	13	54	54
MC4550EUM-1	48.5	740	45	180	54
MC4550EUM-2	48.5	740	150	620	54
MC4550EUM-3	48.5	740	520	2,090	54
MC4550EUM-4	48.5	740	1,800	7,100	54
MC4575EUM-0	73.9	1,130	20	80	54
MC4575EUM-1	73.9	1,130	70	270	54
MC4575EUM-2	73.9	1,130	230	930	54
MC4575EUM-3	73.9	1,130	790	3,140	54

Self-Compensating Shock Absorbers

TYPES	Stroke mm	Energy capacity Nm/cycle	Effective Weight me min. kg	Effective Weight me max. kg	Page
MC4575EUM-4	73.9	1,130	2,650	10,600	54
MC6450EUM-0	48.6	1,870	35	140	55
MC6450EUM-1	48.6	1,870	140	540	55
MC6450EUM-2	48.6	1,870	460	1,850	55
MC6450EUM-3	48.6	1,870	1,600	6,300	55
MC6450EUM-4	48.6	1,870	5,300	21,200	55
MC64100EUM-0	99.4	3,730	70	280	55
MC64100EUM-1	99.4	3,730	270	1,100	55
MC64100EUM-2	99.4	3,730	930	3,700	55
MC64100EUM-3	99.4	3,730	3,150	12,600	55
MC64100EUM-4	99.4	3,730	10,600	42,500	55
MC64150EUM-0	150	5,650	100	460	55
MC64150EUM-1	150	5,650	410	1,640	55
MC64150EUM-2	150	5,650	1,390	5,600	55
MC64150EUM-3	150	5,650	4,700	18,800	55
MC64150EUM-4	150	5,650	16,000	63,700	55
SC3325EUM-5	23.2	155	1,360	2,721	69
SC3325EUM-6	23.2	155	2,500	5,443	69
SC3325EUM-7	23.2	155	4,989	8,935	69
SC3325EUM-8	23.2	155	8,618	13,607	69
SC3350EUM-5	48.6	310	2,721	4,990	69
SC3350EUM-6	48.6	310	4,536	9,980	69
SC4525EUM-5	23.1	340	3,400	6,800	69
SC4525EUM-6	23.1	340	6,350	13,600	69
SC4525EUM-7	23.1	340	12,700	22,679	69
SC4525EUM-8	23.1	340	20,411	39,000	69
SC4550EUM-5	48.5	680	6,800	12,246	69
SC4550EUM-6	48.5	680	11,790	26,988	69
SC4550EUM-7	48.5	680	25,854	44,225	69
CA2X2EU-1	50	3,600	700	2,200	83
CA2X2EU-2	50	3,600	1,800	5,400	83
CA2X2EU-3	50	3,600	4,500	13,000	83
CA2X2EU-4	50	3,600	11,300	34,000	83
CA2X4EU-1	102	7,200	1,400	4,400	83
CA2X4EU-2	102	7,200	3,600	11,000	83
CA2X4EU-3	102	7,200	9,100	27,200	83
CA2X4EU-4	102	7,200	22,600	68,000	83
CA2X6EU-1	152	10,800	2,200	6,500	83
CA2X6EU-2	152	10,800	5,400	16,300	83
CA2X6EU-3	152	10,800	13,600	40,800	83
CA2X6EU-4	152	10,800	34,000	102,000	83
CA2X8EU-1	203	14,500	2,900	8,700	83
CA2X8EU-2	203	14,500	7,200	21,700	83
CA2X8EU-3	203	14,500	18,100	54,400	83
CA2X8EU-4	203	14,500	45,300	136,000	83
CA2X10EU-1	254	18,000	3,600	11,000	83
CA2X10EU-2	254	18,000	9,100	27,200	83
CA2X10EU-3	254	18,000	22,600	68,000	83
CA2X10EU-4	254	18,000	56,600	170,000	83
CA3X5EU-1	127	14,125	2,900	8,700	84
CA3X5EU-2	127	14,125	7,250	21,700	84
CA3X5EU-3	127	14,125	18,100	54,350	84
CA3X5EU-4	127	14,125	45,300	135,900	84
CA3X8EU-1	203	22,600	4,650	13,900	84
CA3X8EU-2	203	22,600	11,600	34,800	84
CA3X8EU-3	203	22,600	29,000	87,000	84
CA3X8EU-4	203	22,600	72,500	217,000	84
CA3X12EU-1	305	33,900	6,950	20,900	84
CA3X12EU-2	305	33,900	17,400	52,200	84
CA3X12EU-3	305	33,900	43,500	130,450	84
CA3X12EU-4	305	33,900	108,700	326,000	84
CA4X6EU-3	152	47,500	3,500	8,600	85
CA4X6EU-5	152	47,500	8,600	18,600	85
CA4X6EU-7	152	47,500	18,600	42,700	85
CA4X8EU-3	203	63,300	5,000	11,400	85
CA4X8EU-5	203	63,300	11,400	25,000	85
CA4X8EU-7	203	63,300	25,000	57,000	85
CA4X16EU-3	406	126,500	10,000	23,000	85
CA4X16EU-5	406	126,500	23,000	50,000	85
CA4X16EU-7	406	126,500	50,000	115,000	85

Issue 07.2017 – Specifications subject to change

Shock Absorbers soft contact and self-compensating

TYPES	Stroke mm	Energy capacity Nm/cycle	Effective Weight Soft-Contact me min. kg	Soft-Contact me max. kg	Self-Compensating me min. kg	Self-Compensating me max. kg	Page
SC190EUM-0	16	25	-	-	0.7	4	29
SC190EUM-1	16	25	2.3	6	1.4	7	29
SC190EUM-2	16	25	5.5	16	3.6	18	29
SC190EUM-3	16	25	14	41	9.0	45	29
SC190EUM-4	16	25	34	91	23.0	102	29
SC300EUM-0	19	33	-	-	0.7	4	29
SC300EUM-1	19	33	2.3	7	1.4	8	29
SC300EUM-2	19	33	7	23	4.5	27	29
SC300EUM-3	19	33	23	68	14.0	82	29
SC300EUM-4	19	33	68	181	32.0	204	29
SC650EUM-0	25.4	73	-	-	2.3	14	29
SC650EUM-1	25.4	73	11	36	8.0	45	29
SC650EUM-2	25.4	73	34	113	23.0	136	29
SC650EUM-3	25.4	73	109	363	68.0	408	29
SC650EUM-4	25.4	73	363	1,089	204.0	1,180	29
SC925EUM-0	40	110	8	25	4.5	29	29
SC925EUM-1	40	110	22	72	14.0	90	29
SC925EUM-2	40	110	59	208	40.0	227	29
SC925EUM-3	40	110	181	612	113.0	726	29
SC925EUM-4	40	110	544	1,952	340.0	2,088	29

Adjustable Shock Absorbers

TYPES	Stroke mm	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight me min. kg	Effective Weight me max. kg	Page
MA30EUM	8	3.5	5,650	0.23	15	35
MA50EUM-B	7.2	5.5	13,550	4.50	20	35
MA35EUM	10.2	4.0	6,000	6.00	57	35
MA150EUM	12.7	22.0	35,000	1.00	109	35
MA225EUM	19	25.0	45,000	2.30	226	35
MA600EUM	25	68.0	68,000	9.00	1,360	35
MA900EUM	40	100.0	90,000	14.00	2,040	35
MA3325EUM	23.2	170	75,000	9	1,700	71
ML3325EUM	23.2	170	75,000	300	50,000	71
MA3350EUM	48.6	340	85,000	13	2,500	71
ML3350EUM	48.6	340	85,000	500	80,000	71
MA4525EUM	23.1	425	107,000	40	10,000	72
ML4525EUM	23.1	425	107,000	3,000	110,000	72
MA4550EUM	48.5	850	112,000	70	14,500	72
ML4550EUM	48.5	850	112,000	5,000	180,000	72
MA4575EUM	73.9	1,300	146,000	70	15,000	72
ML6425EUM	23.2	1,135	124,000	7,000	300,000	73
MA6450EUM	48.6	2,275	146,000	220	50,000	73
ML6450EUM	48.6	2,275	146,000	11,000	500,000	73
MA64100EUM	99.4	4,520	192,000	270	52,000	73
MA64150EUM	150	6,780	248,000	330	80,000	73
A1½X2EU	50	2,350	362,000	195	32,000	87
A1½X3½EU	89	4,150	633,000	218	36,000	87
A1½X5EU	127	5,900	904,000	227	41,000	87
A1½X6½EU	165	7,700	1,180,000	308	45,000	87
A2X2EU	50	3,600	1,100,000	250	77,000	88
A2X4EU	102	9,000	1,350,000	250	82,000	88
A2X6EU	152	13,500	1,600,000	260	86,000	88
A2X8EU	203	19,200	1,900,000	260	90,000	88
A2X10EU	254	23,700	2,200,000	320	113,000	88
A3X5EU	127	15,800	2,260,000	480	154,000	89
A3X8EU	203	28,200	3,600,000	540	181,500	89
A3X12EU	305	44,000	5,400,000	610	204,000	89

Miniature Shock Absorbers

Tuning for almost any design

Miniature shock absorbers from ACE are tried-and-tested quality products used in millions of industrial construction designs throughout the world. They optimise machines in an equally reliable and effective way by decelerating loads quickly and without recoil.

The compact, maintenance-free, hydraulic machine elements can be easily and quickly integrated in any construction design and certain models can be directly integrated in pneumatic cylinders. They reduce the load on handling devices, rotary and pivoting actuators, linear cylinders and many other industrial applications and increase their efficiency. Innovative ACE sealing techniques and shock absorber bodies and inner pressure chambers, fully machined from solid high tensile alloy, tube-shaped steel, ensure a long service life.

- Easy, inexpensive constructions
- Large variety of models for every purpose
- Less stress on the machine
- Reduced operating costs
- Maintenance-free

Miniature Shock Absorbers

MC5 to MC75

Page 18

Self-Compensating
Shock absorbers in miniature format
Miniature slides, Pneumatic cylinders, Handling modules, Copiers

MC150 to MC600

Page 20

Self-Compensating, Rolling Diaphragm Technology
Exceptionaly high endurance and with the lowest resetting force
Linear slides, Pneumatic cylinders, Swivel units, Handling modules

MC150-V4A to MC600-V4A

Page 22

Self-Compensating, Stainless Steel, Rolling Diaphragm Technology
Exceptionally high endurance with stainless steel corrosion protection
Clean room areas, Pharmaceutical industry, Medical technology, Food industry

PMCN150 to PMCN600

Page 24

Self-Compensating, Rolling Diaphragm Technology, TPU Bellow
Reliable protection against fluids
Finishing and processing centres, Clean room areas, Pharmaceutical industry, Medical technology

PMCN150-V4A to PMCN600-V4A

Page 26

Self-Compensating, Rolling Diaphragm Technology, TPU Bellow
Optimum corrosion protection
Finishing and processing centres, Clean room areas, Pharmaceutical industry, Medical technology

SC190 to SC925

Page 28

Self-Compensating, Soft-Contact
Long stroke and soft impact
Linear slides, Pneumatic cylinders, Handling modules, Machines and plants

SC²25 to SC²190

Page 30

Self-Compensating, Piston Tube Technology
Piston tube design for maximum energy absorption
Linear slides, Pneumatic cylinders, Swivel units, Handling modules

SC²300 to SC²650

Page 32

Self-Compensating, Piston Tube Technology
Piston tube design for maximum energy absorption
Turntables, Swivel units, Robot arms, Linear slides

MA30 to MA900

Page 34

Adjustable
Stepless adjustment
Linear slides, Pneumatic cylinders, Swivel units, Handling modules

Issue 07.2017 – Specifications subject to change

MC5 to MC75

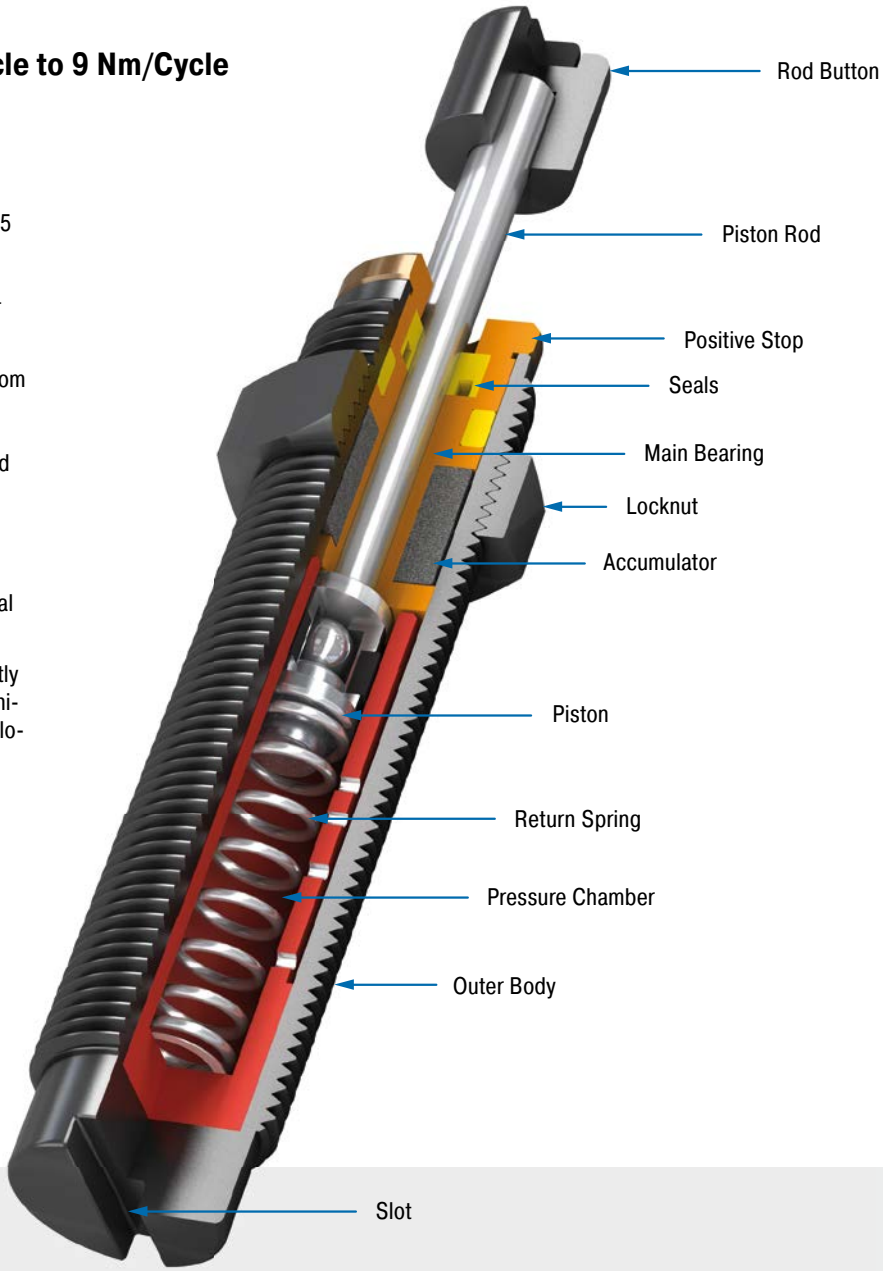
Shock absorbers in miniature format

Self-Compensating
Energy capacity 0.68 Nm/Cycle to 9 Nm/Cycle
Stroke 4 mm to 10 mm

Ideal for compact, efficient designs: The MC5 to MC75 series impresses users with their reduced dimensions and their very short overall lengths and low resetting forces after braking.

The outer body of each damper, produced from one solid piece, are filled with temperature stable oil, offer a continuous thread incl. a supplied lock nut and also have an integrated positive stop. These hydraulic machine elements from ACE, are ready for immediate installation and are maintenance-free. A comprehensive range of energy absorption with a wide range of effective weight potential are further benefits in these minature units.

These miniature shock absorbers are perfectly suited to use in applications such as mechanical engineering, medical and electro-technology and robotics.



Technical Data

Energy capacity: 0.68 Nm/Cycle to 9 Nm/Cycle

Impact velocity range: 0.15 m/s to 4 m/s

Operating temperature range: -10 °C to +66 °C

Mounting: In any position

Positive stop: Integrated

Material: Outer body, Accessories: Steel corrosion-resistant coating; Piston rod: hardened stainless steel; Rod end button: Steel, MC25 and MC75: Elastomer Insert; Locknut: Steel, MC5 and MC9: Aluminium

Damping medium: Oil, temperature stable

Application field: Miniature slides, Pneumatic cylinders, Handling modules, Copiers, Measuring tables, Machines and plants, Locking systems

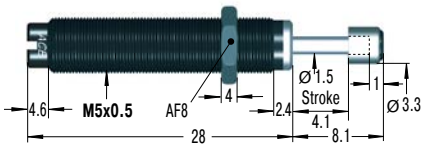
Note: If precise end position datum is required consider use of the stop collar type AH.

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

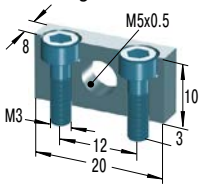
On request: Increased corrosion protection. Special finishes. Models without rod end button also available on request.

Issue 07.2017 – Specifications subject to change

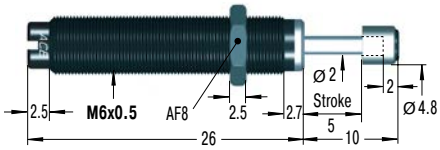
MC5EUM



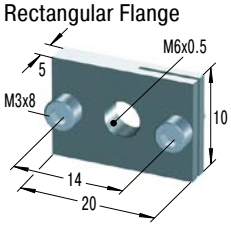
MB5SC2
Mounting Block



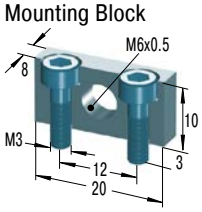
MC9EUM



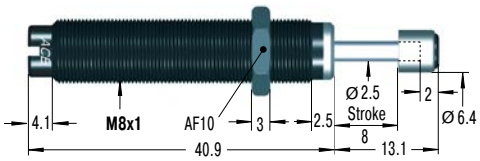
RF6
Rectangular Flange



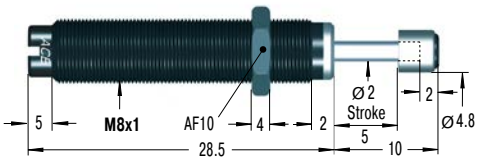
MB6SC2
Mounting Block



MC30EUM for use on new installations

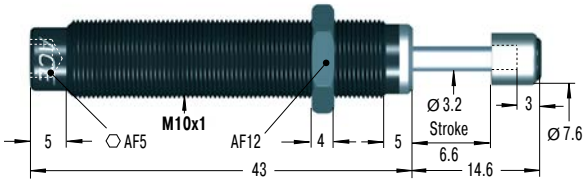


MC10EUM still available in future

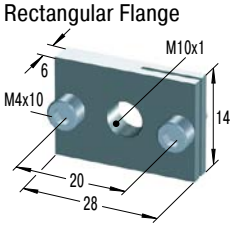


M8x0.75 also available to order

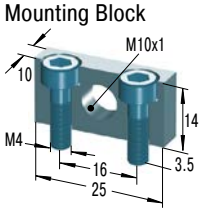
MC25EUM



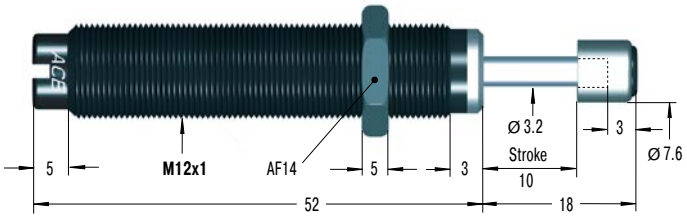
RF10
Rectangular Flange



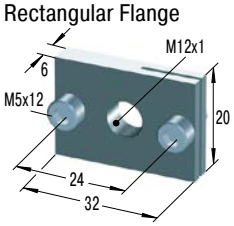
MB10SC2
Mounting Block



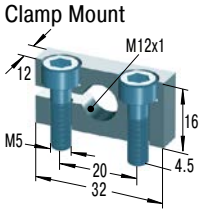
MC75EUM



RF12
Rectangular Flange



MB12
Clamp Mount



Additional accessories, mounting, installation ... see from page 36.

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight me min. kg	Effective Weight me max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	Weight kg
MC5EUM-1-B	0.68	2,040	0.5	4.4	1	5	0.2	2	0.003
MC5EUM-2-B	0.68	2,040	3.8	10.8	1	5	0.2	2	0.003
MC5EUM-3-B	0.68	2,040	9.7	18.7	1	5	0.2	2	0.003
MC9EUM-1-B	1	2,000	0.6	3.2	2	4	0.3	2	0.004
MC9EUM-2-B	1	2,000	0.8	4.1	2	4	0.3	2	0.004
MC10EUML-B	1.25	4,000	0.3	2.7	2	4	0.6	3	0.007
MC10EUMH-B	1.25	4,000	0.7	5	2	4	0.6	3	0.007
MC25EUML	2.8	22,600	0.7	2.2	3	6	0.3	2	0.020
MC25EUM	2.8	22,600	1.8	5.4	3	6	0.3	2	0.020
MC25EUMH	2.8	22,600	4.6	13.6	3	6	0.3	2	0.020
MC30EUM-1	3.5	5,600	0.4	1.9	2	6	0.3	2	0.010
MC30EUM-2	3.5	5,600	1.8	5.4	2	6	0.3	2	0.010
MC30EUM-3	3.5	5,600	5	15	2	6	0.3	2	0.010
MC75EUM-1	9	28,200	0.3	1.1	4	9	0.3	2	0.035
MC75EUM-2	9	28,200	0.9	4.8	4	9	0.3	2	0.035
MC75EUM-3	9	28,200	2.7	36.2	4	9	0.3	2	0.035
MC75EUM-4	9	28,200	25	72	4	9	0.3	2	0.035

[1] For applications with higher side load angles consider using the side load adaptor (BV) pages 38 to 45.

Issue 07.2017 – Specifications subject to change

MC150 to MC600

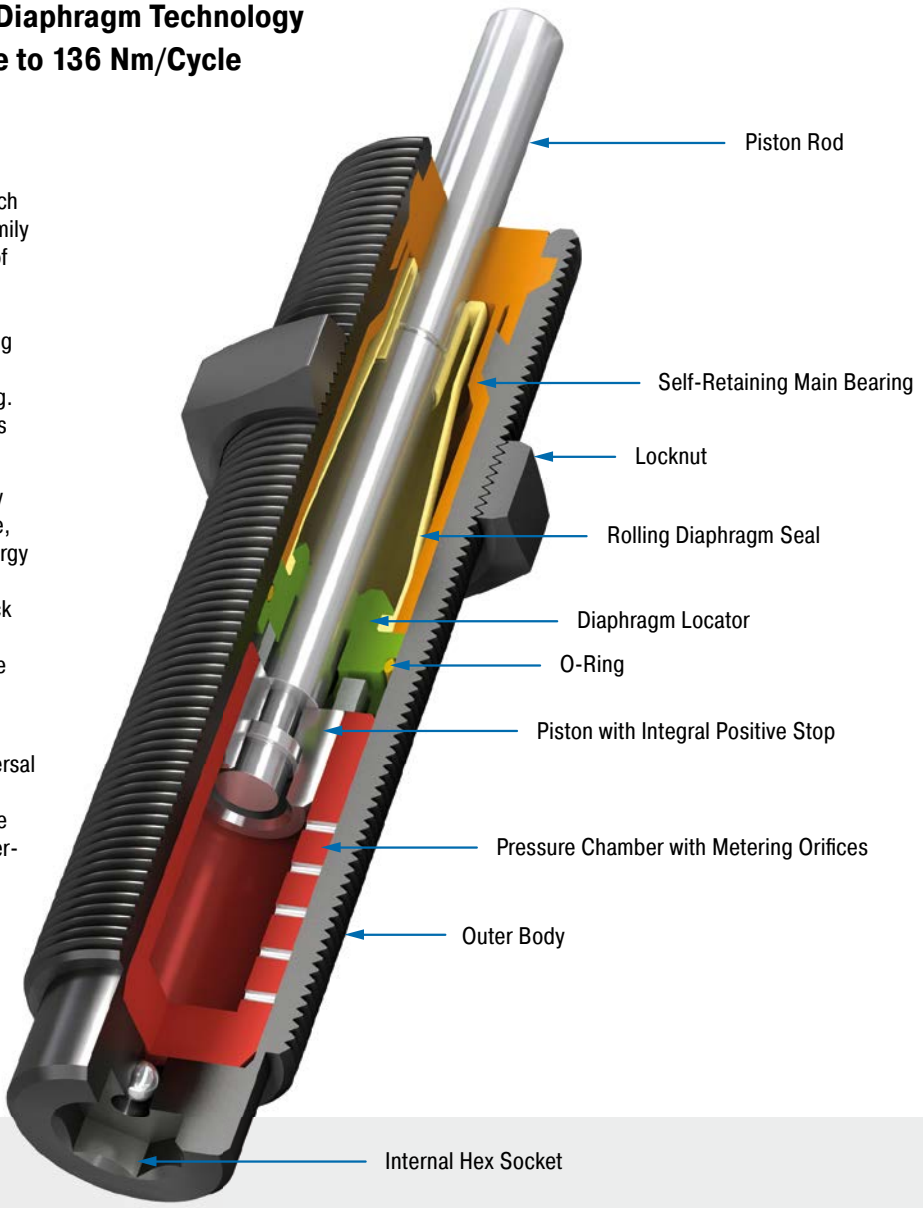
Exceptionaly high endurance and with the lowest resetting force

Self-Compensating, Rolling Diaphragm Technology
Energy capacity 20 Nm/Cycle to 136 Nm/Cycle
Stroke 12 mm bis 25 mm

Tried-and-tested and durable: Due to a hermetically sealed rolling diaphragm in each absorber, the MC150 to MC600 product family is suitable for an exceptional high lifetime of use with up to 25 million cycles. The rolling diaphragm technology perfected by ACE ensures complete separation of the damping fluid from the surrounding air. This makes direct installation in a pressure chamber e.g. as end stop damping in pneumatic cylinders up to approx. 7 bar possible.

The rolling diaphragm also benefits the very low return forces of these maintenance-free, ready-to-install absorbers. Progressive energy capacities, with a wide range of effective weight potential make these miniature shock absorbers, complete with an integrated positive stop a winner. Furthermore, the use of a side load adapter allows impact angles of up to 25°.

Miniature shock absorbers capable of universal mounting even inside a cylinder and also available in stainless steel options. They are often used in mechanical and plant engineering, and a multitude of other applications.



Technical Data

Energy capacity: 20 Nm/Cycle to 136 Nm/Cycle

Impact velocity range: 0.06 m/s to 6 m/s. Other speeds on request.

Operating temperature range: 0 °C to 66 °C

Mounting: in any position

Positive stop: Integrated

Material: Outer body, Accessories: steel corrosion-resistant coating; Main bearing: plastic; Piston rod: hardened stainless steel (1.4125, AISI 440C); Rolling diaphragm: EPDM

Damping medium: oil, temperature stable

Application field: linear slides, pneumatic cylinders, swivel units, handling modules, machines and plants, finishing and processing centres, measuring tables, tool machines, locking systems

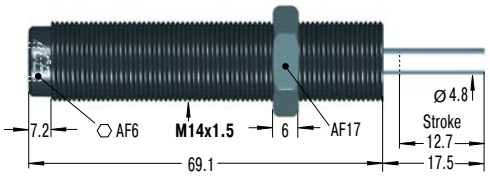
Note: If precise end position datum is required consider use of the stop collar type AH.

Safety instructions: External materials in the surrounding area can attack the rolling seal and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Suitable for use in pressure chambers up to 7 bar.

On request: Increased corrosion protection. Special threads or other special options.

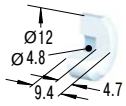
Issue 07.2017 – Specifications subject to change

MC150EUM



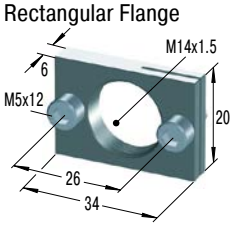
M14x1 also available to special order

PP150
Nylon Button

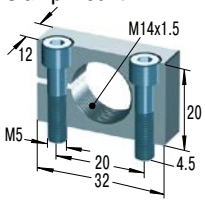


W_3 max = 14 Nm

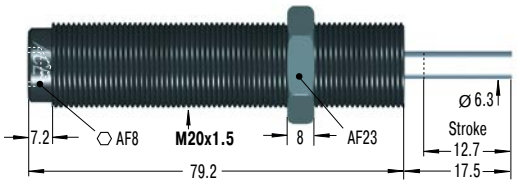
RF14
Rectangular Flange



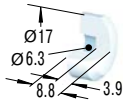
MB14
Clamp Mount



MC225EUM

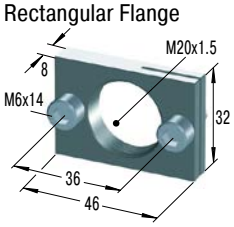


PP225
Nylon Button

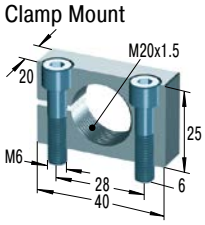


W_3 max = 33 Nm

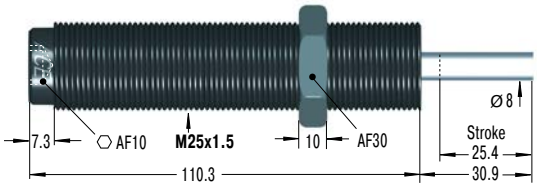
RF20
Rectangular Flange



MB20
Clamp Mount

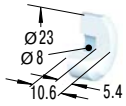


MC600EUM



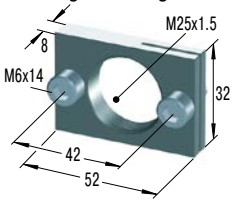
M27x3 also available to special order

PP600
Nylon Button

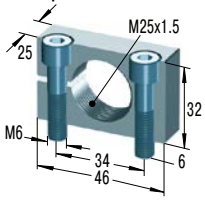


W_3 max = 68 Nm

RF25
Rectangular Flange



MB25
Clamp Mount



Additional accessories, mounting, installation ... see from page 36.

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight me min. kg	Effective Weight me max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	Weight kg
MC150EUM	20	34,000	0.9	10	3	8	0.4	4	0.06
MC150EUMH	20	34,000	8.6	86	3	8	0.4	4	0.06
MC150EUMH2	20	34,000	70.0	200	3	8	0.4	4	0.06
MC150EUMH3	20	34,000	181.0	408	3	8	1.0	4	0.06
MC225EUM	41	45,000	2.3	25	4	9	0.3	4	0.13
MC225EUMH	41	45,000	23.0	230	4	9	0.3	4	0.13
MC225EUMH2	41	45,000	180.0	910	4	9	0.3	4	0.13
MC225EUMH3	41	45,000	816.0	1,814	4	9	0.3	4	0.13
MC600EUM	136	68,000	9.0	136	5	10	0.6	2	0.31
MC600EUMH	136	68,000	113.0	1,130	5	10	0.6	2	0.31
MC600EUMH2	136	68,000	400.0	2,300	5	10	0.6	2	0.31
MC600EUMH3	136	68,000	2,177.0	4,536	5	10	0.6	2	0.31

[1] For applications with higher side load angles consider using the side load adaptor (BV) pages 38 to 45.

MC150-V4A to MC600-V4A

Exceptionally high endurance with stainless steel corrosion protection

Self-Compensating, Stainless Steel, Rolling Diaphragm Technology

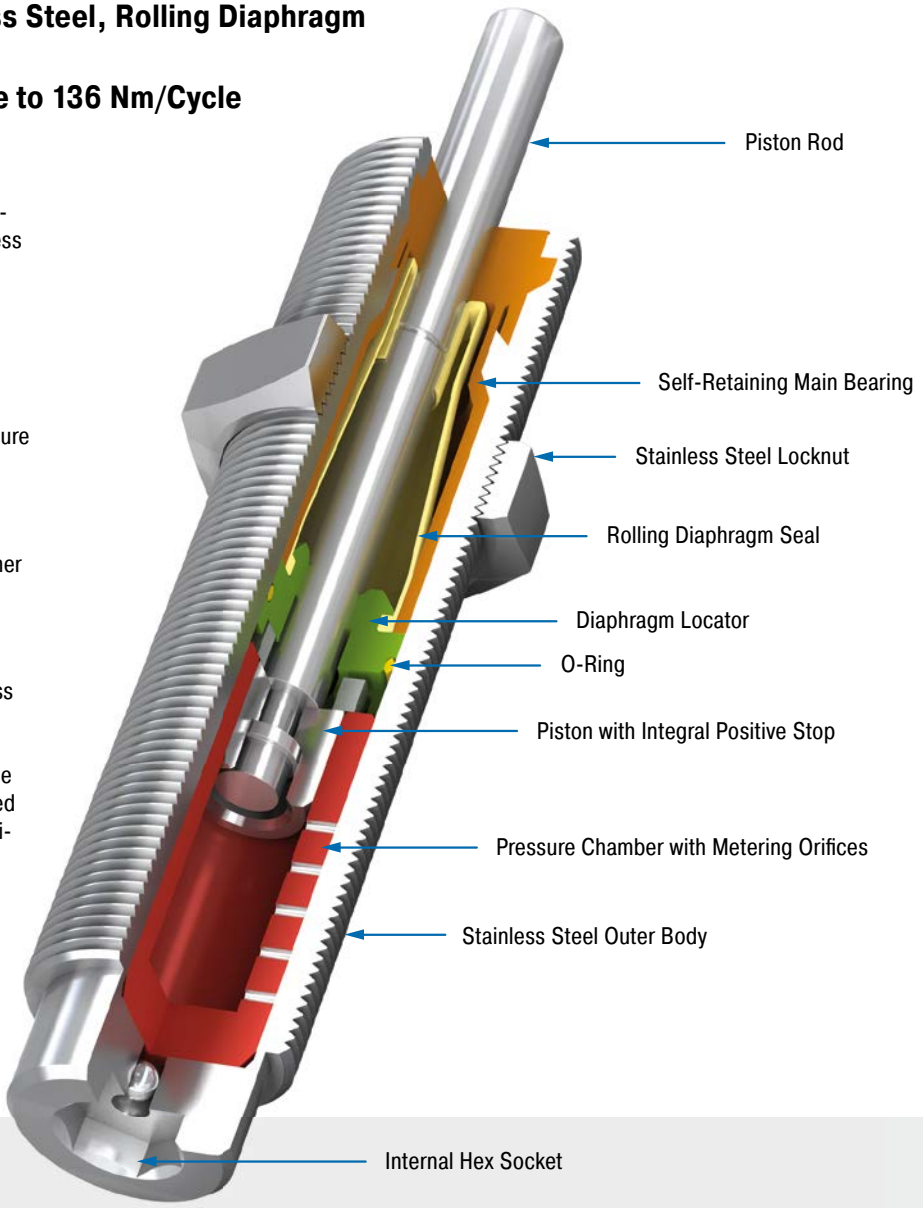
Energy capacity 20 Nm/Cycle to 136 Nm/Cycle

Stroke 12 mm to 25 mm

Brilliant in every respect: These high performance miniature shock absorbers in stainless steel are based on the MC150 to MC600 product family and its proven damping technology. This means that these special absorbers offer all of the benefits of the MC standard units such as the proven ACE rolling diaphragm technology for maximum service life and direct installation in a pressure chamber with up to approx. 7 bar.

Thanks to perfectly progressive maximum energy absorption and effective weight potential, their use is augmented even further by the outer body and a complete range of accessories made of stainless steel (material 1.4404).

Miniature shock absorbers made of stainless steel are mainly used in medical and electro-technology, but also in shipbuilding, packaging and chemicals industry and in the food processing. For the latter, they are filled with a special oil in order to fulfil the authorisation conditions (NSF-H1) for this market.



Technical Data

Energy capacity: 20 Nm/Cycle to 136 Nm/Cycle

Impact velocity range: 0.06 m/s to 6 m/s. Other speeds on request.

Operating temperature range: 0 °C to 66 °C

Mounting: In any position

Positive stop: Integrated

Material: Outer body, Locknut, Accessories: Stainless steel (1.4404, AISI 316L); Main bearing: Plastic; Piston rod: Hardened stainless steel (1.4125, AISI 440C); Rolling diaphragm: EPDM

Damping medium: Oil, temperature stable

Application field: Clean room areas, Pharmaceutical industry, Medical technology, Food industry, Linear slides, Pneumatic cylinders, Handling modules, Machines and plants, Finishing and processing centres

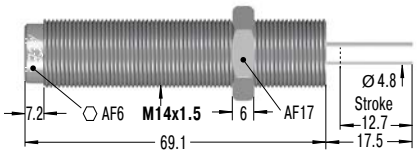
Note: If precise end position datum is required consider use of the stop collar type AH.

Safety instructions: External materials in the surrounding area can attack the rolling seal and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Suitable for use in pressure chambers up to 7 bar.

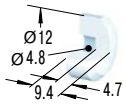
On request: Special oil with food approval. Special threads or other special options available on request.

Issue 07.2017 – Specifications subject to change

MC150EUM-V4A

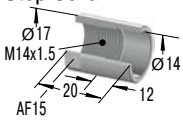


PP150
Nylon Button

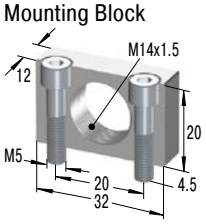


W_3 max = 14 Nm

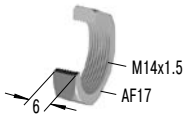
AH14-V4A
Stop Collar



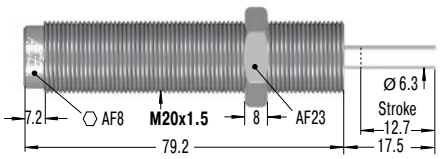
MB14SC2-V4A
Mounting Block



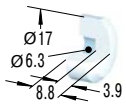
KM14-V4A
Locknut



MC225EUM-V4A

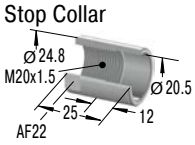


PP225
Nylon Button

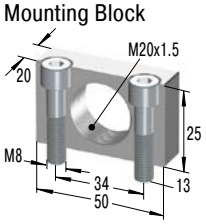


W_3 max = 33 Nm

AH20-V4A
Stop Collar

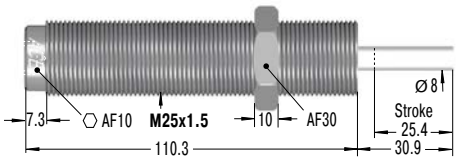


MB20SC2-V4A
Mounting Block

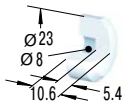


KM20-V4A
Locknut

MC600EUM-V4A

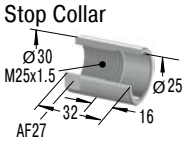


PP600
Nylon Button

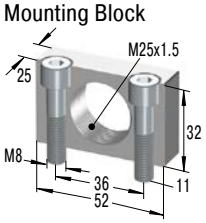


W_3 max = 68 Nm

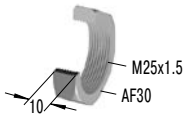
AH25-V4A
Stop Collar



MB25SC2-V4A
Mounting Block



KM25-V4A
Locknut



Additional accessories, mounting, installation ... see from page 36.

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight me min. kg	Effective Weight me max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	Weight kg
MC150EUM-V4A	20	34,000	0.9	10	3	5	0.4	4	0.06
MC150EUMH-V4A	20	34,000	8.6	86	3	5	0.4	4	0.06
MC150EUMH2-V4A	20	34,000	70.0	200	3	5	0.4	4	0.06
MC150EUMH3-V4A	20	34,000	181.0	408	3	5	1.0	4	0.06
MC225EUM-V4A	41	45,000	2.3	25	4	6	0.3	4	0.13
MC225EUMH-V4A	41	45,000	23.0	230	4	6	0.3	4	0.13
MC225EUMH2-V4A	41	45,000	180.0	910	4	6	0.3	4	0.13
MC225EUMH3-V4A	41	45,000	816.0	1,814	4	6	0.3	4	0.13
MC600EUM-V4A	136	68,000	9.0	136	5	9	0.6	2	0.31
MC600EUMH-V4A	136	68,000	113.0	1,130	5	9	0.6	2	0.31
MC600EUMH2-V4A	136	68,000	400.0	2,300	5	9	0.6	2	0.31
MC600EUMH3-V4A	136	68,000	2,177.0	4,536	5	9	0.6	2	0.31

[1] For applications with higher side load angles please contact ACE.

Issue 07.2017 – Specifications subject to change

PMCN150 to PMCN600

Reliable protection against fluids

Self-Compensating, Rolling Diaphragm Technology, TPU Bellow

Energy capacity 20 Nm/Cycle to 136 Nm/Cycle

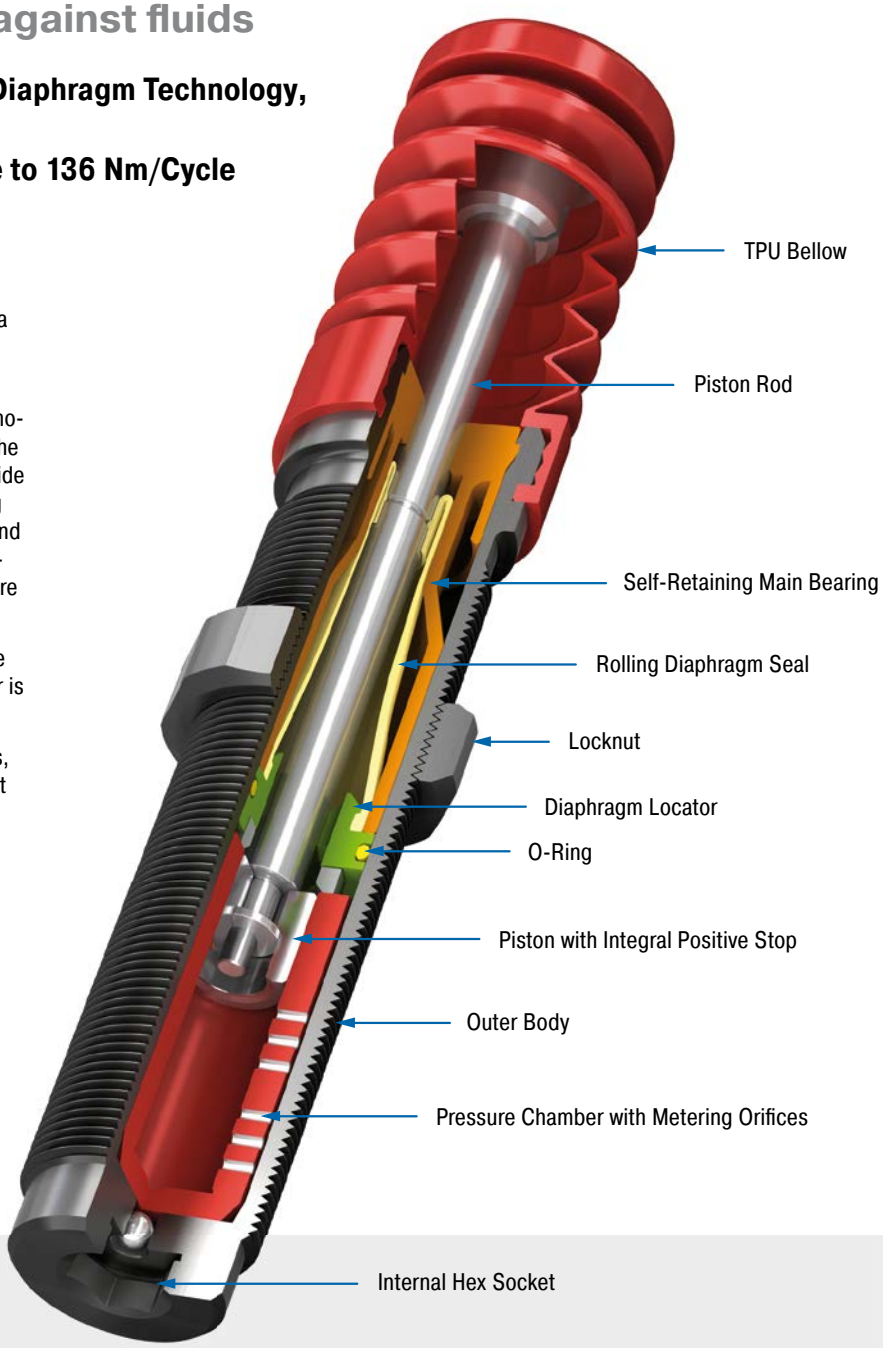
Stroke 12 mm to 25 mm

Hermetically sealed: The shock absorbers from the ACE Protection series PMCN have a compact, perfectly sealed cap as a special feature.

This protection bellows, made of TPU (thermo-plastic polyurethane), safely encapsulates the proven ACE rolling diaphragm from the outside environment. Aggressive cutting, lubricating and cleaning agents don‘t stand a chance and the function of the maintenance-free, ready-to-install shock absorber is retained. They are also available in full stainless steel.

The PMCN series is a good alternative to the SP type air bleed collar if no compressed air is available on the machine or system.

Reliable protection against aggressive fluids, these miniature shock absorbers are the first choice everywhere where conventional dampers wear out too quickly, eg. As in machining centers or other applications of mechanical engineering.



Technical Data

Energy capacity: 20 Nm/Cycle to 136 Nm/Cycle

Impact velocity range: 0.06 m/s to 6 m/s. Other speeds on request.

Operating temperature range: 0 °C to 66 °C

Mounting: In any position

Positive stop: Integrated

Material: Outer body: Steel corrosion-resistant coating; Main bearing: Plastic; Piston rod: Hardened stainless steel (1.4125, AISI 440C); Bellow: TPU, steel insert: Stainless steel (1.4404/1.4571, AISI 316L/316Ti); Rolling diaphragm: EPDM

Damping medium: Oil, temperature stable

Application field: Finishing and processing centres, Clean room areas, Pharmaceutical industry, Medical technology, Food industry, Linear slides, Pneumatic cylinders, Machines and plants

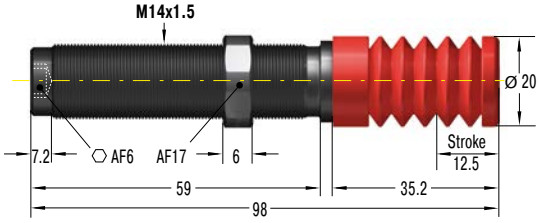
Note: Final preliminary test must be done on the application.

Safety instructions: Do not paint the shock absorbers due to heat emission.

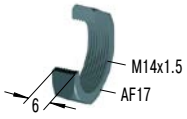
On request: Special accessories available on request.

Issue 07.2017 – Specifications subject to change

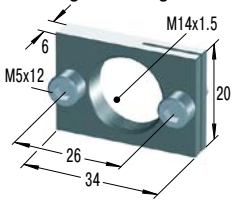
PMCN150EUM



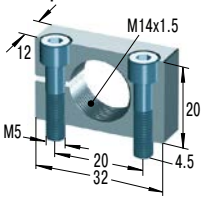
KM14
Locknut



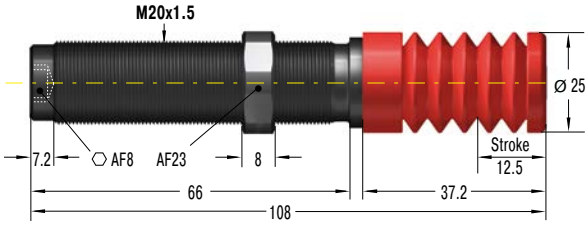
RF14
Rectangular Flange



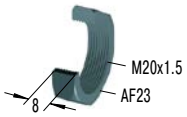
MB14
Clamp Mount



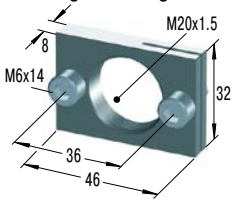
PMCN225EUM



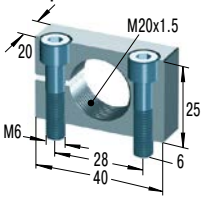
KM20
Locknut



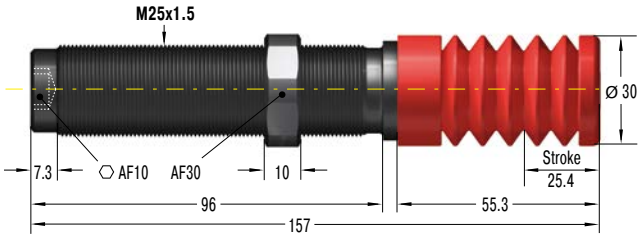
RF20
Rectangular Flange



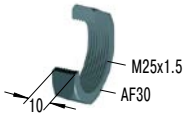
MB20
Clamp Mount



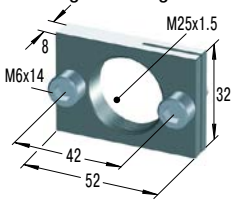
PMCN600EUM



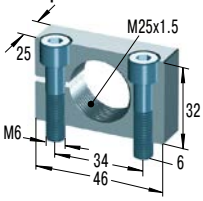
KM25
Locknut



RF25
Rectangular Flange



MB25
Clamp Mount



Additional accessories, mounting, installation ... see from page 36.

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight me min. kg	Effective Weight me max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
PMCN150EUM	20	34,000	0.9	10	8	80	0.4	4	0.07
PMCN150EUMH	20	34,000	8.6	86	8	80	0.4	4	0.07
PMCN150EUMH2	20	34,000	70.0	200	8	80	0.4	4	0.07
PMCN150EUMH3	20	34,000	181.0	408	8	80	1.0	4	0.07
PMCN225EUM	41	45,000	2.3	25	8	85	0.3	4	0.17
PMCN225EUMH	41	45,000	23	230	8	85	0.3	4	0.17
PMCN225EUMH2	41	45,000	180.0	910	8	85	0.3	4	0.17
PMCN225EUMH3	41	45,000	816.0	1,814	8	85	0.3	4	0.17
PMCN600EUM	136	68,000	9.0	136	8	90	0.6	2	0.32
PMCN600EUMH	136	68,000	113.0	1,130	8	90	0.6	2	0.32
PMCN600EUMH2	136	68,000	400	2,300	8	90	0.6	2	0.32
PMCN600EUMH3	136	68,000	2,177.0	4,536	8	90	0.6	2	0.32

PMCN150-V4A to PMCN600-V4A

Optimum corrosion protection

Self-Compensating, Rolling Diaphragm Technology, TPU Bellow

Energy capacity 20 Nm/Cycle to 136 Nm/Cycle

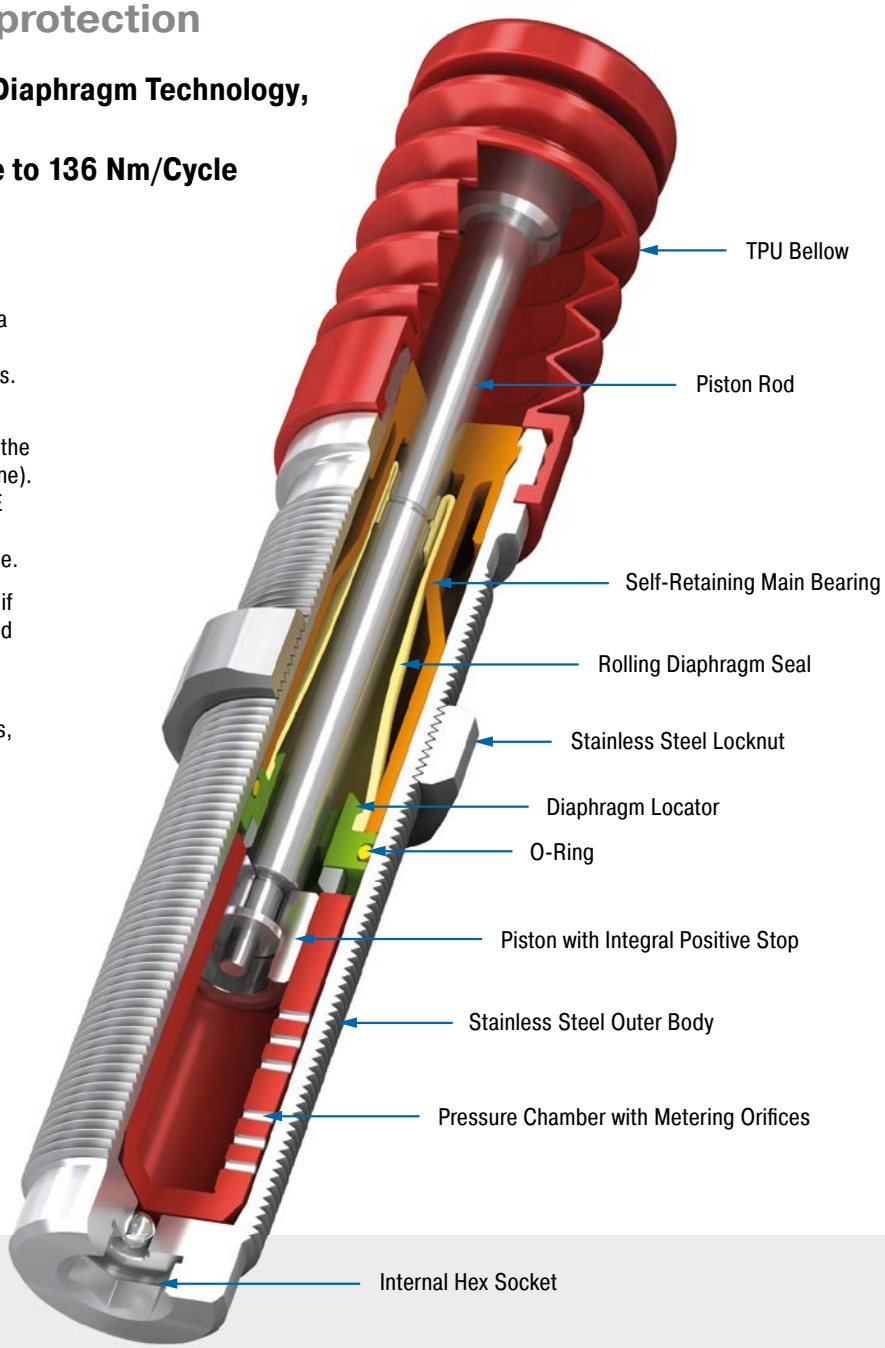
Stroke 12 mm to 25 mm

Hermetically sealed and rustproof: The Protection series PMCN is also available in a stainless steel design. This is or particular interest to the food and packaging industries.

Their main special feature is the compact, totally sealed bellow between the body and the cap made of TPU (thermoplastic polyurethane). This protection safely encapsulates the ACE rolling diaphragm from the outside environment. Aggressive fluids don't stand a chance.

The PMCN series is an excellent alternative if the accessory option of the SP type air bleed collar cannot be used due to a lack of compressed air.

The PMCN series miniature shock absorbers, produced from stainless steel, are primarily suitable for use in the food industry, but are also wherever an elegant look is important e.g. in shipbuilding.



Technical Data

Energy capacity: 20 Nm/Cycle to 136 Nm/Cycle

Impact velocity range: 0.06 m/s to 6 m/s. Other speeds on request.

Operating temperature range: 0 °C to 66 °C

Mounting: In any position

Positive stop: Integrated

Material: Outer body: Stainless steel (1.4404, AISI 316L); Main bearing: Plastic; Piston rod: Hardened stainless steel (1.4125, AISI 440C); Bellow: TPU, steel insert: Stainless steel (1.4404/1.4571, AISI 316L/316Ti); Rolling diaphragm: EPDM

Damping medium: Oil, temperature stable

Application field: Finishing and processing centres, Clean room areas, Pharmaceutical industry, Medical technology, Food industry, Machines and plants

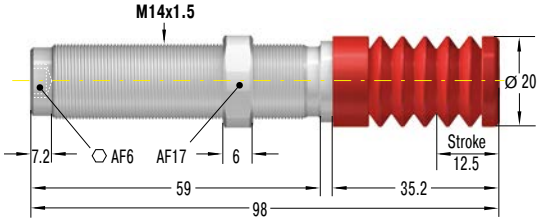
Note: Final preliminary test must be done on the application.

Safety instructions: Do not paint the shock absorbers due to heat emission.

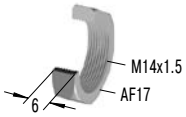
On request: Special accessories available on request.

Issue 07.2017 – Specifications subject to change

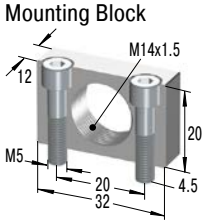
PMCN150EUM-V4A



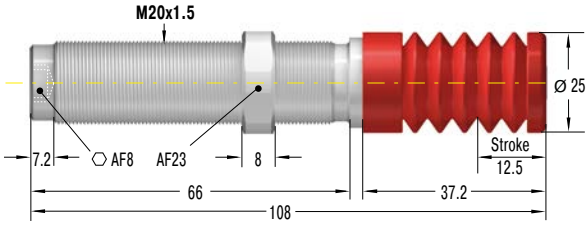
KM14-V4A
Locknut



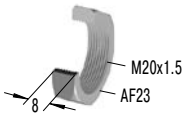
MB14SC2-V4A
Mounting Block



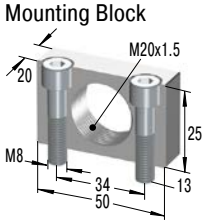
PMCN225EUM-V4A



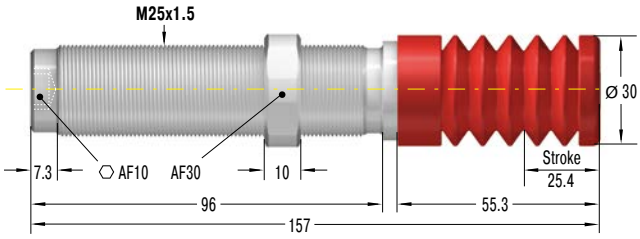
KM20-V4A
Locknut



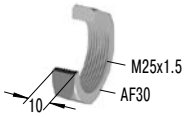
MB20SC2-V4A
Mounting Block



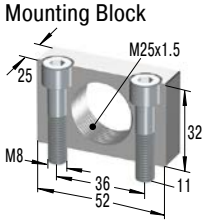
PMCN600EUM-V4A



KM25-V4A
Locknut



MB25SC2-V4A
Mounting Block



Additional accessories, mounting, installation ... see from page 36.

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight me min. kg	Effective Weight me max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
PMCN150EUM-V4A	20	34,000	0.9	10	8	80	0.4	4	0.07
PMCN150EUMH-V4A	20	34,000	8.6	86	8	80	0.4	4	0.07
PMCN150EUMH2-V4A	20	34,000	70.0	200	8	80	0.4	4	0.07
PMCN150EUMH3-V4A	20	34,000	181.0	408	8	80	1.0	4	0.07
PMCN225EUM-V4A	41	45,000	2.3	25	8	85	0.3	4	0.17
PMCN225EUMH-V4A	41	45,000	23.0	230	8	85	0.3	4	0.17
PMCN225EUMH2-V4A	41	45,000	180.0	910	8	85	0.3	4	0.17
PMCN225EUMH3-V4A	41	45,000	816.0	1,814	8	85	0.3	4	0.17
PMCN600EUM-V4A	136	68,000	9.0	136	8	90	0.6	2	0.32
PMCN600EUMH-V4A	136	68,000	113.0	1,130	8	90	0.6	2	0.32
PMCN600EUMH2-V4A	136	68,000	400.0	2,300	8	90	0.6	2	0.32
PMCN600EUMH3-V4A	136	68,000	2,177.0	4,536	8	90	0.6	2	0.32

Issue 07.2017 – Specifications subject to change

SC190 to SC925

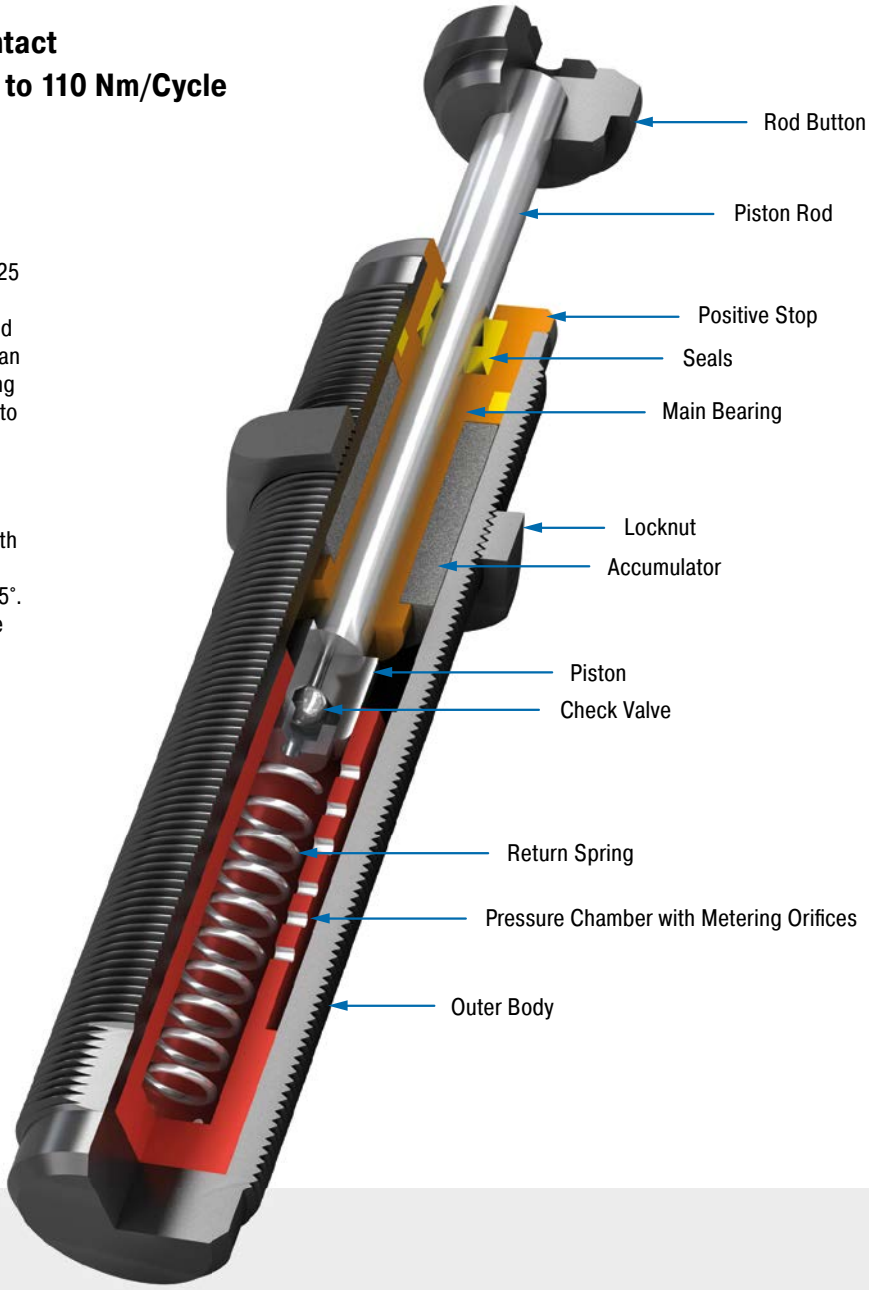
Long stroke and soft impact

Self-Compensating, Soft-Contact
Energy capacity 25 Nm/Cycle to 110 Nm/Cycle
Stroke 16 mm to 40 mm

Ideal for soft damping: The SC found in the model code from the ACE series SC190 to 925 stands for ‚soft contact'. These miniature shock absorbers manufactured from one solid piece are designed in such a way that they can be setup with a linear or a progressive braking curve. The soft damping character is thanks to the special, long strokes producing smooth deceleration and low reaction forces.

These maintenance-free, ready-to-install hydraulic machine elements are equipped with an integrated positive stop. The use of side load adapter allows impact angles of up to 25°. Thanks to the designed overlapping effective weight ranges, these dampers cover an effective load range of below 1 kg to more than 2,000 kg!

The miniature shock absorbers from the SC190 to 925 series are used in mechanical engineering and primarily in the areas of handling and automation.



Technical Data

Energy capacity: 25 Nm/Cycle to 110 Nm/Cycle

Impact velocity range: 0.15 m/s to 3.66 m/s. Other speeds on request.

Operating temperature range: 0 °C to 66 °C

Mounting: in any position

Positive stop: Integrated

Material: Outer body, Accessories: steel corrosion-resistant coating; Piston rod: hardened stainless steel

Damping medium: oil, temperature stable

Application field: linear slides, pneumatic cylinders, handling modules, machines and plants, finishing and processing centres, measuring tables, tool machines

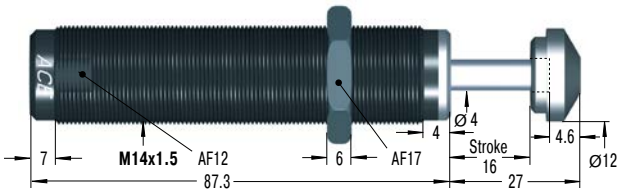
Note: If precise end position datum is required consider use of the stop collar type AH.

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

On request: Nickel-plated or weartec finish (seawater resistant) or other special finishes available to special order. Models without rod end button.

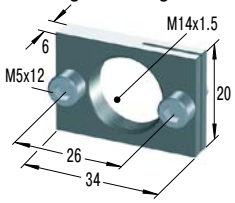
Issue 07.2017 – Specifications subject to change

SC190EUM; 0 to 4

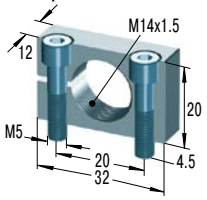


M14x1 and M16x1 also available to special order

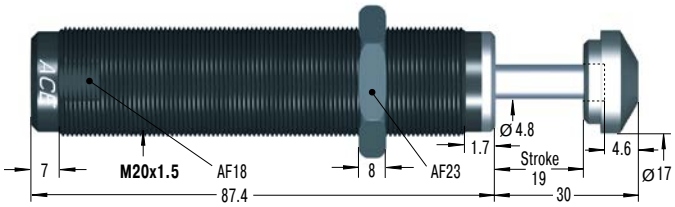
RF14
Rectangular Flange



MB14
Clamp Mount

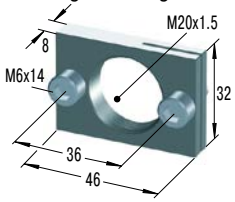


SC300EUM; 0 to 4

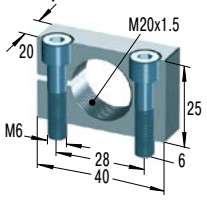


M22x1.5 also available to special order

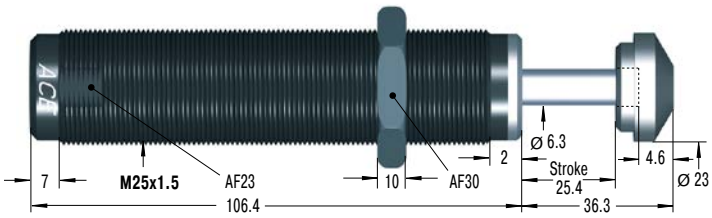
RF20
Rectangular Flange



MB20
Clamp Mount

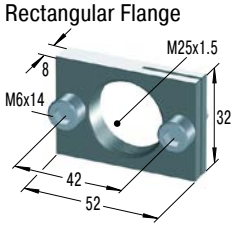


SC650EUM; 0 to 4

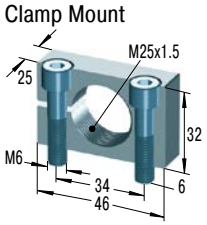


M26x1.5 also available to special order

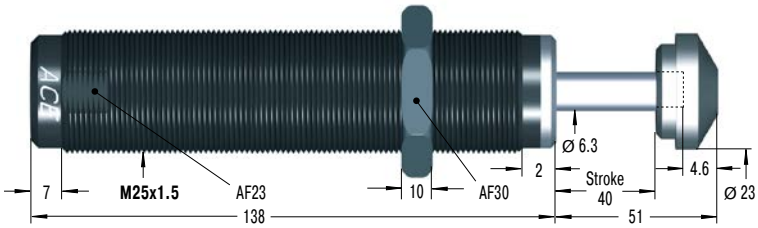
RF25
Rectangular Flange



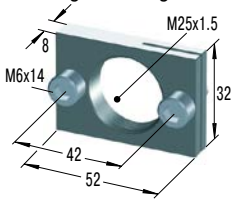
MB25
Clamp Mount



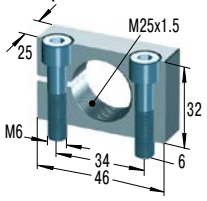
SC925EUM; 0 to 4



RF25
Rectangular Flange



MB25
Clamp Mount



Additional accessories, mounting, installation ... see from page 36.

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight Soft-Contact me min. kg	Soft-Contact me max. kg	Self-Compensating me min. kg	Self-Compensating me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	Weight kg
SC190EUM-0	25	34,000	-	-	0.7	4	-0	4	9	0.25	5	0.08
SC190EUM-1	25	34,000	2.3	6	1.4	7	-1	4	9	0.25	5	0.08
SC190EUM-2	25	34,000	5.5	16	3.6	18	-2	4	9	0.25	5	0.08
SC190EUM-3	25	34,000	14	41	9.0	45	-3	4	9	0.25	5	0.08
SC190EUM-4	25	34,000	34	91	23.0	102	-4	4	9	0.25	5	0.08
SC300EUM-0	33	45,000	-	-	0.7	4	-0	5	10	0.10	5	0.18
SC300EUM-1	33	45,000	2.3	7	1.4	8	-1	5	10	0.10	5	0.18
SC300EUM-2	33	45,000	7	23	4.5	27	-2	5	10	0.10	5	0.18
SC300EUM-3	33	45,000	23	68	14.0	82	-3	5	10	0.10	5	0.18
SC300EUM-4	33	45,000	68	181	32.0	204	-4	5	10	0.10	5	0.18
SC650EUM-0	73	68,000	-	-	2.3	14	-0	11	32	0.20	5	0.34
SC650EUM-1	73	68,000	11	36	8.0	45	-1	11	32	0.20	5	0.34
SC650EUM-2	73	68,000	34	113	23.0	136	-2	11	32	0.20	5	0.34
SC650EUM-3	73	68,000	109	363	68.0	408	-3	11	32	0.20	5	0.34
SC650EUM-4	73	68,000	363	1,089	204.0	1,180	-4	11	32	0.20	5	0.34
SC925EUM-0	110	90,000	8	25	4.5	29	-0	11	32	0.40	5	0.42
SC925EUM-1	110	90,000	22	72	14.0	90	-1	11	32	0.40	5	0.42
SC925EUM-2	110	90,000	59	208	40.0	227	-2	11	32	0.40	5	0.42
SC925EUM-3	110	90,000	181	612	113.0	726	-3	11	32	0.40	5	0.42
SC925EUM-4	110	90,000	544	1,952	340.0	2,088	-4	11	32	0.40	5	0.42

[1] For applications with higher side load angles consider using the side load adaptor (BV) pages 38 to 45.

SC²25 to SC²190

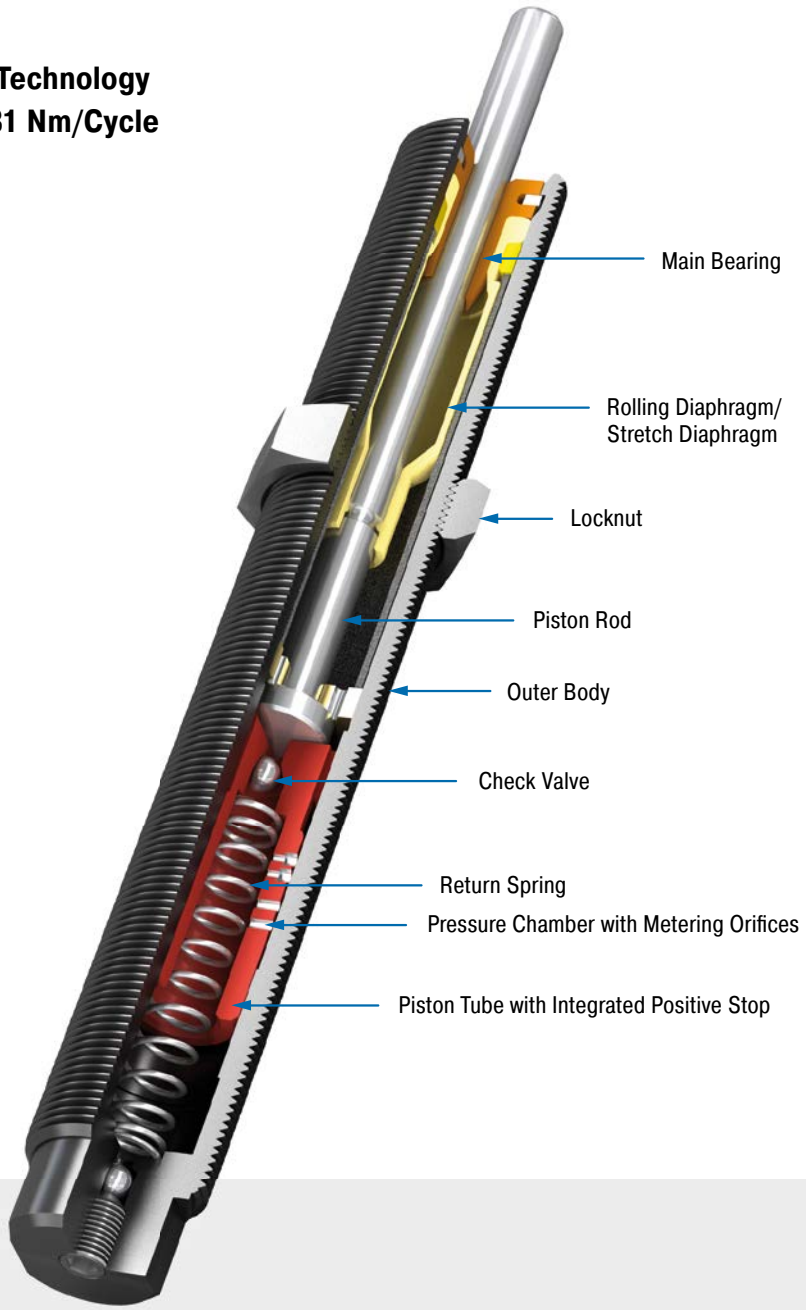
Piston tube design for maximum energy absorption

Self-Compensating, Piston Tube Technology
Energy capacity 10 Nm/Cycle to 31 Nm/Cycle
Stroke 8 mm to 12 mm

Soft damping, but enormous capacity: The range of ‚soft contact' absorbers SC²25 to 190 extends from thread size M10 to M14 and covers effective weight ranges of 1 kg to 1,550 kg. All models are characterised by high energy absorption and they also unite the piston tube technology with the diaphragm seal perfected by ACE. This enables direct installation as end position damping in pneumatic cylinders at 5 to 7 bar or applications where deceleration needs to take placed close to the pivot point.

They are maintenance-free, have an integrated positive stop and are mountable in any position. The option of a side load adapter allows impact angles of up to 25°.

Thanks to their robust design and their durability, these miniature shock absorbers can be used for a wide range of applications. Designers mainly use them for pick and place systems, pneumatic rotary modules and in automation applications.



Technical Data

Energy capacity: 10 Nm/Cycle to 31 Nm/Cycle

Impact velocity range: 0.1 m/s to 5.7 m/s. Other speeds on request.

Operating temperature range: 0 °C to 66 °C

Mounting: In any position

Positive stop: Integrated

Material: Outer body, Accessories: Steel corrosion-resistant coating; Piston rod: hardened stainless steel; Rolling diaphragm: SC²190: EPDM; Stretch diaphragm: SC²25 and SC²75: Nitrile

Damping medium: Oil, temperature stable

Application field: Linear slides, Pneumatic cylinders, Swivel units, Handling modules, Machines and plants, Finishing and processing centres, Measuring tables, Tool machines, Locking systems

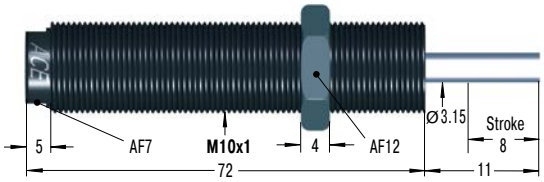
Note: If precise end position datum is required consider use of the stop collar type AH.

Safety instructions: External materials in the surrounding area can attack the rolling and stretch seals and lead to a shorter service life. Please contact ACE for appropriate solution suggestions.

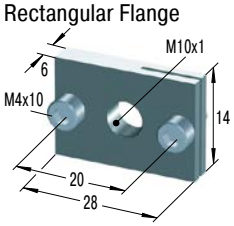
On request: Increased corrosion protection. Special finishes.

Issue 07.2017 – Specifications subject to change

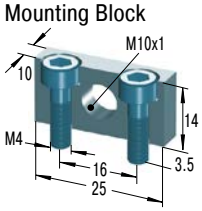
SC25EUM; 5 to 7



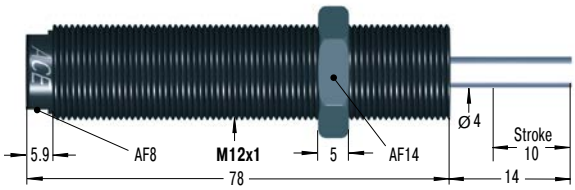
RF10
Rectangular Flange



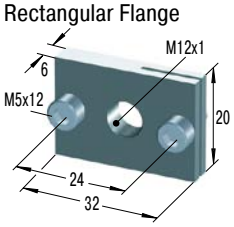
MB10SC2
Mounting Block



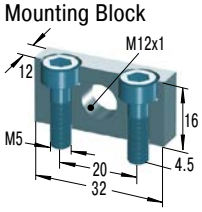
SC75EUM; 5 to 7



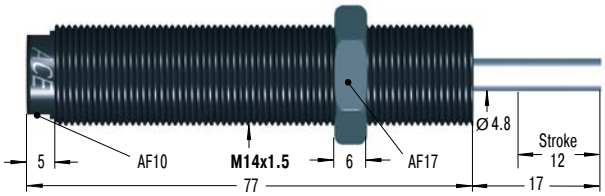
RF12
Rectangular Flange



MB12SC2
Mounting Block

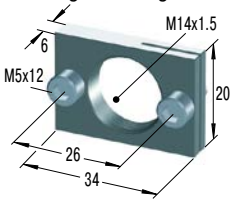


SC190EUM; 5 to 7

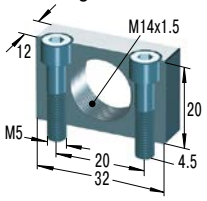


M14x1 also available to special order

RF14
Rectangular Flange



MB14SC2
Mounting Block



Additional accessories, mounting, installation ... see from page 36.

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight me min. kg	Effective Weight me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	Weight kg
SC25EUM-5	10	16,000	1	5	-5	4.5	14	0.3	2	0.029
SC25EUM-6	10	16,000	4	44	-6	4.5	14	0.3	2	0.029
SC25EUM-7	10	16,000	42	500	-7	4.5	14	0.3	2	0.029
SC75EUM-5	16	30,000	1	8	-5	6.0	19	0.3	2	0.047
SC75EUM-6	16	30,000	7	78	-6	6.0	19	0.3	2	0.047
SC75EUM-7	16	30,000	75	800	-7	6.0	19	0.3	2	0.047
SC190EUM-5	31	50,000	2	16	-5	6.0	19	0.4	2	0.055
SC190EUM-6	31	50,000	13	140	-6	6.0	19	0.4	2	0.055
SC190EUM-7	31	50,000	136	1,550	-7	6.0	19	0.4	2	0.055

[1] For applications with higher side load angles consider using the side load adaptor (BV) pages 38 to 45.

Issue 07.2017 – Specifications subject to change

SC²300 to SC²650

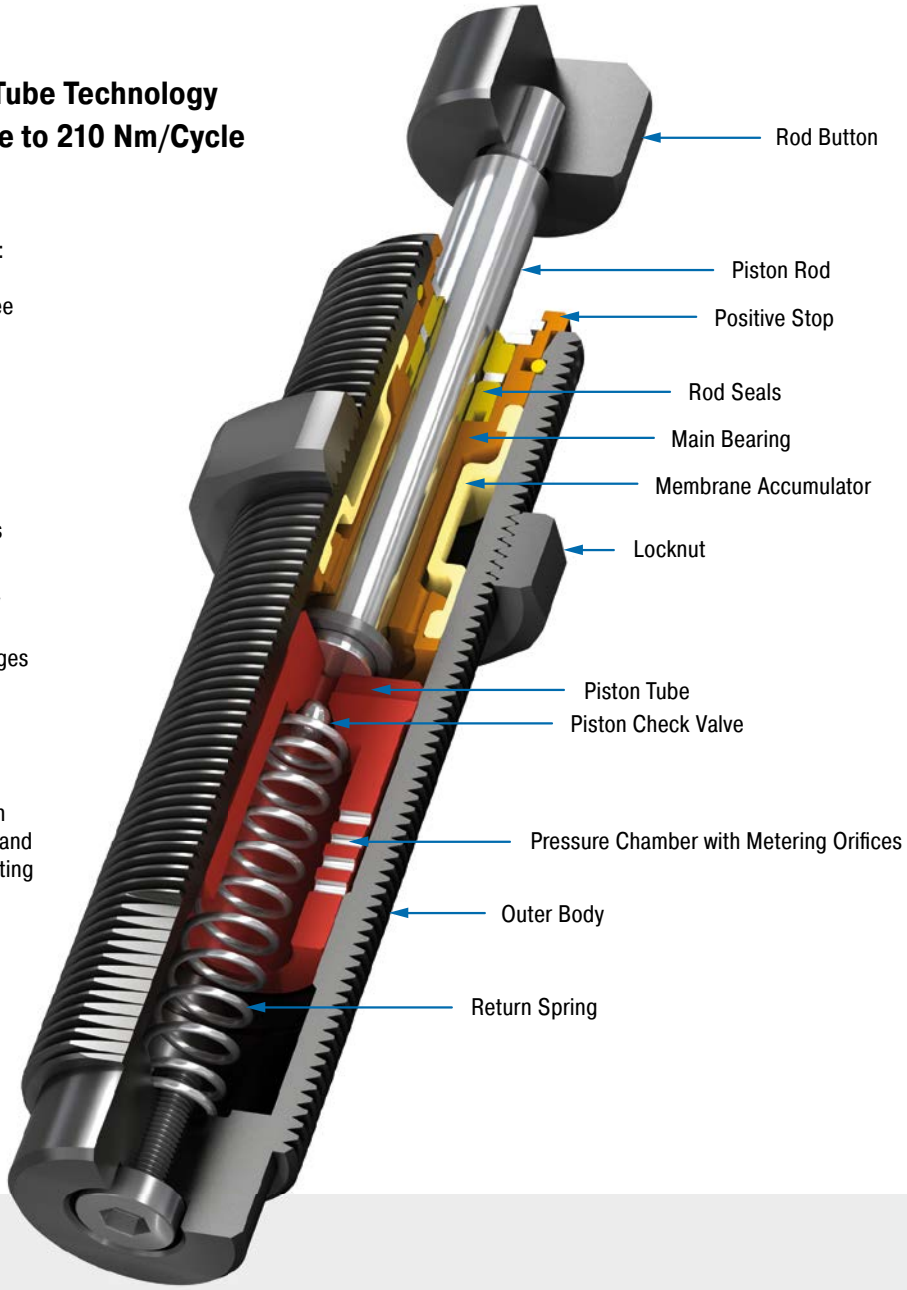
Piston tube design for maximum energy absorption

Self-Compensating, Piston Tube Technology
Energy capacity 73 Nm/Cycle to 210 Nm/Cycle
Stroke 15 mm to 23 mm

Added safety with accumulator technology: The larger ‚soft contact' models from the SC²300 to 650 are available with up to three times the energy absorption compaired to similar sizes of standard shock absorbers SC190 to 925, due to the ACE piston tube speciality. Furthermore, the membrane accumulator serves as a compensation element for the oil displaced in the shock absorber and replaces the standard use of absorber materials. This increases process safety even further.

The absorbers, which are perfect for rotary modules for example, are available in progressively stepped effective weight ranges with an integrated positive stop. They are maintenance-free and ready for direct installation. The side load adapter option allows impact angles of up to 25°.

These miniature shock absorbers offer high performance levels with a long service life and are particularly popular for handling, mounting very close to pivots and automation tasks.



Technical Data

Energy capacity: 73 Nm/Cycle to 210 Nm/Cycle

Impact velocity range: 0.09 m/s to 3.66 m/s. Other speeds on request.

Operating temperature range: 0 °C to 66 °C

Mounting: in any position

Positive stop: Integrated

Material: Outer body: steel corrosion-resistant coating; Piston rod: hardened stainless steel; Accessories: hardened steel and corrosion-resistant coating

Damping medium: oil, temperature stable

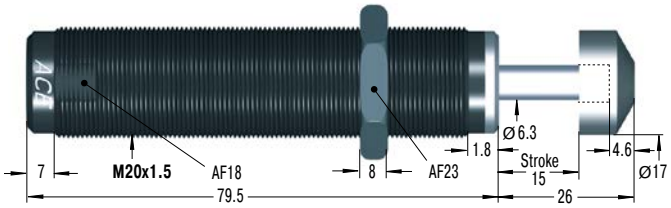
Application field: turntables, swivel units, robot arms, linear slides, pneumatic cylinders, handling modules, machines and plants, finishing and processing centres, tool machines

Note: If precise end position datum is required consider use of the stop collar type AH.

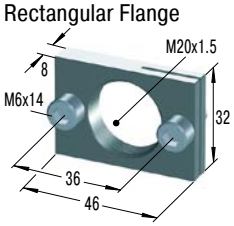
On request: Increased corrosion protection. Special finishes.

Issue 07.2017 – Specifications subject to change

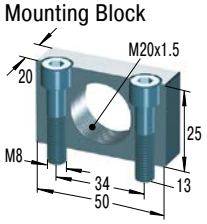
SC300EUM; 5 to 9



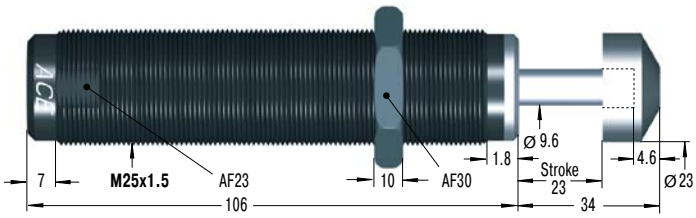
RF20
Rectangular Flange



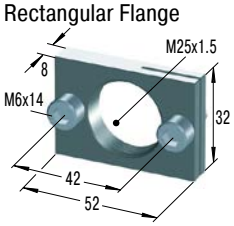
MB20SC2
Mounting Block



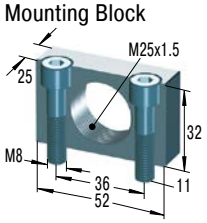
SC650EUM; 5 to 9



RF25
Rectangular Flange



MB25SC2
Mounting Block



Additional accessories, mounting, installation ... see from page 36.

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	W_3 Nm/cycle	W_4 Nm/h	me min. kg	me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	Weight kg
SC300EUM-5	73	45,000	11	45	-5	8	18	0.2	5	0.150
SC300EUM-6	73	45,000	34	136	-6	8	18	0.2	5	0.150
SC300EUM-7	73	45,000	91	181	-7	8	18	0.2	5	0.150
SC300EUM-8	73	45,000	135	680	-8	8	18	0.2	5	0.150
SC300EUM-9	73	45,000	320	1,950	-9	8	18	0.2	5	0.150
SC650EUM-5	210	68,000	23	113	-5	11	33	0.3	5	0.310
SC650EUM-6	210	68,000	90	360	-6	11	33	0.3	5	0.310
SC650EUM-7	210	68,000	320	1,090	-7	11	33	0.3	5	0.310
SC650EUM-8	210	68,000	770	2,630	-8	11	33	0.3	5	0.310
SC650EUM-9	210	68,000	1,800	6,350	-9	11	33	0.3	5	0.310

[1] For applications with higher side load angles consider using the side load adaptor (BV) pages 38 to 45.

Issue 07.2017 – Specifications subject to change

MA30 to MA900

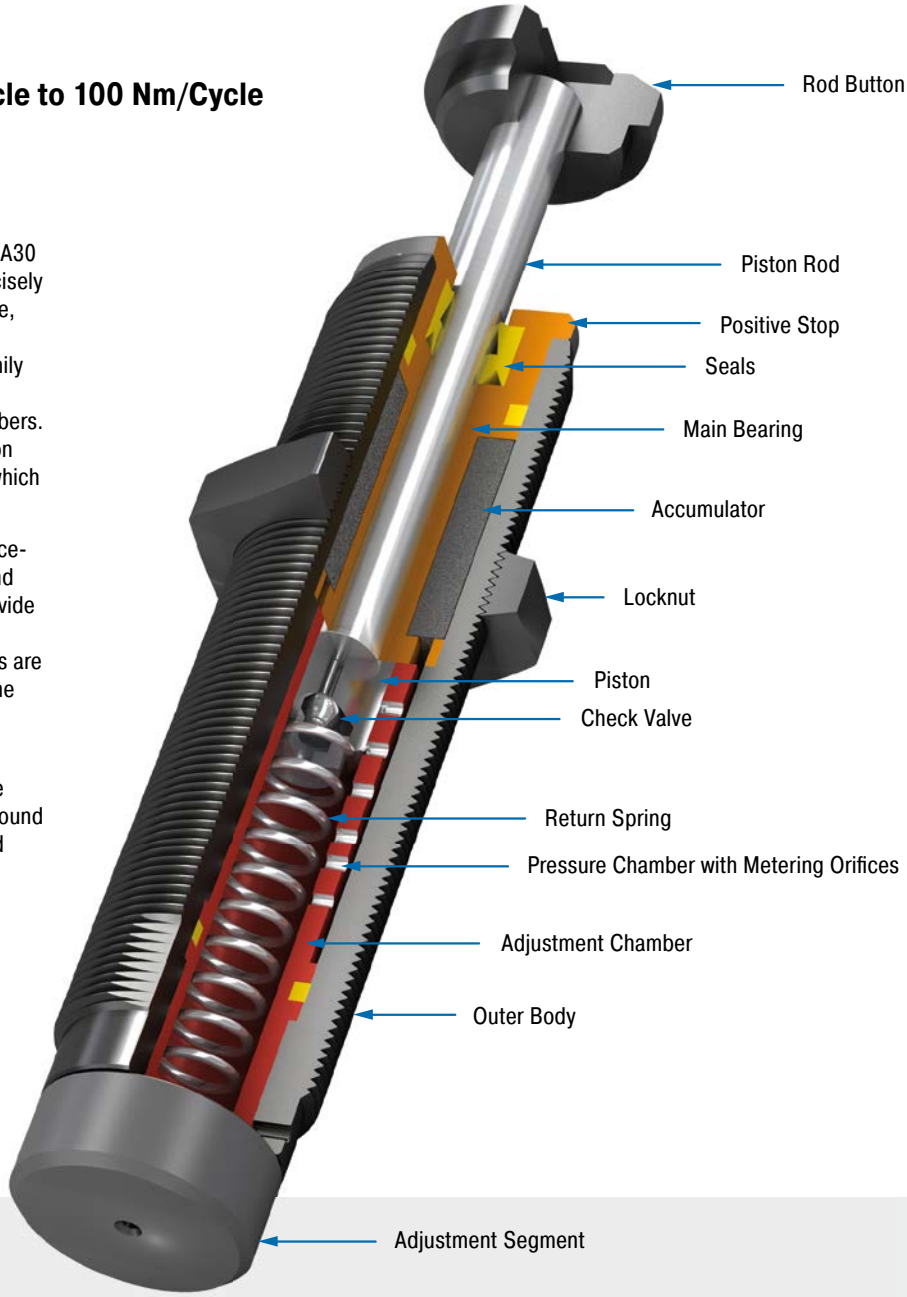
Stepless adjustment

Adjustable
Energy capacity 3.5 Nm/Cycle to 100 Nm/Cycle
Stroke 8 mm to 40 mm

The miniature shock absorbers from the MA30 to MA900 series can be adjusted and precisely adapted to your requirements. For example, the MA150 displays the rolling diaphragm technology from the MC150 to MC600 family and offers all of the advantages of this technology, such as use in pressure chambers. Thanks to long strokes (including 40 mm on the MA900) lower reaction forces result, which provide a soft damping characteristic.

All variations of these units are maintenance-free, ready-to-install machine elements and have an integrated positive stop. They provide the best service where application data changes, where the calculation parameters are not clear or where maximum flexibility in the possible usage is required.

The adjustable miniature shock absorbers from ACE can be used to meet precisely the customer's application and are therefore found everywhere in mechanical engineering and many other applications.



Technical Data

Energy capacity: 3.5 Nm/Cycle to 100 Nm/Cycle

Impact velocity range: 0.15 m/s to 4.5 m/s. Other speeds on request.

Operating temperature range: 0 °C to 66 °C

Mounting: in any position

Positive stop: Integrated

Adjustment: Hard impact at the start of stroke, adjust the ring towards 9 or PLUS. Hard impact at the end of stroke, adjust the ring towards 0 or MINUS.

Material: Outer body, Accessories: steel corrosion-resistant coating; Piston rod: hardened stainless steel

Damping medium: oil, temperature stable

Application field: linear slides, pneumatic cylinders, swivel units, handling modules, machines and plants, finishing and processing centres, automatic machinery, tool machines, locking systems

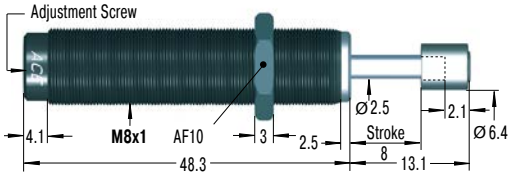
Note: If precise end position datum is required consider use of the stop collar type AH. Shock absorber is preset at delivery in a neutral position between hard and soft.

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

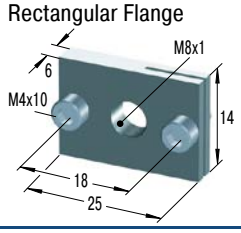
On request: Nickel-plated or other special options available to special order. Models without rod end button.

Issue 07.2017 – Specifications subject to change

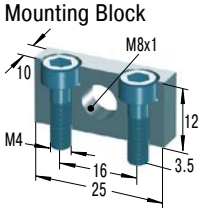
MA30EUM



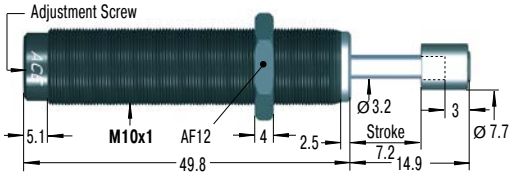
RF8
Rectangular Flange



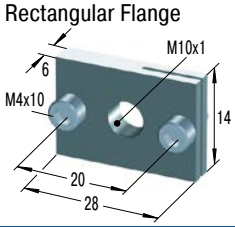
MB8SC2
Mounting Block



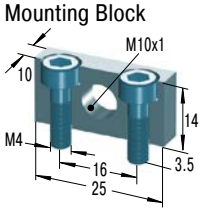
MA50EUM-B



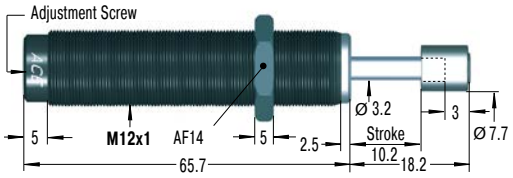
RF10
Rectangular Flange



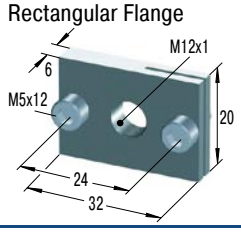
MB10SC2
Mounting Block



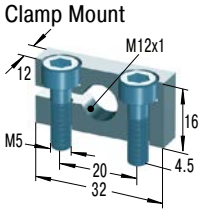
MA35EUM



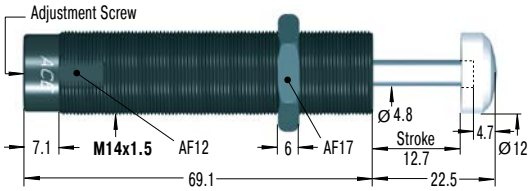
RF12
Rectangular Flange



MB12
Clamp Mount

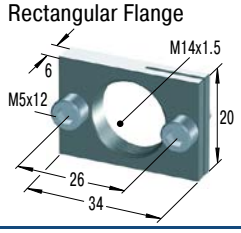


MA150EUM

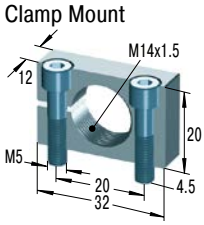


M14x1 also available to special order

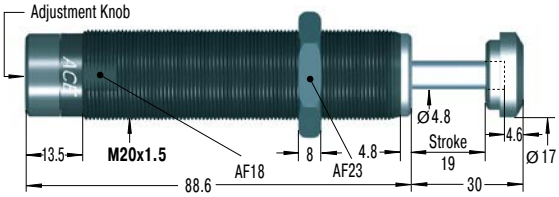
RF14
Rectangular Flange



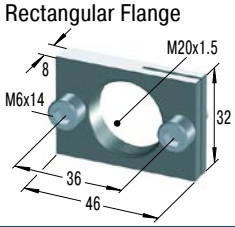
MB14
Clamp Mount



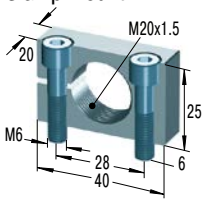
MA225EUM



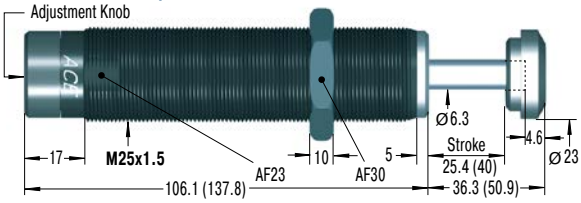
RF20
Rectangular Flange



MB20
Clamp Mount

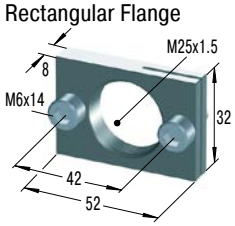


MA600EUM / MA900EUM

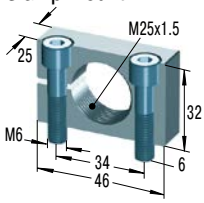


Dimensions for MA900EUM in ( ). MA600EUML with M27x3 available to special order

RF25
Rectangular Flange



MB25
Clamp Mount



Additional accessories, mounting, installation ... see from page 36.

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight me min. kg	Effective Weight me max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	Weight kg
MA30EUM	3.5	5,650	0.23	15	1.7	5.3	0.3	2.0	0.011
MA50EUM-B	5.5	13,550	4.50	20	3.0	6.0	0.3	2.0	0.025
MA35EUM	4.0	6,000	6.00	57	5.0	11.0	0.2	2.0	0.045
MA150EUM	22.0	35,000	1.00	109	3.0	5.0	0.4	2.0	0.061
MA225EUM	25.0	45,000	2.30	226	5.0	10.0	0.1	2.0	0.173
MA600EUM	68.0	68,000	9.00	1,360	10.0	30.0	0.2	2.0	0.352
MA900EUM	100.0	90,000	14.00	2,040	10.0	35.0	0.4	1.0	0.414

[1] For applications with higher side load angles consider using the side load adaptor (BV) pages 38 to 45.

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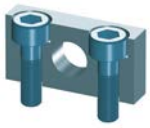
Minature Shock Absorber Accessories M5 to M25

Selection Chart

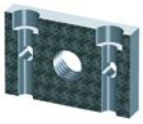

Locknut


Stop Collar


Clamp Mount


[1] Mounting Block


Rectangular Flange


Universal Mount

Shock Absorber Type	KM	AH	MB	MBSC2	RF	UM
Thread M5x0.5						
MC5EUM	KM5	AH5	–	MB5SC2	–	–
Thread M6x0.5						
MC9EUM	KM6	AH6	–	MB6SC2	RF6	–
Thread M8x1						
MA30EUM	KM8	AH8	–	MB8SC2	RF8	–
MC10EUM	KM8	AH8	–	MB8SC2	RF8	–
MC30EUM	KM8	AH8	–	MB8SC2	RF8	–
Thread M10x1						
MA50EUM-B	KM10	AH10	–	MB10SC2	RF10	UM10
MC25EUM	KM10	AH10	–	MB10SC2	RF10	UM10
SC25EUM; 5 to 7	KM10	AH10	–	MB10SC2	RF10	UM10
Thread M12x1						
MA35EUM	KM12	AH12	MB12	–	RF12	UM12
MC75EUM	KM12	AH12	MB12	–	RF12	UM12
SC75EUM; 5 to 7	KM12	AH12	–	MB12SC2	RF12	UM12
Thread M14x1.5						
MA150EUM	KM14	AH14	MB14	–	RF14	UM14
MC150EUM	KM14	AH14	MB14	–	RF14	UM14
MC150EUM-V4A	KM14-V4A	AH14-V4A	–	MB14SC2-V4A	–	–
PMCN150EUM	KM14	–	MB14	–	RF14	UM14
PMCN150EUM-V4A	KM14-V4A	–	–	MB14SC2-V4A	–	–
SC190EUM; 0 to 4	KM14	AH14	MB14	–	RF14	UM14
SC190EUM; 5 to 7	KM14	AH14	–	MB14SC2	RF14	UM14
Thread M20x1.5						
MA225EUM	KM20	AH20	MB20	–	RF20	UM20
MC225EUM	KM20	AH20	MB20	–	RF20	UM20
MC225EUM-V4A	KM20-V4A	AH20-V4A	–	MB20SC2-V4A	–	–
PMCN225EUM	KM20	–	MB20	–	RF20	UM20
PMCN225EUM-V4A	KM20-V4A	–	–	MB20SC2-V4A	–	–
SC300EUM; 0 to 4	KM20	AH20	MB20	–	RF20	UM20
SC300EUM; 5 to 9	KM20	AH20	–	MB20SC2	RF20	UM20
Thread M25x1.5						
MA600EUM	KM25	AH25	MB25	–	RF25	UM25
MA900EUM	KM25	AH25	MB25	–	RF25	UM25
MC600EUM	KM25	AH25	MB25	–	RF25	UM25
MC600EUM-V4A	KM25-V4A	AH25-V4A	–	MB25SC2-V4A	–	–
PMCN600EUM	KM25	–	MB25	–	RF25	UM25
PMCN600EUM-V4A	KM25-V4A	–	–	MB25SC2-V4A	–	–
SC650EUM; 0 to 4	KM25	AH25	MB25	–	RF25	UM25
SC650EUM; 5 to 9	KM25	AH25	–	MB25SC2	RF25	UM25
SC925EUM; 0 to 4	KM25	AH25	MB25	–	RF25	UM25

[1] Use a locknut for protection if a clamp mount MB...SC2 is installed.

[2] Only mountable on units without button.
Remove the button from the shock absorber, if there's one fitted!

Dimensions can be found on the corresponding accessories pages.

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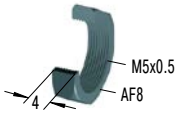
[2] Side Load Adaptor	[2] Steel Shroud	Air Bleed Collar	Switch Stop Collar	Steel Button	Steel/Urethane Button	Nylon Button	
BV	**PB**	**SP**	**AS**	**PS**	**BP**	**PP**	Page
Thread M5x0.5							
–	–	–	–	–	–	–	38
Thread M6x0.5							
–	–	–	–	–	–	–	38
Thread M8x1							
BV8	PB8	–	–	–	–	–	38
BV8A	PB8-A	–	–	–	–	–	38
BV8	PB8	–	–	–	–	–	38
Thread M10x1							
BV10	PB10	–	AS10	PS10	–	–	39
BV10	PB10	–	AS10	PS10	–	–	39
BV10SC	PB10SC	–	–	PS10SC	–	–	39
Thread M12x1							
BV12	PB12	–	AS12	PS12	–	–	39
BV12	PB12	–	AS12	PS12	–	–	39
BV12SC	PB12SC	SP12	AS12	PS12SC	–	–	39
Thread M14x1.5							
BV14	PB14	SP14	AS14	PS14	–	included	40
BV14	PB14	SP14	AS14	PS14	–	PP150	40
–	–	–	–	–	–	PP150	40
–	–	–	–	–	–	–	40
–	–	–	–	–	–	–	40
BV14SC	PB14SC	–	AS14	included	BP14	–	40
BV14	PB14	SP14	AS14	PS14	–	–	40
Thread M20x1.5							
BV20SC	PB20SC	–	AS20	included	BP20	–	41
BV20	PB20	SP20	AS20	PS20	–	PP225	41
–	–	–	–	–	–	PP225	41
–	–	–	–	–	–	–	41
–	–	–	–	–	–	–	41
BV20SC	PB20SC	–	AS20	included	BP20	–	41
BV20SC	PB20SC	–	AS20	included	–	–	41
Thread M25x1.5							
BV25SC	PB25SC	–	AS25	included	BP25	–	42
–	–	–	AS25	included	BP25	–	42
BV25	PB25	SP25	AS25	PS25	–	PP600	42
–	–	–	–	–	–	PP600	42
–	–	–	–	–	–	–	42
–	–	–	–	–	–	–	42
BV25SC	PB25SC	–	AS25	included	BP25	–	42
BV25SC	PB25	–	AS25	included	–	–	42
–	–	–	AS25	included	BP25	–	42

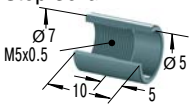
For selection chart, see pages 36 to 37

M5x0.5

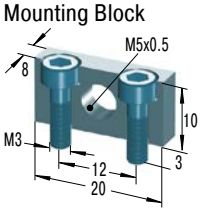
KM5
Locknut



AH5
Stop Collar

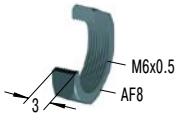


MB5SC2
Mounting Block

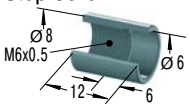


M6x0,5

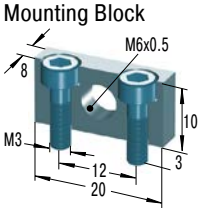
KM6
Locknut



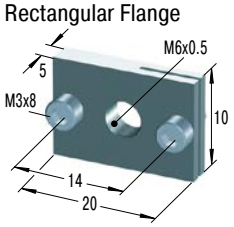
AH6
Stop Collar



MB6SC2
Mounting Block

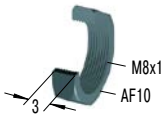


RF6
Rectangular Flange



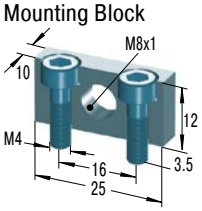
M8x1

KM8
Locknut

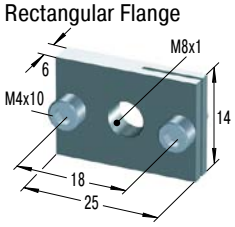


AH8
Stop Collar

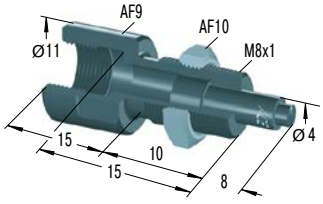
MB8SC2
Mounting Block



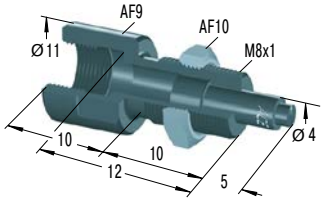
RF8
Rectangular Flange



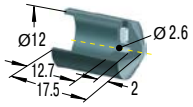
BV8
Side Load Adaptor



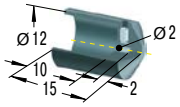
BV8A
Side Load Adaptor



PB8
Steel Shroud



PB8-A
Steel Shroud



For mounting, installation, ..., see pages 43 to 46.

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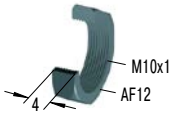
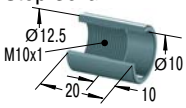
For selection chart, see pages 36 to 37

M10x1

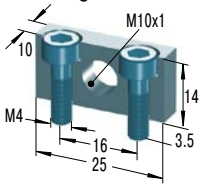
KM10
Locknut



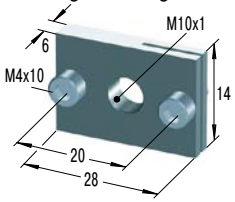
AH10
Stop Collar



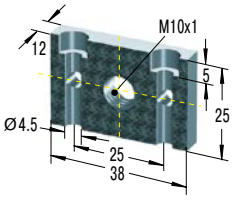
MB10SC2
Mounting Block



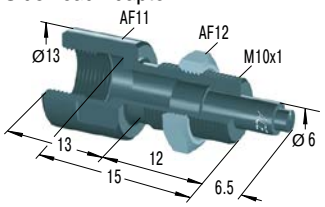
RF10
Rectangular Flange



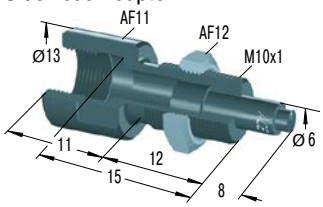
UM10
Universal Mount



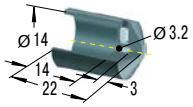
BV10
Side Load Adaptor



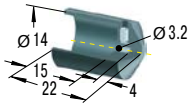
BV10SC
Side Load Adaptor



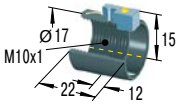
PB10
Steel Shroud



PB10SC
Steel Shroud

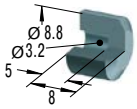


AS10
Switch Stop Collar

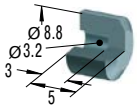


inc. Proximity Switch

PS10
Steel Button

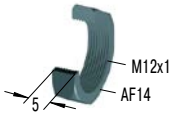


PS10SC
Steel Button

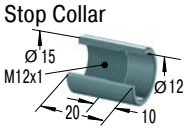


M12x1

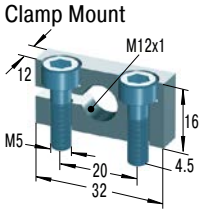
KM12
Locknut



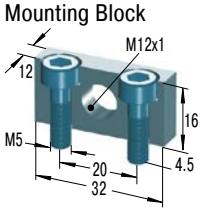
AH12
Stop Collar



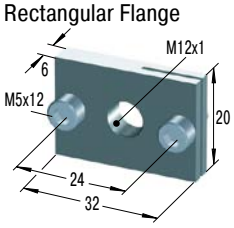
MB12
Clamp Mount



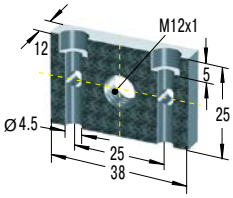
MB12SC2
Mounting Block



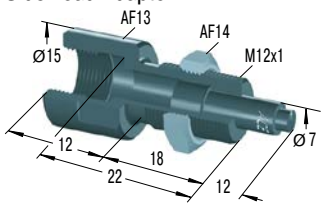
RF12
Rectangular Flange



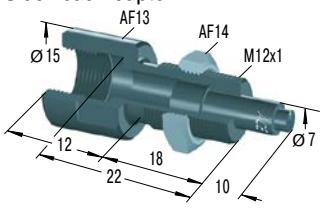
UM12
Universal Mount



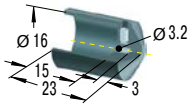
BV12
Side Load Adaptor



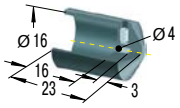
BV12SC
Side Load Adaptor



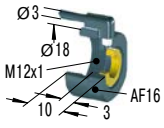
PB12
Steel Shroud



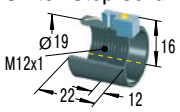
PB12SC
Steel Shroud



SP12
Air Bleed Collar

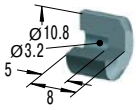


AS12
Switch Stop Collar

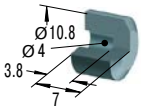


inc. Proximity Switch

PS12
Steel Button



PS12SC
Steel Button



For mounting, installation, ..., see pages 43 to 46.

Minature Shock Absorber Accessories M5 to M25

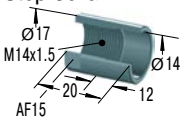
For selection chart, see pages 36 to 37

M14x1,5

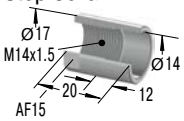
KM14
Locknut

KM14-V4A
Locknut

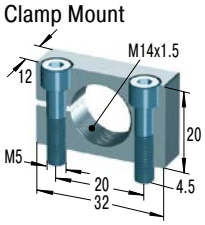
AH14
Stop Collar



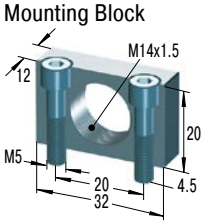
AH14-V4A
Stop Collar



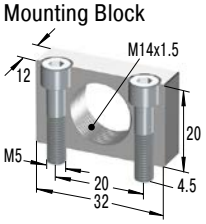
MB14
Clamp Mount



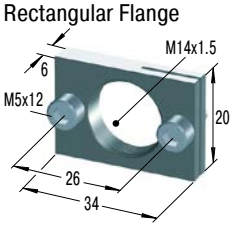
MB14SC2
Mounting Block



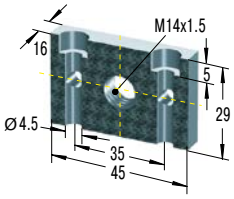
MB14SC2-V4A
Mounting Block



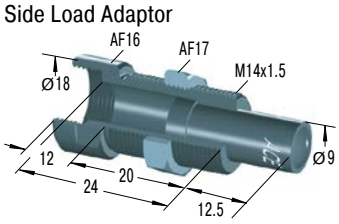
RF14
Rectangular Flange



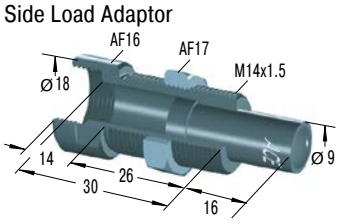
UM14
Universal Mount



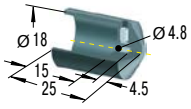
BV14
Side Load Adaptor



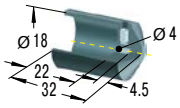
BV14SC
Side Load Adaptor



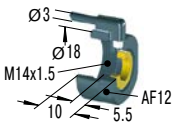
PB14
Steel Shroud



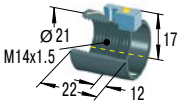
PB14SC
Steel Shroud



SP14
Air Bleed Collar

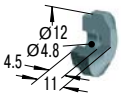


AS14
Switch Stop Collar



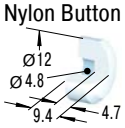
inc. Proximity Switch

PS14
Steel Button



BP14
Steel/Urethane Button

PP150
Nylon Button



W_3 max = 14 Nm

For mounting, installation, ..., see pages 43 to 46.

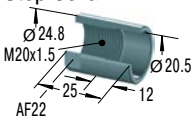
For selection chart, see pages 36 to 37

M20x1.5

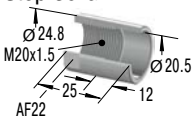
KM20
Locknut

KM20-V4A
Locknut

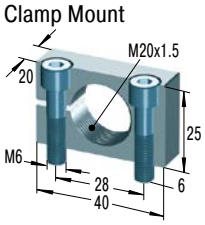
AH20
Stop Collar



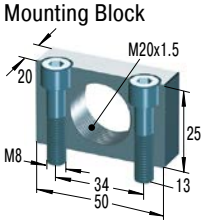
AH20-V4A
Stop Collar



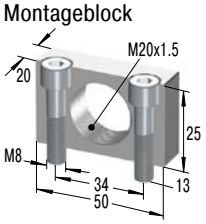
MB20
Clamp Mount



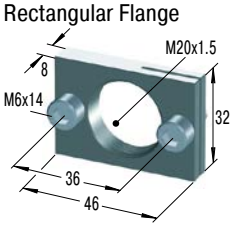
MB20SC2
Mounting Block



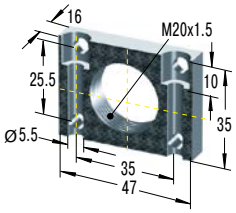
MB20SC2-V4A
Montageblock



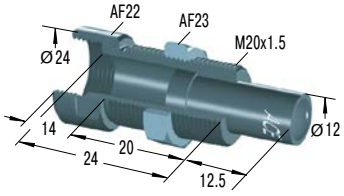
RF20
Rectangular Flange



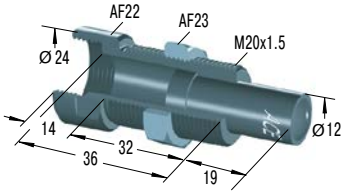
UM20
Universal Mount



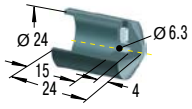
BV20
Side Load Adaptor



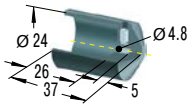
BV20SC
Side Load Adaptor



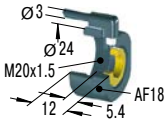
PB20
Steel Shroud



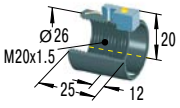
PB20SC
Steel Shroud



SP20
Air Bleed Collar

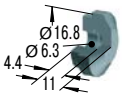


AS20
Switch Stop Collar



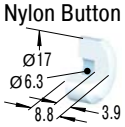
inc. Proximity Switch

PS20
Steel Button



BP20
Steel/Urethane Button

PP225
Nylon Button



W_3 max = 33 Nm

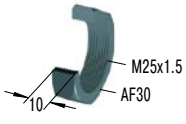
For mounting, installation, ..., see pages 43 to 46.

Minature Shock Absorber Accessories M5 to M25

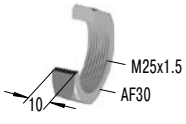
For selection chart, see pages 36 to 37

M25x1.5

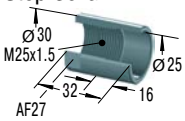
KM25
Locknut



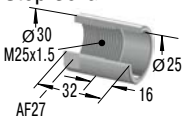
KM25-V4A
Locknut



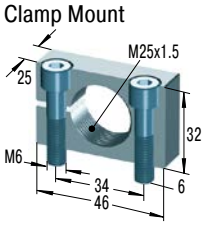
AH25
Stop Collar



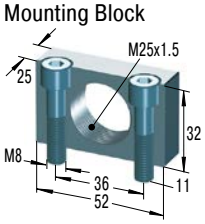
AH25-V4A
Stop Collar



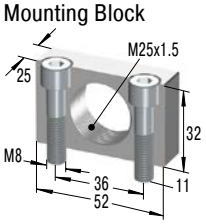
MB25
Clamp Mount



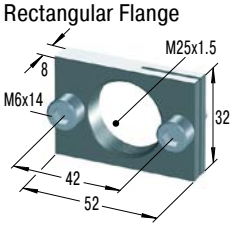
MB25SC2
Mounting Block



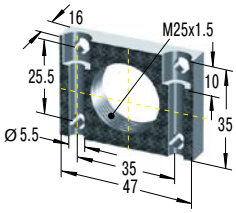
MB25SC2-V4A
Mounting Block



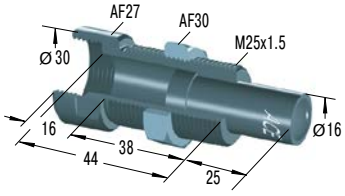
RF25
Rectangular Flange



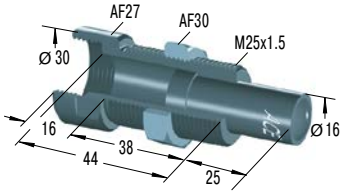
UM25
Universal Mount



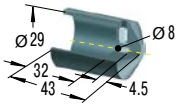
BV25
Side Load Adaptor



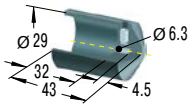
BV25SC
Side Load Adaptor



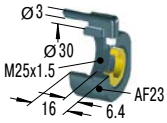
PB25
Steel Shroud



PB25SC
Steel Shroud

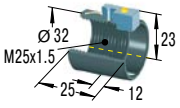


SP25
Air Bleed Collar



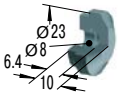
For VC2515FT to VC2555FT
reduction of the stroke 6.4 mm

AS25
Switch Stop Collar



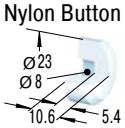
inc. Proximity Switch

PS25
Steel Button



BP25
Steel/Urethane Button

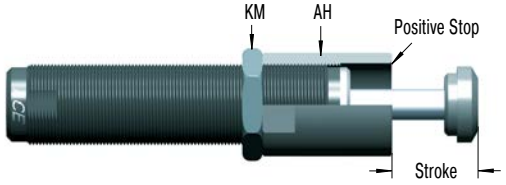
PP600
Nylon Button



W_3 max = 68 Nm

For mounting, installation, ..., see pages 43 to 46.

AH



Stop Collar

All ACE miniature shock absorbers have an integral positive stop. An optional stop collar (AH...) can be added if desired to give fine adjustment of final stopping position.

MB

Clamp Mount

When using the MB clamp mount no locknut is needed on the shock absorber (split clamp action). The clamp mount is very compact and allows fine adjustment of the shock absorber position by turning in and out.

Safety instructions
When foot mounting the types with combined piston and inner tube SC²25EUM to SC²650EUM and the types MC5EUM, MC9EUM, MC10EUM, MC30EUM, MC25EUM and MA30EUM, the mounting block MB (SC²) must be used.

Delivery
Two socket head screws are included with the clamp mount.

Dimensions

TYPES	Screw Size	Max. Torque Nm
MB12	M5x16	6
MB14	M5x20	6
MB20	M6x25	11
MB25	M6x30	11

MBSC2

Mounting Block

The mounting block MB...SC2 ensures the stable fixation of shock absorbers of the SC²-Series. Due to the piston tube technology of this series, this mounting block has no clamp slot. The mounting block is also used for types MC5EUM to MC30EUM as well as type MA30EUM.

Mounting information
As the MB (SC²) has no clamp slot, the shock absorber has to be tightened with the supplied locknut.

Delivery
Two socket head screws are included with the clamp mount.

RF

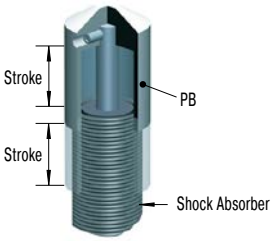
Rectangular Flange

The rectangular flange RF provides a space saving convenient assembly and does not need a lock nut to hold the shock absorber. Therefore achieving a neat, compact and flat surface mounting.

Dimensions

TYPES	Screw Size	Max. Torque Nm
RF6	M3x8	3
RF8	M4x10	4
RF10	M4x10	4
RF12	M5x12	6
RF14	M5x12	6
RF20	M6x14	11
RF25	M6x14	11

PB



Steel Shroud

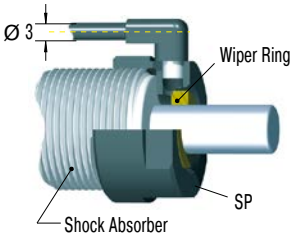
Grinding beads, sand, welding splatter, paints and adhesives etc. can adhere to the piston rod. They then damage the rod seals and the shock absorber quickly fails. In many cases the installation of the optional steel shroud can provide worthwhile protection and increase lifetime.

Ordering information
The PB steel shroud can only be installed onto a shock absorber without rod end button.

For part number MA, MC, SC please order with “M-880” suffix. Part numbers MA150EUM, MC150EUM to MC600EUM and SC25EUM to SC190EUM5-7 are supplied without a button.

Safety instructions
When installing don‘t forget to allow operating space for the shroud to move as the shock absorber is cycled.

SP

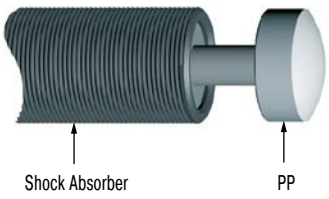


Air Bleed Collar

Air bleed collar (includes integral stop collar) protects shock absorber from ingress of abrasive contaminents like cement, paper or wood dust into the rod seal area. It also prevents aggressive fluids such as cutting oils, coolants etc. damaging the seals. Air bleed supply 0.5 to 1 bar. Low air consumption. The constant air bleed prevents contaminants passing the wiper ring and entering the shock absorber seal area.

Safety instructions
Do not switch off air supply whilst machine is operating! The air bleed collar cannot be used on all similar body thread sized shock absorbers. The air bleed collar is only for types MC150EUM to MC600EUM, MA150EUM, SC75EUM and SC190EUM5-7.

PP



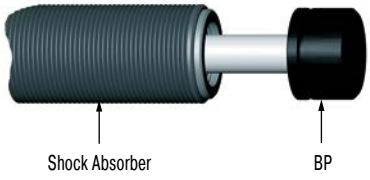
Nylon Button

While the use of industrial shock absorbers already achieves a considerable reduction in noise levels, the additional use of PP impact buttons made of glass fibre reinforced nylon reduces noise levels even further, making it easy to fulfil the regulations of the new Noise Control Ordinance. At the same time, wear of impact surface is drastically minimized. The PP buttons are available for shock absorbers in series MC150EUM to MC600EUM.

Mounting information
The buttons are fitted simply by pressing onto the piston rod.
We recommend to additionally fix the nylon button with LOCTITE.

Delivery
Model MA150EUM is supplied as standard with PP button.

BP



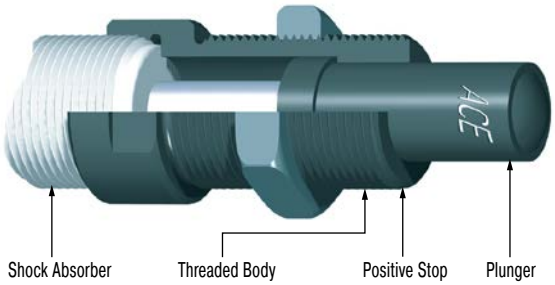
Steel/Urethane Button

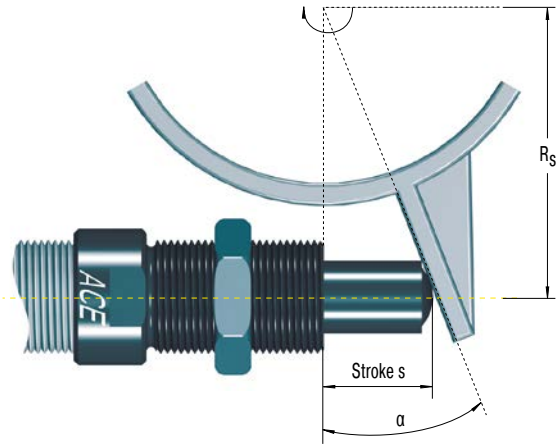
These impact buttons made of urethane offer all above advantages of the PP nylon button in terms of reducing noise and wear. They fit easily onto the piston rod of the corresponding shock absorber. BP buttons must additionally be secured with LOCTITE.

Please refer to the accessories table on pages 36 to 37 to see which shock absorber types the BP buttons are available for.

Issue 07.2017 – Specifications subject to change

BV





Formulae:

$$\alpha = \tan^{-1}\left(\frac{s}{R_s}\right) \qquad R_{s\,min} = \frac{s}{\tan \alpha\,max}$$

Example:

s = 0.025 m α max = 25° (Type BV25)

R_s = 0.1 m

$$\alpha = \tan^{-1}\left(\frac{0.025}{0.1}\right) \qquad R_{s\,min} = \frac{0.025}{\tan 25}$$

α = 14.04° $R_{s\,min}$ = 0.054 m

α	= side load angle °	R_s	= mounting radius m
α max	= max. angle °	$R_{s\,min}$	= min. possible mounting radius m
s	= absorber stroke m		

Side Load Adaptor

Rotating impact motion causes high side load forces on the piston rod. This increases bearing wear and possibly results in rod breakage or bending. With side load impact angles of more than 3° the operation lifetime of the shock absorber reduces rapidly due to increased wear of the rod bearings. The optional BV side load adaptor provides long lasting solution.

Ordering information
The BV adaptor can only be installed onto a shock absorber without rod end button.

Part Number: MA, MC, SC...-880 (Models MC150EUM to MC600EUM and SC²25EUM to SC²190EUM5-7 are supplied as standard without buttons.)

Material
Threaded body and plunger: Hardened high tensile steel, hardened 610 HV1

Mounting information
Secure the side load adaptor with LOCTITE or locknut on the shock absorber.

For material combination plunger/impact plate use similar hardness values. We recommend that you install the shock absorber/side load adaptor using the thread on the side load adaptor.

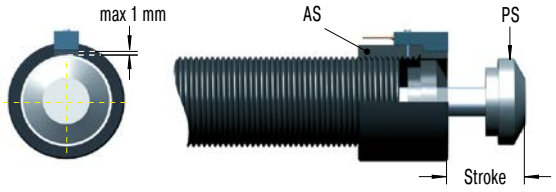
Installation with clamp mount MB... not possible. Use mounting block MB... SC²!

Safety instructions
Maximum angle:
BV8, BV10 and BV12 = 12.5°
BV14, BV20 and BV25 = 25°

By repositioning the centre of the stroke of the side load plunger to be at 90 degrees to the piston rod, the side load angle can be halved. The use of an external positive stop due to high forces encountered is required.

Issue 07.2017 – Specifications subject to change

AS



Switch Stop Collar

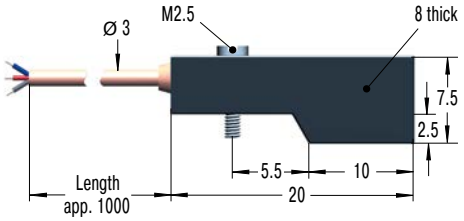
The ACE stop light switch stop collar combination AS, incl. proximity switch PNP, can be mounted on all popular shock absorber models. The use of the steel button PS is mandatory.

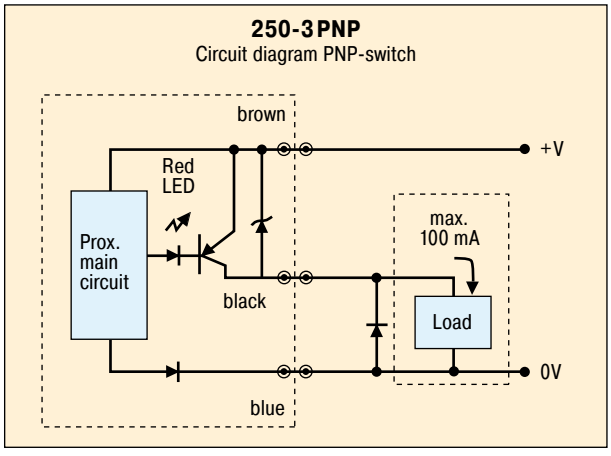
Advantages: Very short, compact mounting package, good price-performance ratio, retrofit possible for standard shock absorber models, fine adjustment of the stroke possible.

Ordering information
The steel button type PS is fitted as standard on the models: SC190EUM0-4, SC300EUM0-9, SC650EUM0-9, SC925EUM0-4, MA/MVC225EUM, MA/MVC600EUM and MA/MVC900EUM. With all other models you must order the PS button as an optional accessory.

Mounting information
We recommend to fix the steel button onto the end of the piston rod using LOCTITE 290. Attention! Take care not to leave any adhesive on the piston rod as this will cause seal damage. Thread the switch stop collar onto the front of the shock absorber and secure in position. Switch cable should not be routed close to power cables.

250-3 PNP





Proximity Switch

The proximity switch is part of the ACE stop light switch collar combination. The correct starting position can thus be checked electronically.

Ordering information
Part number: 250-3 PNP

PNP proximity switch data
Supply voltage: 10-27 VDC
Ripple: < 10 %
Load current max.: 100 mA
Operating temperature range: -10 °C to +60 °C
Residual voltage: max. 1 V
Protection: IP67 (IEC 144) with LED-indicator
Proximity switch N/Open when shock absorber extended.
When shock absorber is fully compressed switch closes and LED indicator lights.

Issue 07.2017 – Specifications subject to change

High Performance

for PET Stretch Blow Machines

PET 20 and PET 27

20 million cycles – up to 107 °C – aluminium outer body
hardened pressure chamber – corrosion protection

=

extended service life – low-wear – faster
reduced downtime – improved system performance
increased production volume – high cost efficiency

For all information see our Website www.ace-ace.com

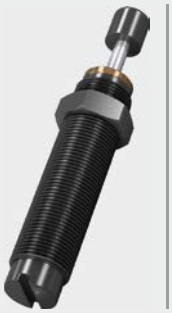
ACE Stoßdämpfer GmbH · PO Box 1510 · D-40740 Langenfeld · T +49 (0)2173 - 9226-4100 · info@ace-int.eu · www.ace-ace.com

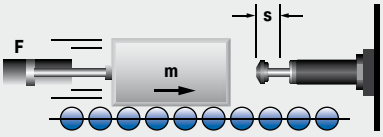
Application Examples

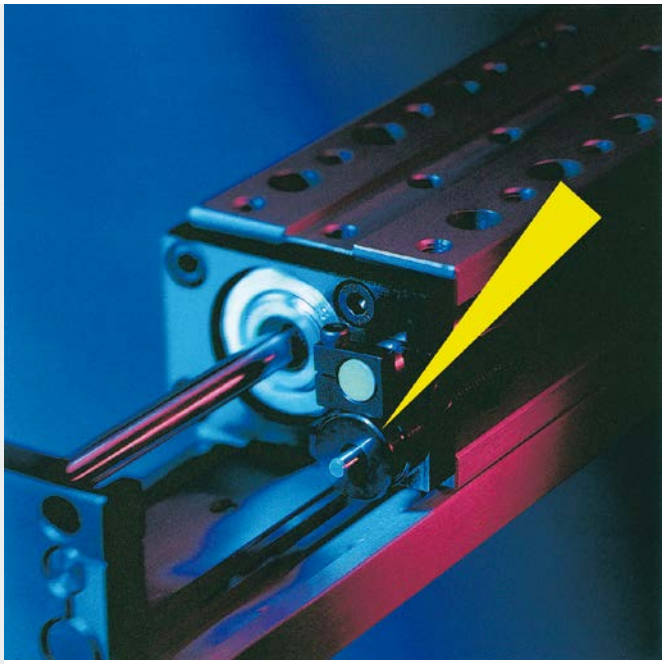
MC25EUM

Constant deceleration force

ACE miniature shock absorbers are the right alternative. This pneumatic module for high precision, high speed motion intentionally abandoned pneumatic end-of-travel damping. The compact miniature shock absorbers of the type MC25EUMH-NB decelerate the linear motion safer and faster when reaching the end-of-travel position. They accept the moving load gently and decelerate it smoothly throughout the entire stroke length. Additional advantages: simpler construction, smaller pneumatic valves, lower maintenance costs as well as reduced compressed air consumption.





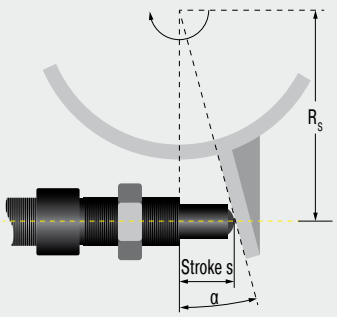


Miniature Shock Absorber in compact pneumatic module

MC225EUM

Obstacle end positions secured

In the case of driving safety training, swinging flags are used to simulate the sudden appearance of obstacles. If the driver reacts too slowly, the flags are swung just as quickly away to avoid damage to the vehicle. In order to protect the end positions of this safety system during to and fro motion, ACE miniature shock absorbers of the type MC225EUMH2 are installed. They come with a special side load adapter for use in this situation. Among other things, this improves the ability of the shock absorber to absorb lateral forces during to and fro motion.



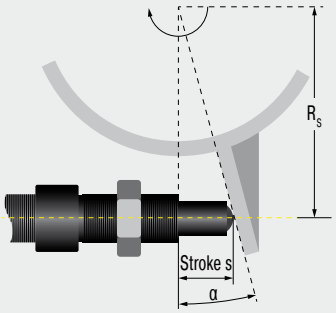
Miniature shock absorbers protect the end positions during driving safety training
Dorninger Hytronics GmbH, 4210 Unterweitersdorf, Austria

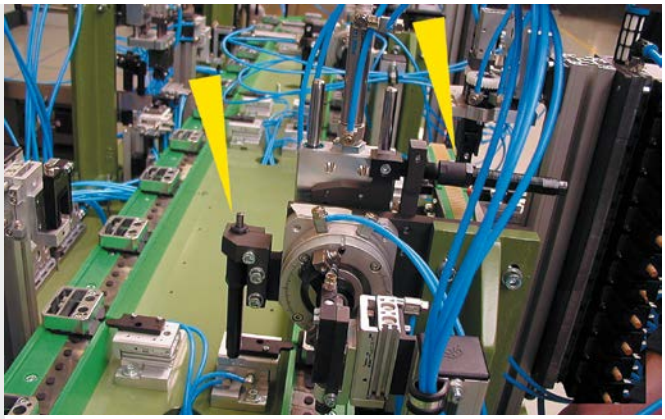
Issue 07.2017 – Specifications subject to change

SC190EUM

Soft end-of-travel damping on rotary movements

ACE miniature shock absorbers optimize production with minimum expenditure. The cycle rate for an assembly line producing electronic components was increased to 3,600 units/hr. Miniature shock absorbers type SC190EUM-1 decelerate the rapid transfer movements on the production line and using soft damping methods optimize the pick up and set down of components. This soft deceleration technique has increased production and reduced maintenance on the portal and rotary actuator modules. The optional side load adaptor protects the shock absorber from high side load forces and increases the operating lifetime. Using ACE shock absorbers reduces maintenance costs by 50 % and running costs by 20 %, diminishing energy consumption.





Optimised production in the electronics industry
Stebie Maschinenbau GmbH, Germany

ACE Stoßdämpfer GmbH · PO Box 1510 · D-40740 Langenfeld · T +49 (0)2173 - 9226-4100 · F +49 (0)2173 - 9226-89 · info@ace-int.eu · www.ace-ace.com

ACE
A STABILUS COMPANY

Industrial Shock Absorbers

Absorbers to suit – for all loads

ACE industrial shock absorbers work hard. Their application means moving loads are evenly decelerated over the full stroke. The result: the lowest braking force and shortest braking time. The MAGNUM series from ACE is viewed as the reference standard for medium design sizes in damping technology.

Innovations such as diaphragm accumulators, seals, tube-shaped inner pressure chambers and many more make a decisive contribution towards extension of the service life. This means that the effective load range can be extended considerably, which provides users with more scope with respect to the absorber size and utilisation of the machine‘s output. ACE offers a wide range of matching accessories for this and all other absorber series. This eliminates internal production of assembly parts, which involves high costs and lots of time.

Innovative damping techniques

Reference class for medium sizes

Less stress on the machine

Increase of production figures

Long machine service lives

Industrial Shock Absorbers

MC33 to MC64

Page 52

Self-Compensating
High energy absorption and robust design
Linear slides, Swivel units, Turntables, Portal systems

MC33-V4A to MC64-V4A

Page 56

self-Compensating, stainless Steel
Optimum corrosion protection
Linear slides, Swivel units, Turntables, Food industry

MC33-HT to MC64-HT

Page 60

Self-Compensating
Extreme temperatures and high cycle frequencies
Linear slides, Swivel units, Turntables, Machines and plants

MC33-LT to MC64-LT

Page 64

Self-Compensating
Extreme temperatures and high cycle frequencies
Linear slides, Swivel units, Turntables, Machines and plants

SC33 to SC45

Page 68

Self-Compensating, Piston Tube Technology
Piston tube design for maximum energy absorption
Turntables, Swivel units, Robot arms, Linear slides

MA/ML33 to MA/ML64

Page 70

Adjustable
High energy absorption and progressive adjustment
Linear slides, Swivel units, Turntables, Portal systems

Issue 07.2017 – Specifications subject to change

MC33 to MC64

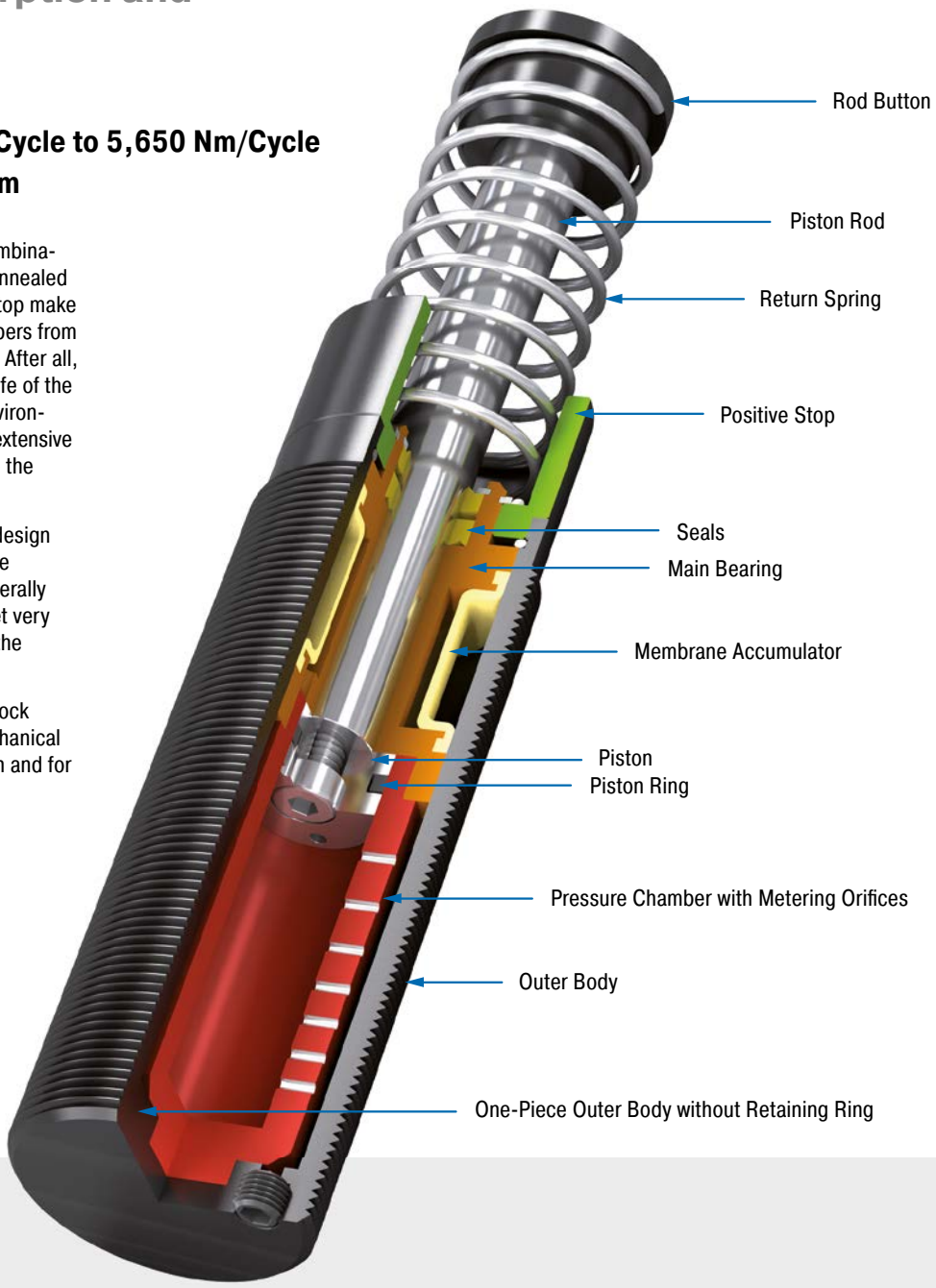
High energy absorption and robust design

Self-Compensating
Energy capacity 170 Nm/Cycle to 5,650 Nm/Cycle
Stroke 23.1 mm to 150 mm

The latest damper technology: The combination of the latest sealing technology, annealed guide bearing and integrated positiv stop make these self-compensating shock absorbers from ACE'S MAGNUM range so successful. After all, users benefit from the longer service life of the products, even in the most difficult environments. A continuous outer thread and extensive accessories make their contribution to the success story of the MC33 to MC64.

High energy absorption in a compact design and a wide damping range lead to huge advantages in practice. Alongside generally more compact designs, these small yet very powerful absorbers enable full use of the machine's performance.

These self-compensating industrial shock absorbers are used in all areas of mechanical engineering – especially in automation and for gantries.



Technical Data

Energy capacity: 170 Nm/Cycle to 5,650 Nm/Cycle

Impact velocity range: 0.15 m/s to 5 m/s. Other speeds on request.

Operating temperature range: -12 °C to +66 °C. Other temperatures on request.

Mounting: In any position

Positive stop: Integrated

Material: Outer body: Nitride hardened steel; Piston rod: Hard chrome plated steel; Rod end button: Hardened steel and corrosion-resistant coating; Return spring: Zinc plated or plastic-coated steel; Accessories: Steel with black oxide finish or nitride hardened

Damping medium: Automatic Transmission Fluid (ATF)

Application field: Linear slides, Swivel units, Turntables, Portal systems, Machines and plants, Tool machines, Machining centres, Z-axes, Impact panels

Note: A noise reduction of 3 to 7 dB is possible when using the special impact button (PP). For emergency use only applications and for continous use (with additional cooling) it is sometimes possible to exceed the published max. capacity ratings. In this case, please consult ACE.

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

On request: Special oils, nickel-plated, increased corrosion protection, mounting inside air cylinders or other special options are available on request.

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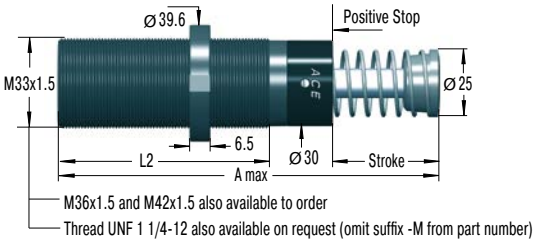
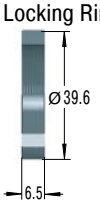
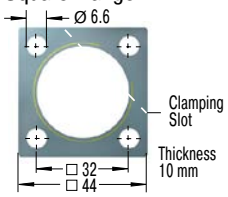
MC33EUM



NM33
Locking Ring



QF33
Square Flange



Torque max.: 11 Nm
Clamping torque: > 90 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models
MC: Self-Contained with return spring, self-compensating
Special Models
MCA: Air/Oil return without return spring.
Use only with external air/oil tank.
MCS: Air/Oil return with return spring.
Use only with external air/oil tank.
MCN: Self-Contained without return spring

Ordering Example **MC3325EUM-1**

Self-Compensating
Thread Size M33
Stroke 25 mm
EU Compliant
Metric Thread
(omitted when using thread UNF 1 1/4-12)
Effective Weight Range Version

Dimensions

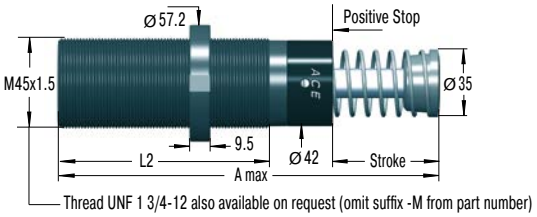
TYPES	Stroke mm	A max. mm	L2 mm
MC3325EUM	23.2	138	83
MC3350EUM	48.6	189	108

Performance

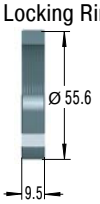
	Max. Energy Capacity				Effective Weight							
TYPES	[1] W_3 Nm/cycle	W_4 Nm/h	W_4 with Air/Oil Tank Nm/h	W_4 with Oil Recirculation Nm/h	[2] me min. kg	[2] me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MC3325EUM-0	170	75,000	124,000	169,000	3	11	-0	45	90	0.03	4	0.51
MC3325EUM-1	170	75,000	124,000	169,000	9	40	-1	45	90	0.03	4	0.51
MC3325EUM-2	170	75,000	124,000	169,000	30	120	-2	45	90	0.03	4	0.51
MC3325EUM-3	170	75,000	124,000	169,000	100	420	-3	45	90	0.03	4	0.51
MC3325EUM-4	170	75,000	124,000	169,000	350	1,420	-4	45	90	0.03	4	0.51
MC3350EUM-0	330	85,000	135,000	180,000	5	22	-0	45	135	0.06	3	0.63
MC3350EUM-1	330	85,000	135,000	180,000	18	70	-1	45	135	0.06	3	0.63
MC3350EUM-2	330	85,000	135,000	180,000	60	250	-2	45	135	0.06	3	0.63
MC3350EUM-3	330	85,000	135,000	180,000	210	840	-3	45	135	0.06	3	0.63
MC3350EUM-4	330	85,000	135,000	180,000	710	2,830	-4	45	135	0.06	3	0.63

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] The effective weight range limits can be raised or lowered to special order.
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

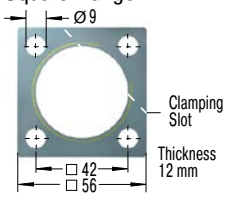
MC45EUM



NM45
Locking Ring



QF45
Square Flange



Torque max.: 27 Nm
Clamping torque: > 200 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

MC: Self-Contained with return spring, self-compensating

Special Models

MCA: Air/Oil return without return spring.
Use only with external air/oil tank.

MCS: Air/Oil return with return spring.
Use only with external air/oil tank.

MCN: Self-Contained without return spring

Ordering Example **MC4550EUM-3**

- Self-Compensating
- Thread Size M45
- Stroke 50 mm
- EU Compliant
- Metric Thread
- (omitted when using thread UNF 1 3/4-12)
- Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	L2 mm
MC4525EUM	23.1	145	95
MC4550EUM	48.5	195	120
MC4575EUM	73.9	246	145

Performance

	Max. Energy Capacity				Effective Weight							
TYPES	[1] W_3 Nm/cycle	W_4 Nm/h	W_4 with Air/Oil Tank Nm/h	W_4 with Oil Recirculation Nm/h	[2] me min. kg	[2] me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MC4525EUM-0	370	107,000	158,000	192,000	7	27	-0	70	100	0.03	4	1.14
MC4525EUM-1	370	107,000	158,000	192,000	20	90	-1	70	100	0.03	4	1.14
MC4525EUM-2	370	107,000	158,000	192,000	80	310	-2	70	100	0.03	4	1.14
MC4525EUM-3	370	107,000	158,000	192,000	260	1,050	-3	70	100	0.03	4	1.14
MC4525EUM-4	370	107,000	158,000	192,000	890	3,540	-4	70	100	0.03	4	1.14
MC4550EUM-0	740	112,000	192,000	248,000	13	54	-0	70	145	0.08	3	1.36
MC4550EUM-1	740	112,000	192,000	248,000	45	180	-1	70	145	0.08	3	1.36
MC4550EUM-2	740	112,000	192,000	248,000	150	620	-2	70	145	0.08	3	1.36
MC4550EUM-3	740	112,000	192,000	248,000	520	2,090	-3	70	145	0.08	3	1.36
MC4550EUM-4	740	112,000	192,000	248,000	1,800	7,100	-4	70	145	0.08	3	1.36
MC4575EUM-0	1,130	146,000	225,000	282,000	20	80	-0	50	180	0.11	2	1.59
MC4575EUM-1	1,130	146,000	225,000	282,000	70	270	-1	50	180	0.11	2	1.59
MC4575EUM-2	1,130	146,000	225,000	282,000	230	930	-2	50	180	0.11	2	1.59
MC4575EUM-3	1,130	146,000	225,000	282,000	790	3,140	-3	50	180	0.11	2	1.59
MC4575EUM-4	1,130	146,000	225,000	282,000	2,650	10,600	-4	50	180	0.11	2	1.59

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] The effective weight range limits can be raised or lowered to special order.
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

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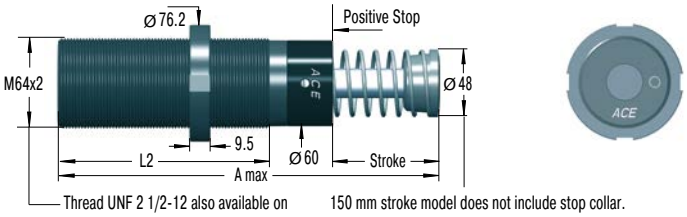
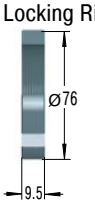
MC64EUM



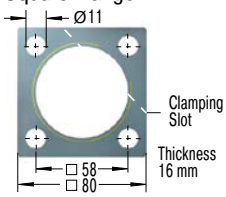
Thread UNF 2 1/2-12 also available on request (omit suffix -M from part number)

150 mm stroke model does not include stop collar. Positive stop is provided by the rod button (Ø 60 mm) and a stop block.

NM64
Locking Ring



QF64
Square Flange



Torque max.: 50 Nm
Clamping torque: > 210 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

MC: Self-Contained with return spring, self-compensating

Special Models

MCA: Air/Oil return without return spring.
Use only with external air/oil tank.

MCS: Air/Oil return with return spring.
Use only with external air/oil tank.

MCN: Self-Contained without return spring

Ordering Example **MC64100EUM-2**

- Self-Compensating
- Thread Size M64
- Stroke 100 mm
- EU Compliant
- Metric Thread
- (omitted when using thread UNF 2 1/2-12)
- Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	L2 mm
MC6450EUM	48.6	225	140
MC64100EUM	99.4	326	191
MC64150EUM	150	450	241

Performance

	Max. Energy Capacity				Effective Weight							
TYPES	[1] W_3 Nm/cycle	W_4 Nm/h	W_4 with Air/Oil Tank Nm/h	W_4 with Oil Recirculation Nm/h	[2] me min. kg	[2] me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MC6450EUM-0	1,870	146,000	293,000	384,000	35	140	-0	90	155	0.12	4	2.9
MC6450EUM-1	1,870	146,000	293,000	384,000	140	540	-1	90	155	0.12	4	2.9
MC6450EUM-2	1,870	146,000	293,000	384,000	460	1,850	-2	90	155	0.12	4	2.9
MC6450EUM-3	1,870	146,000	293,000	384,000	1,600	6,300	-3	90	155	0.12	4	2.9
MC6450EUM-4	1,870	146,000	293,000	384,000	5,300	21,200	-4	90	155	0.12	4	2.9
MC64100EUM-0	3,730	192,000	384,000	497,000	70	280	-0	105	270	0.34	3	3.7
MC64100EUM-1	3,730	192,000	384,000	497,000	270	1,100	-1	105	270	0.34	3	3.7
MC64100EUM-2	3,730	192,000	384,000	497,000	930	3,700	-2	105	270	0.34	3	3.7
MC64100EUM-3	3,730	192,000	384,000	497,000	3,150	12,600	-3	105	270	0.34	3	3.7
MC64100EUM-4	3,730	192,000	384,000	497,000	10,600	42,500	-4	105	270	0.34	3	3.7
MC64150EUM-0	5,650	248,000	497,000	644,000	100	460	-0	75	365	0.48	2	5.1
MC64150EUM-1	5,650	248,000	497,000	644,000	410	1,640	-1	75	365	0.48	2	5.1
MC64150EUM-2	5,650	248,000	497,000	644,000	1,390	5,600	-2	75	365	0.48	2	5.1
MC64150EUM-3	5,650	248,000	497,000	644,000	4,700	18,800	-3	75	365	0.48	2	5.1
MC64150EUM-4	5,650	248,000	497,000	644,000	16,000	63,700	-4	75	365	0.48	2	5.1

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] The effective weight range limits can be raised or lowered to special order.
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

ACE Stoßdämpfer GmbH · PO Box 1510 · D-40740 Langenfeld · T +49 (0)2173 - 9226-4100 · F +49 (0)2173 - 9226-89 · info@ace-int.eu · www.ace-ace.com

MC33-V4A to MC64-V4A

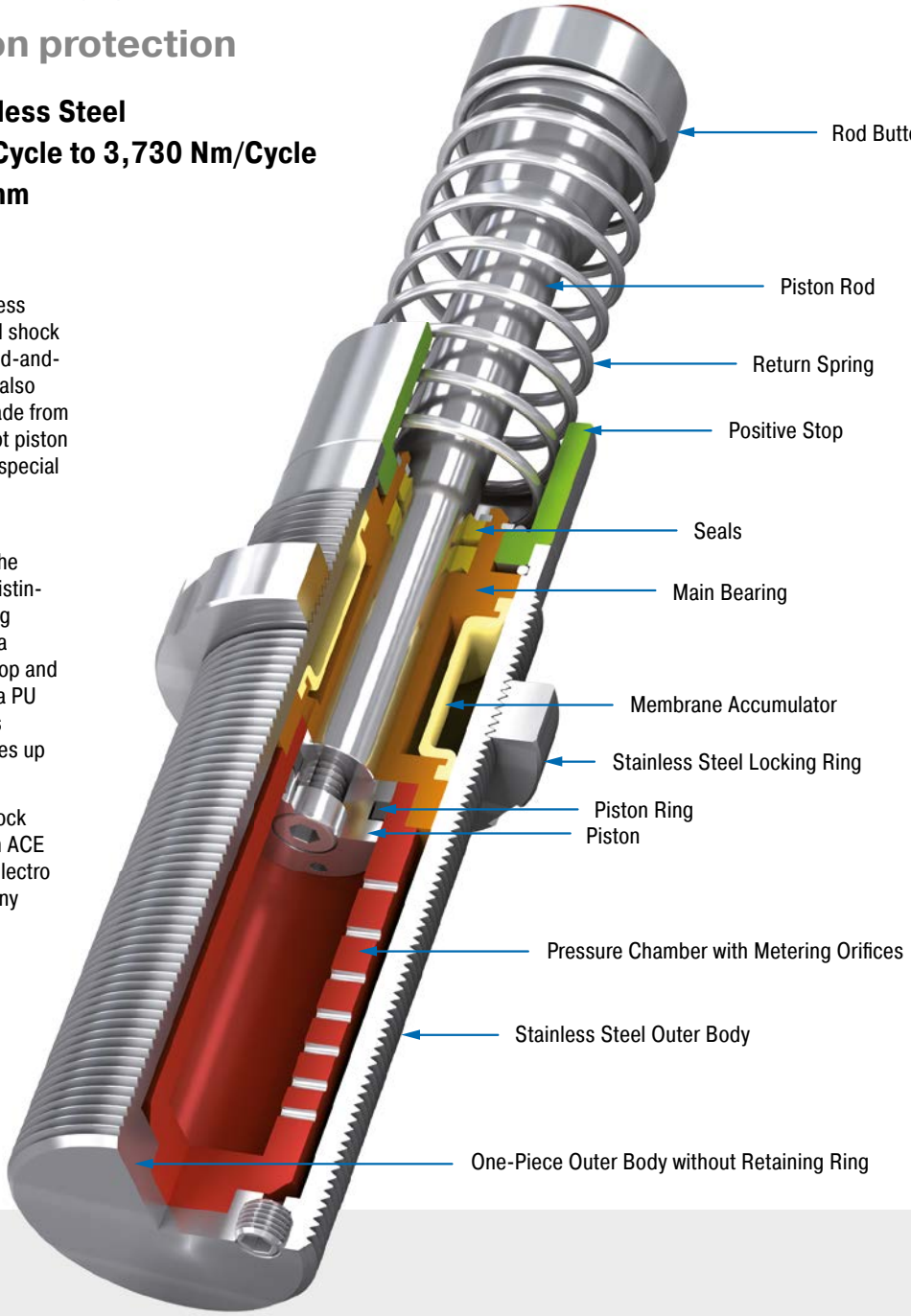
Optimum corrosion protection

self-Compensating, stainless Steel
Energy capacity 170 Nm/Cycle to 3,730 Nm/Cycle
Stroke 23.1 mm to 99.4 mm

The latest damper technology in stainless steel: The self-compensating industrial shock absorbers MC33 to MC64 from the tried-and-tested and popular MAGNUM range is also available with all outer components made from stainless steel, material 1.4404 (except piston rod). They are filled in the factory with special oil, which meets the permit conditions (NSF-H1) for the food industry.

Just like the standard product family, the MAGNUM stainless steel models are distinguished by their robust, modern sealing technology, high energy absorption in a compact design, integrated positive stop and a wide damping range. Equipped with a PU head, they are available in thread sizes M33x1.5 to M64x2 with damping strokes up to 100 mm.

These self-compensating industrial shock absorbers made of stainless steel from ACE are mainly used in the food, medical, electro and offshore industries, but also in many other markets.



Technical Data

Energy capacity: 170 Nm/Cycle to 3,730 Nm/Cycle

Impact velocity range: 0.15 m/s to 5 m/s. Other speeds on request.

Operating temperature range: -12 °C to +66 °C. Other temperatures on request.

Mounting: In any position

Positive stop: Integrated

Material: Outer body, Main bearing, Accessories, Locking ring: Stainless steel (1.4404, AISI 316L); Piston rod: Hard chrome plated steel; Rod end button: Stainless steel (1.4404, AISI 316L) with elastomer insert; Return spring: Stainless steel

Damping medium: Special oil NSF-H1 approved

Application field: Linear slides, Swivel units, Turntables, Food industry, Medical technology, Portal systems, Machines and plants, Tool machines, Machining centres

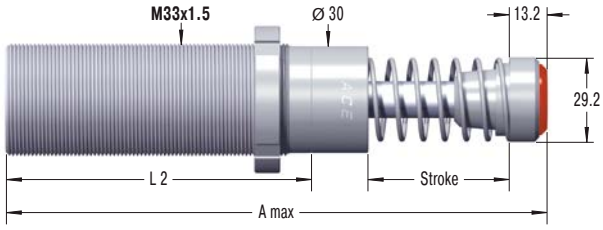
Note: Impact button (PP) for noise reduction included. For emergency use only applications and for continous use (with additional cooling) it is sometimes possible to exceed the published max. capacity ratings. In this case, please consult ACE.

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

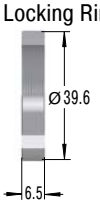
On request: Special oils, other special options and special accessories are available on request.

Issue 07.2017 – Specifications subject to change

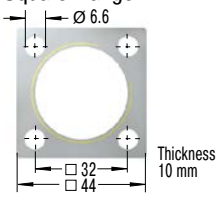
MC33EUM-V4A



NM33-V4A
Locking Ring



QF33-V4A
Square Flange



The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

MC: Self-Contained with return spring, self-compensating

Special Models

MCA: Air/Oil return without return spring.
Use only with external air/oil tank.

MCS: Air/Oil return with return spring.
Use only with external air/oil tank.

MCN: Self-Contained without return spring

Ordering Example **MC3325EUM-2-V4A**

Self-Compensating
Thread Size M33
Stroke 25 mm
EU Compliant
Metric Thread
Effective Weight Range Version
Stainless Steel 1.4404/AISI 316L

Performance and Dimensions

	Max. Energy Capacity		Effective Weight										
TYPES	W_3 Nm/cycle	W_4 Nm/h	[1] me min. kg	[1] me max. kg	Hardness	Stroke mm	A max. mm	L2 mm	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
MC3325EUM-0-V4A	170	75,000	3	11	-0	23.2	151.2	83	45	90	0.03	4	0.51
MC3325EUM-1-V4A	170	75,000	9	40	-1	23.2	151.2	83	45	90	0.03	4	0.51
MC3325EUM-2-V4A	170	75,000	30	120	-2	23.2	151.2	83	45	90	0.03	4	0.51
MC3325EUM-3-V4A	170	75,000	100	420	-3	23.2	151.2	83	45	90	0.03	4	0.51
MC3325EUM-4-V4A	170	75,000	350	1,420	-4	23.2	151.2	83	45	90	0.03	4	0.51
MC3350EUM-0-V4A	330	85,000	5	22	-0	48.6	202.2	108	45	135	0.06	3	0.63
MC3350EUM-1-V4A	330	85,000	18	70	-1	48.6	202.2	108	45	135	0.06	3	0.63
MC3350EUM-2-V4A	330	85,000	60	250	-2	48.6	202.2	108	45	135	0.06	3	0.63
MC3350EUM-3-V4A	330	85,000	210	840	-3	48.6	202.2	108	45	135	0.06	3	0.63
MC3350EUM-4-V4A	330	85,000	710	2,830	-4	48.6	202.2	108	45	135	0.06	3	0.63

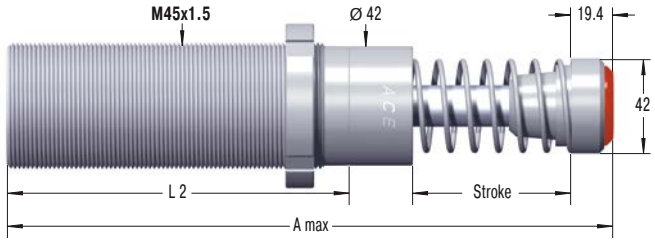
[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

Industrial Shock Absorbers MC45EUM-V4A

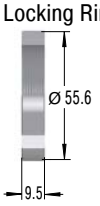
self-Compensating, stainless Steel

ACE
A STABILUS COMPANY

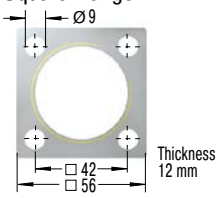
MC45EUM-V4A



NM45-V4A
Locking Ring



QF45-V4A
Square Flange



The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

MC: Self-Contained with return spring, self-compensating

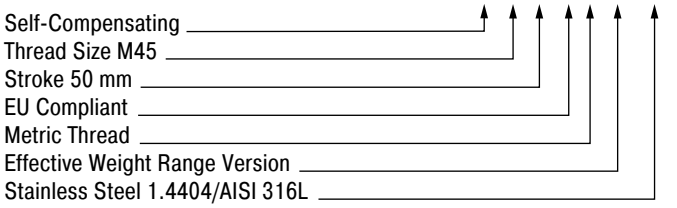
Special Models

MCA: Air/Oil return without return spring.
Use only with external air/oil tank.

MCS: Air/Oil return with return spring.
Use only with external air/oil tank.

MCN: Self-Contained without return spring

Ordering Example **MC4550EUM-1-V4A**



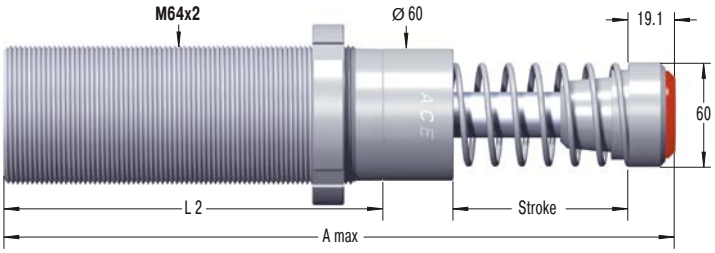
Performance and Dimensions

	Max. Energy Capacity		Effective Weight										
TYPES	W_3 Nm/cycle	W_4 Nm/h	[1] me min. kg	[1] me max. kg	Hardness	Stroke mm	A max. mm	L2 mm	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
MC4525EUM-0-V4A	370	107,000	7	27	-0	23.1	164.5	95	70	100	0.03	4	1.14
MC4525EUM-1-V4A	370	107,000	20	90	-1	23.1	164.5	95	70	100	0.03	4	1.14
MC4525EUM-2-V4A	370	107,000	80	310	-2	23.1	164.5	95	70	100	0.03	4	1.14
MC4525EUM-3-V4A	370	107,000	260	1,050	-3	23.1	164.5	95	70	100	0.03	4	1.14
MC4525EUM-4-V4A	370	107,000	890	3,540	-4	23.1	164.5	95	70	100	0.03	4	1.14
MC4550EUM-0-V4A	740	112,000	13	54	-0	48.5	214.4	120	70	145	0.08	3	1.36
MC4550EUM-1-V4A	740	112,000	45	180	-1	48.5	214.4	120	70	145	0.08	3	1.36
MC4550EUM-2-V4A	740	112,000	150	620	-2	48.5	214.4	120	70	145	0.08	3	1.36
MC4550EUM-3-V4A	740	112,000	520	2,090	-3	48.5	214.4	120	70	145	0.08	3	1.36
MC4550EUM-4-V4A	740	112,000	1,800	7,100	-4	48.5	214.4	120	70	145	0.08	3	1.36
MC4575EUM-0-V4A	1,130	146,000	20	80	-0	73.9	265.4	145	50	180	0.11	2	1.59
MC4575EUM-1-V4A	1,130	146,000	70	270	-1	73.9	265.4	145	50	180	0.11	2	1.59
MC4575EUM-2-V4A	1,130	146,000	230	930	-2	73.9	265.4	145	50	180	0.11	2	1.59
MC4575EUM-3-V4A	1,130	146,000	790	3,140	-3	73.9	265.4	145	50	180	0.11	2	1.59
MC4575EUM-4-V4A	1,130	146,000	2,650	10,600	-4	73.9	265.4	145	50	180	0.11	2	1.59

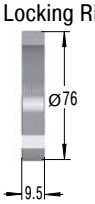
[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

Issue 07.2017 – Specifications subject to change

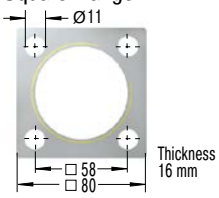
MC64EUM-V4A



NM64-V4A
Locking Ring



QF64-V4A
Square Flange



The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

MC: Self-Contained with return spring, self-compensating

Special Models

MCA: Air/Oil return without return spring.
Use only with external air/oil tank.

MCS: Air/Oil return with return spring.
Use only with external air/oil tank.

MCN: Self-Contained without return spring

Ordering Example **MC6450EUM-3-V4A**

- Self-Compensating
- Thread Size M64
- Stroke 50 mm
- EU Compliant
- Metric Thread
- Effective Weight Range Version
- Stainless Steel 1.4404/AISI 316L

Performance and Dimensions

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight [1] me min. kg	Effective Weight [1] me max. kg	Hardness	Stroke mm	A max. mm	L2 mm	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
MC6450EUM-0-V4A	1,870	146,000	35	140	-0	48.6	244.1	140	90	155	0.12	4	2.9
MC6450EUM-1-V4A	1,870	146,000	140	540	-1	48.6	244.1	140	90	155	0.12	4	2.9
MC6450EUM-2-V4A	1,870	146,000	460	1,850	-2	48.6	244.1	140	90	155	0.12	4	2.9
MC6450EUM-3-V4A	1,870	146,000	1,600	6,300	-3	48.6	244.1	140	90	155	0.12	4	2.9
MC6450EUM-4-V4A	1,870	146,000	5,300	21,200	-4	48.6	244.1	140	90	155	0.12	4	2.9
MC64100EUM-0-V4A	3,730	192,000	70	280	-0	99.4	345.1	191	105	270	0.34	3	3.7
MC64100EUM-1-V4A	3,730	192,000	270	11,000	-1	99.4	345.1	191	105	270	0.34	3	3.7
MC64100EUM-2-V4A	3,730	192,000	930	3,700	-2	99.4	345.1	191	105	270	0.34	3	3.7
MC64100EUM-3-V4A	3,730	192,000	3,150	12,600	-3	99.4	345.1	191	105	270	0.34	3	3.7
MC64100EUM-4-V4A	3,730	192,000	10,600	42,500	-4	99.4	345.1	191	105	270	0.34	3	3.7

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

MC33-HT to MC64-HT

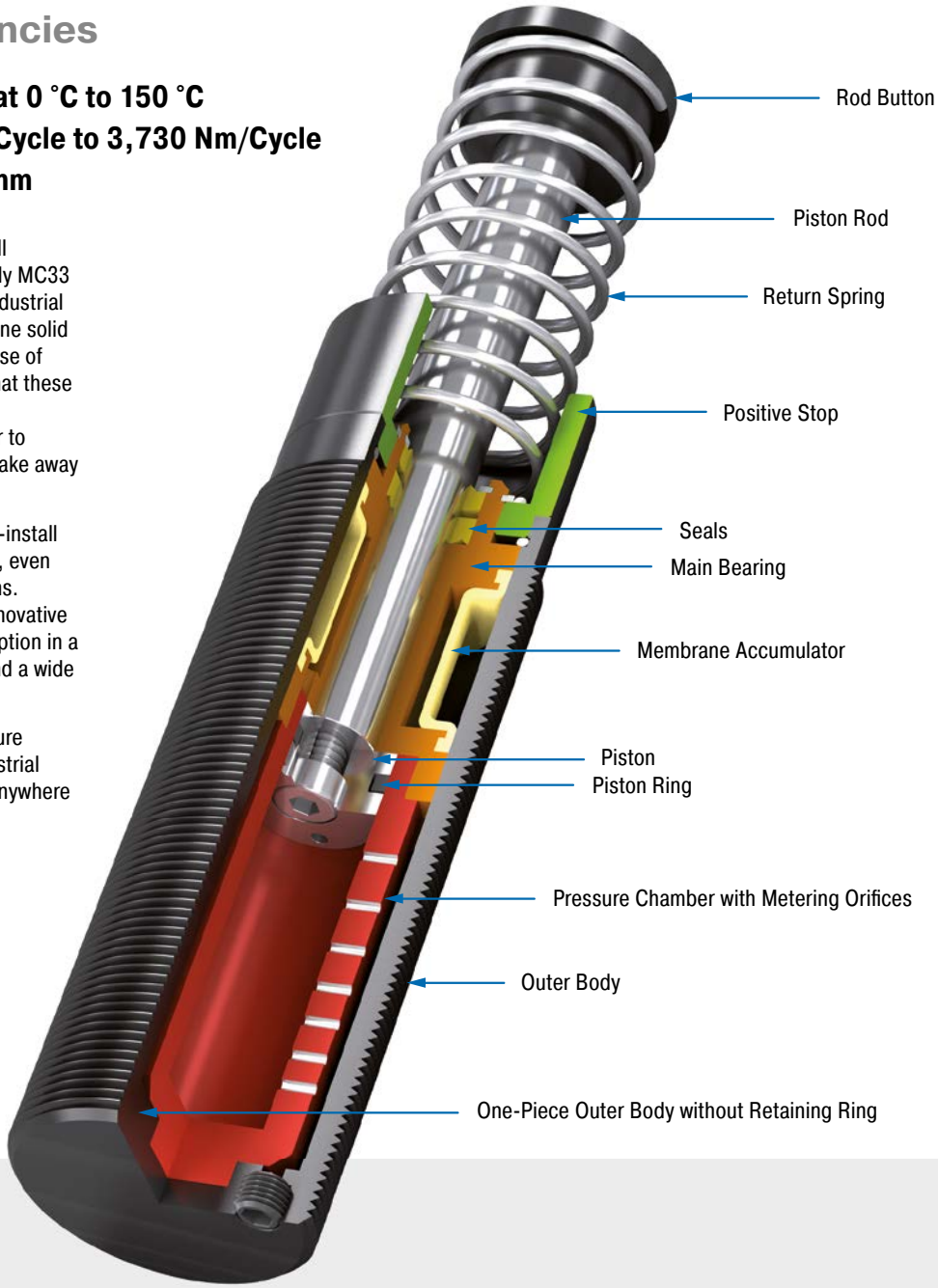
Extremely heat-resistant at high cycle frequencies

Self-Compensating, use at 0 °C to 150 °C
Energy capacity 170 Nm/Cycle to 3,730 Nm/Cycle
Stroke 23.1 mm to 99.4 mm

Further possibilities of use: Just like all MAGNUM types from the product family MC33 to MC64, the HT (high temperature) industrial shock absorbers are also made from one solid piece. They are characterised by the use of special seals and fluids. This means that these versions can even be used at extreme temperatures of 0 °C to 150 °C in order to safely and reliably damp masses and take away 100 % kinetic energy.

There is no reason why these ready-to-install machine elements should not be used, even under the most unfavourable conditions. Additional benefits are their robust, innovative sealing technology, high energy absorption in a compact design, fixed positive stop and a wide damping range.

Designed for use in extreme temperature ranges, these self-compensating industrial shock absorbers are suitable almost anywhere in plant and mechanical engineering.



Technical Data

Energy capacity: 170 Nm/Cycle to 3,730 Nm/Cycle

Impact velocity range: 0.15 m/s to 5 m/s. Other speeds on request.

Operating temperature range: 0 °C to 150 °C

Mounting: In any position

Positive stop: Integrated

Material: Outer body: Nitride hardened steel; Piston rod: Hard chrome plated steel; Rod end button: Hardened steel and corrosion-resistant coating; Return spring: Zinc plated or plastic-coated steel; Accessories: Steel with black oxide finish or nitride hardened

Damping medium: Synthetic high temperature oil

Application field: Linear slides, Swivel units, Turntables, Machines and plants, Tool machines, Machining centres, Z-axes

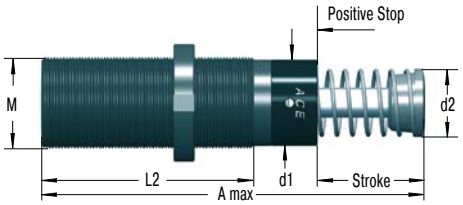
Note: A noise reduction of 3 to 7 dB is possible when using the special impact button (PP).

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

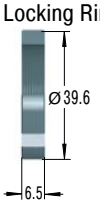
On request: Nickel-plated, increased corrosion protection, mounting inside air cylinders or other special options are available on request. Adjustable HT and LT shock absorbers.

Issue 07.2017 – Specifications subject to change

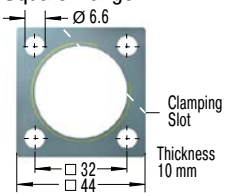
MC33EUM-HT



NM33
Locking Ring



QF33
Square Flange



Torque max.: 11 Nm
Clamping torque: > 90 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Complete details required when ordering

Load to be decelerated: m (kg)
Impact velocity: v (m/s)
Propelling force: F (N)
Operating cycles per hour: c (/hr)
Number of absorbers in parallel: n
Ambient temperature: °C

Ordering Example **MC3350EUM-2-HT**

Self-Compensating
Thread Size M33
Stroke 50 mm
EU Compliant
Metric Thread (omitted when using thread UNF)
Effective Weight Range Code
HT = Version for High Temperature Use

Dimensions

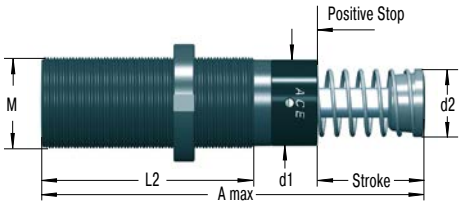
TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC3325EUM-HT	23.2	138	30	25	83	M33x1.5
MC3350EUM-HT	48.6	189	30	25	108	M33x1.5

Performance

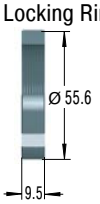
	Max. Energy Capacity			Effective Weight				
TYPES	W_3 Nm/cycle	W_4 at 20 °C Nm/h	W_4 at 100 °C Nm/h	[1] me min. kg	[1] me max. kg	Hardness	[2] Side Load Angle max. °	Weight kg
MC3325EUM-0-HT	170	215,000	82,000	3	11	-0	4	0.51
MC3325EUM-1-HT	170	215,000	82,000	9	40	-1	4	0.51
MC3325EUM-2-HT	170	215,000	82,000	30	120	-2	4	0.51
MC3325EUM-3-HT	170	215,000	82,000	100	420	-3	4	0.51
MC3325EUM-4-HT	170	215,000	82,000	350	1,420	-4	4	0.51
MC3350EUM-0-HT	330	244,000	93,000	5	22	-0	3	0.63
MC3350EUM-1-HT	330	244,000	93,000	18	70	-1	3	0.63
MC3350EUM-2-HT	330	244,000	93,000	60	250	-2	3	0.63
MC3350EUM-3-HT	330	244,000	93,000	240	840	-3	3	0.63
MC3350EUM-4-HT	330	244,000	93,000	710	2,830	-4	3	0.63

[1] The effective weight range limits can be raised or lowered to special order.
[2] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

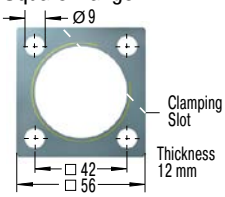
MC45EUM-HT



NM45
Locking Ring



QF45
Square Flange



Torque max.: 27 Nm
Clamping torque: > 200 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Complete details required when ordering

Load to be decelerated: m (kg)
Impact velocity: v (m/s)
Propelling force: F (N)
Operating cycles per hour: c (/hr)
Number of absorbers in parallel: n
Ambient temperature: °C

Ordering Example **MC4525EUM-3-HT**

Self-Compensating
Thread Size M45
Stroke 25 mm
EU Compliant
Metric Thread (omitted when using thread UNF)
Effective Weight Range Code
HT = Version for High Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC4525EUM-HT	23.1	145	42	35	95	M45x1.5
MC4550EUM-HT	48.5	195	42	35	120	M45x1.5

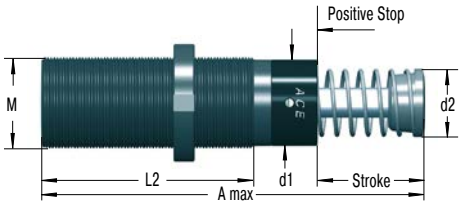
Performance

	Max. Energy Capacity			Effective Weight				
TYPES	W_3 Nm/cycle	W_4 at 20 °C Nm/h	W_4 at 100 °C Nm/h	[1] me min. kg	[1] me max. kg	Hardness	[2] Side Load Angle max. °	Weight kg
MC4525EUM-0-HT	370	307,000	117,000	7	27	-0	4	1.14
MC4525EUM-1-HT	370	307,000	117,000	20	90	-1	4	1.14
MC4525EUM-2-HT	370	307,000	117,000	80	310	-2	4	1.14
MC4525EUM-3-HT	370	307,000	117,000	260	1,050	-3	4	1.14
MC4525EUM-4-HT	370	307,000	117,000	890	3,540	-4	4	1.14
MC4550EUM-0-HT	740	321,000	122,000	13	54	-0	3	1.36
MC4550EUM-1-HT	740	321,000	122,000	45	180	-1	3	1.36
MC4550EUM-2-HT	740	321,000	122,000	150	620	-2	3	1.36
MC4550EUM-3-HT	740	321,000	122,000	520	2,090	-3	3	1.36
MC4550EUM-4-HT	740	321,000	122,000	1,800	7,100	-4	3	1.36

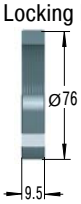
[1] The effective weight range limits can be raised or lowered to special order.
[2] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

Issue 07.2017 – Specifications subject to change

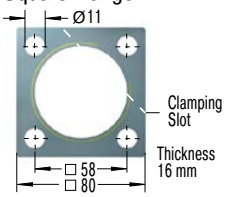
MC64EUM-HT



NM64
Locking Ring



QF64
Square Flange



Torque max.: 50 Nm
Clamping torque: > 210 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Complete details required when ordering

Load to be decelerated: m (kg)
Impact velocity: v (m/s)
Propelling force: F (N)
Operating cycles per hour: c (/hr)
Number of absorbers in parallel: n
Ambient temperature: °C

Ordering Example **MC6450EUM-1-HT**

Self-Compensating
Thread Size M64
Stroke 50 mm
EU Compliant
Metric Thread (omitted when using thread UNF)
Effective Weight Range Code
HT = Version for High Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC6450EUM-HT	48.6	225	60	48	140	M64x2
MC64100EUM-HT	99.4	326	60	48	191	M64x2

Performance

	Max. Energy Capacity			Effective Weight				
TYPES	W_3 Nm/cycle	W_4 at 20 °C Nm/h	W_4 at 100 °C Nm/h	[1] me min. kg	[1] me max. kg	Hardness	[2] Side Load Angle max. °	Weight kg
MC6450EUM-0-HT	1,870	419,000	159,000	35	140	-0	4	2.9
MC6450EUM-1-HT	1,870	419,000	159,000	140	540	-1	4	2.9
MC6450EUM-2-HT	1,870	419,000	159,000	460	1,850	-2	4	2.9
MC6450EUM-3-HT	1,870	419,000	159,000	1,600	6,300	-3	4	2.9
MC6450EUM-4-HT	1,870	419,000	159,000	5,300	21,200	-4	4	2.9
MC64100EUM-0-HT	3,730	550,000	200,000	70	280	-0	3	3.7
MC64100EUM-1-HT	3,730	550,000	200,000	270	1,100	-1	3	3.7
MC64100EUM-2-HT	3,730	550,000	200,000	930	3,700	-2	3	3.7
MC64100EUM-3-HT	3,730	550,000	200,000	3,150	12,600	-3	3	3.7
MC64100EUM-4-HT	3,730	550,000	200,000	10,600	42,500	-4	3	3.7

[1] The effective weight range limits can be raised or lowered to special order.
[2] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

MC33-LT to MC64-LT

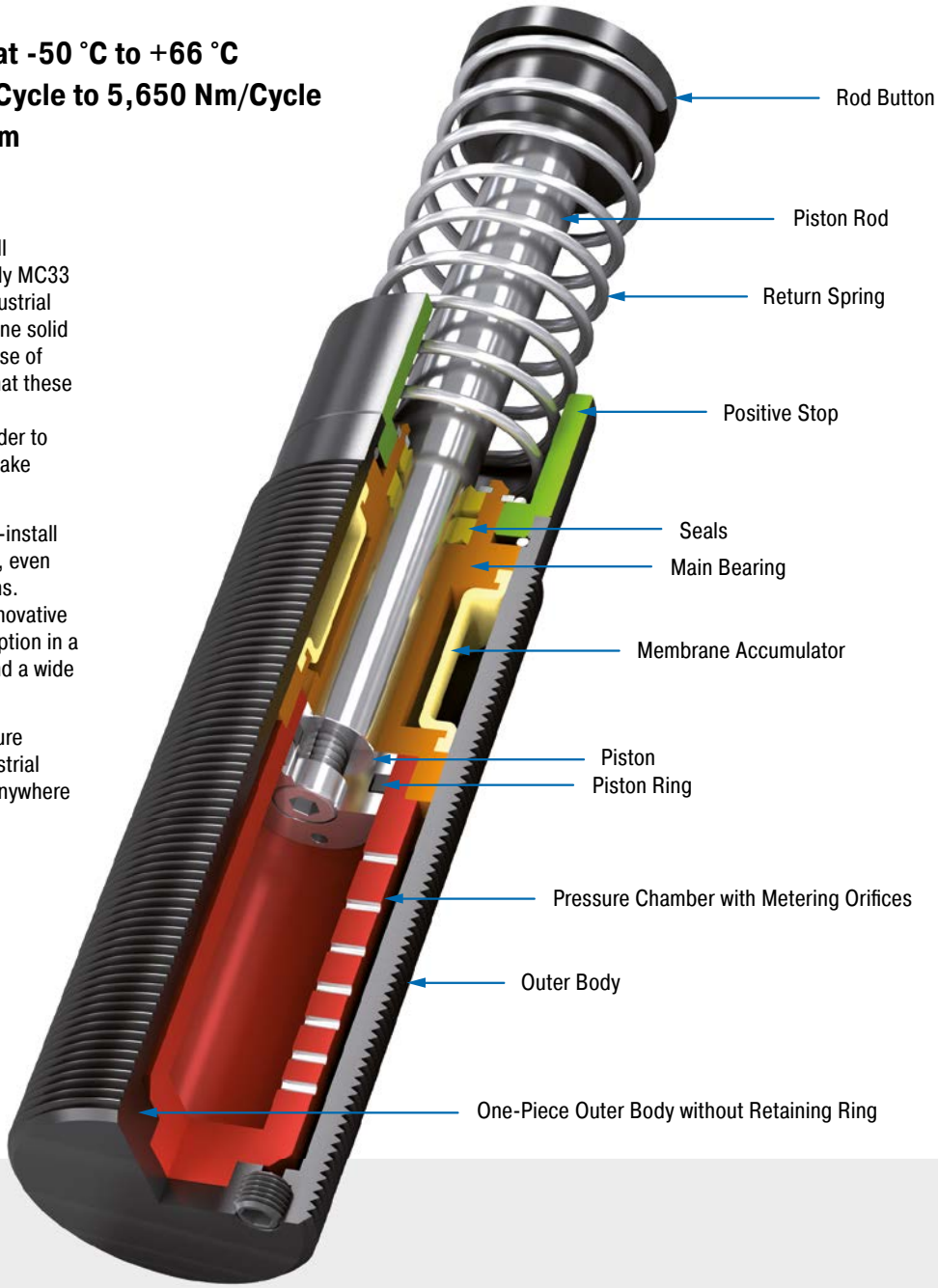
Extreme low temperatures

Self-Compensating, use at -50 °C to +66 °C
Energy capacity 170 Nm/Cycle to 5,650 Nm/Cycle
Stroke 23.1 mm to 150 mm

Further possibilities of use: Just like all MAGNUM types from the product family MC33 to MC64, the LT (low temperature) industrial shock absorbers are also made from one solid piece. They are characterised by the use of special seals and fluids. This means that these versions can even be used at extreme temperatures of -50 °C to +66 °C in order to safely and reliable damp masses and take away 100 % kinetic energy.

There is no reason why these ready-to-install machine elements should not be used, even under the most unfavourable conditions. Additional benefits are their robust, innovative sealing technology, high energy absorption in a compact design, fixed positive stop and a wide damping range.

Designed for use in extreme temperature ranges, these self-compensating industrial shock absorbers are suitable almost anywhere in plant and mechanical engineering.



Technical Data

Energy capacity: 170 Nm/Cycle to 5,650 Nm/Cycle

Impact velocity range: 0.15 m/s to 5 m/s. Other speeds on request.

Operating temperature range: -50 °C to +66 °C

Mounting: In any position

Positive stop: Integrated

Material: Outer body: Nitride hardened steel; Piston rod: Hard chrome plated steel; Rod end button: Hardened steel and corrosion-resistant coating; Return spring: Zinc plated or plastic-coated steel; Accessories: Steel with black oxide finish or nitride hardened

Damping medium: Low temperature hydraulic oil

Application field: Linear slides, Swivel units, Turntables, Machines and plants, Tool machines, Machining centres, Z-axes

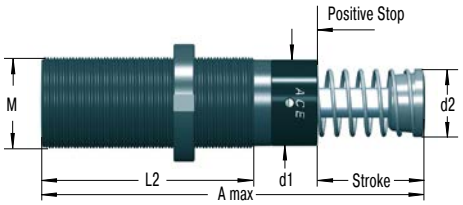
Note: A noise reduction of 3 to 7 dB is possible when using the special impact button (PP).

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

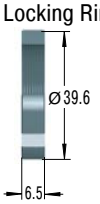
On request: Nickel-plated, increased corrosion protection, mounting inside air cylinders or other special options are available on request. Adjustable HT and LT shock absorbers.

Issue 07.2017 – Specifications subject to change

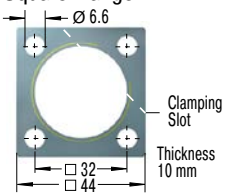
MC33EUM-LT



NM33
Locking Ring



QF33
Square Flange



Torque max.: 11 Nm
Clamping torque: > 90 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Complete details required when ordering

Load to be decelerated: m (kg)
Impact velocity: v (m/s)
Propelling force: F (N)
Operating cycles per hour: c (/hr)
Number of absorbers in parallel: n
Ambient temperature: °C

Ordering Example **MC3325EUM-2-LT**

Self-Compensating
Thread Size M33
Stroke 25 mm
EU Compliant
Metric Thread (omitted when using thread UNF)
Effective Weight Range Code
LT = Version for Low Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC3325EUM-LT	23.2	138	30	25	83	M33x1.5
MC3350EUM-LT	48.6	189	30	25	108	M33x1.5

Performance

	Max. Energy Capacity		Effective Weight					
TYPES	W_3 Nm/cycle	W_4 Nm/h	[1] me min. kg	[1] me max. kg	Hardness	[2] Return Time s	[3] Side Load Angle max. °	Weight kg
MC3325EUM-0-LT	170	75,000	3	11	-0	0.08	4	0.51
MC3325EUM-1-LT	170	75,000	9	40	-1	0.08	4	0.51
MC3325EUM-2-LT	170	75,000	30	120	-2	0.08	4	0.51
MC3325EUM-3-LT	170	75,000	100	420	-3	0.08	4	0.51
MC3325EUM-4-LT	170	75,000	350	1,420	-4	0.08	4	0.51
MC3350EUM-0-LT	330	85,000	5	22	-0	0.16	3	0.63
MC3350EUM-1-LT	330	85,000	18	70	-1	0.16	3	0.63
MC3350EUM-2-LT	330	85,000	60	250	-2	0.16	3	0.63
MC3350EUM-3-LT	330	85,000	240	840	-3	0.16	3	0.63
MC3350EUM-4-LT	330	85,000	710	2,830	-4	0,16	3	0.63

[1] The effective weight range limits can be raised or lowered to special order.
[2] at -50 °C
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

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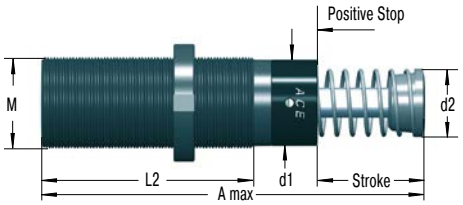
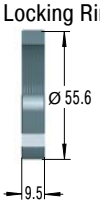
Industrial Shock Absorbers MC45EUM-LT

Self-Compensating

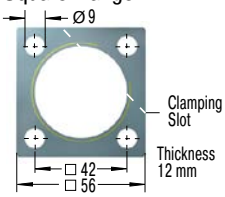
MC45EUM-LT



NM45
Locking Ring



QF45
Square Flange



Torque max.: 27 Nm
Clamping torque: > 200 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Complete details required when ordering

Load to be decelerated: m (kg)
Impact velocity: v (m/s)
Propelling force: F (N)
Operating cycles per hour: c (/hr)
Number of absorbers in parallel: n
Ambient temperature: °C

Ordering Example **MC4525EUM-3-LT**

Self-Compensating
Thread Size M45
Stroke 25 mm
EU Compliant
Metric Thread (omitted when using thread UNF)
Effective Weight Range Code
LT = Version for Low Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC4525EUM-LT	23.1	145	42	35	95	M45x1.5
MC4550EUM-LT	48.5	195	42	35	120	M45x1.5
MC4575EUM-LT	73.9	246	42	35	145	M45x1.5

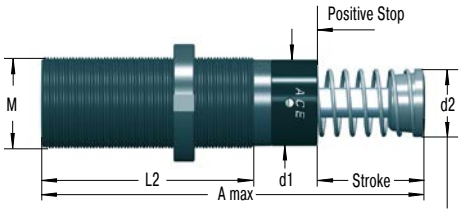
Performance

	Max. Energy Capacity		Effective Weight					
TYPES	W_3 Nm/cycle	W_4 Nm/h	[1] me min. kg	[1] me max. kg	Hardness	[2] Return Time s	[3] Side Load Angle max. °	Weight kg
MC4525EUM-0-LT	370	107,000	7	27	-0	0.08	4	1.14
MC4525EUM-1-LT	370	107,000	20	90	-1	0.08	4	1.14
MC4525EUM-2-LT	370	107,000	80	310	-2	0.08	4	1.14
MC4525EUM-3-LT	370	107,000	260	1,050	-3	0.08	4	1.14
MC4525EUM-4-LT	370	107,000	890	3,540	-4	0.08	4	1.14
MC4550EUM-0-LT	740	112,000	13	54	-0	0.16	3	1.36
MC4550EUM-1-LT	740	112,000	45	180	-1	0.16	3	1.36
MC4550EUM-2-LT	740	112,000	150	620	-2	0.16	3	1.36
MC4550EUM-3-LT	740	112,000	520	2,090	-3	0.16	3	1.36
MC4550EUM-4-LT	740	112,000	1,800	7,100	-4	0.16	3	1.36
MC4575EUM-0-LT	1,130	146,000	20	80	-0	0.24	2	1.59
MC4575EUM-1-LT	1,130	146,000	70	270	-1	0.24	2	1.59
MC4575EUM-2-LT	1,130	146,000	230	930	-2	0.24	2	1.59
MC4575EUM-3-LT	1,130	146,000	790	3,140	-3	0.24	2	1.59
MC4575EUM-4-LT	1,130	146,000	2,650	10,600	-4	0.24	2	1.59

[1] The effective weight range limits can be raised or lowered to special order.
[2] at -50 °C
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

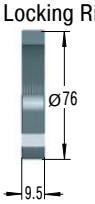
Issue 07.2017 – Specifications subject to change

MC64EUM-LT

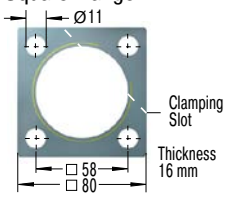


150 mm stroke model does not include stop collar.
Positive stop is provided by the rod button (Ø 60 mm) and a stop block.

NM64
Locking Ring



QF64
Square Flange



Torque max.: 50 Nm
Clamping torque: > 210 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Complete details required when ordering

Load to be decelerated: m (kg)
Impact velocity: v (m/s)
Propelling force: F (N)
Operating cycles per hour: c (/hr)
Number of absorbers in parallel: n
Ambient temperature: °C

Ordering Example **MC6450EUM-4-LT**

Self-Compensating
Thread Size M64
Stroke 50 mm
EU Compliant
Metric Thread (omitted when using thread UNF)
Effective Weight Range Code
LT = Version for Low Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC6450EUM-LT	48.6	225	60	48	140	M64x2
MC64100EUM-LT	99.4	326	60	48	191	M64x2
MC64150EUM-LT	150	450	60	48	241	M64x2

Performance

	Max. Energy Capacity		Effective Weight					
TYPES	W_3 Nm/cycle	W_4 Nm/h	[1] me min. kg	[1] me max. kg	Hardness	[2] Return Time s	[3] Side Load Angle max. °	Weight kg
MC6450EUM-0-LT	1,870	146,000	35	140	-0	0.24	4	2.9
MC6450EUM-1-LT	1,870	146,000	140	540	-1	0.24	4	2.9
MC6450EUM-2-LT	1,870	146,000	460	1,850	-2	0.24	4	2.9
MC6450EUM-3-LT	1,870	146,000	1,600	6,300	-3	0.24	4	2.9
MC6450EUM-4-LT	1,870	146,000	5,300	21,200	-4	0.24	4	2.9
MC64100EUM-0-LT	3,730	192,000	70	280	-0	0.68	3	3.7
MC64100EUM-1-LT	3,730	192,000	270	1,100	-1	0.68	3	3.7
MC64100EUM-2-LT	3,730	192,000	930	3,700	-2	0.68	3	3.7
MC64100EUM-3-LT	3,730	192,000	3,150	12,600	-3	0.68	3	3.7
MC64100EUM-4-LT	3,730	192,000	10,600	42,500	-4	0.68	3	3.7
MC64150EUM-0-LT	5,650	248,000	100	460	-0	0.96	2	5.1
MC64150EUM-1-LT	5,650	248,000	410	1,640	-1	0.96	2	5.1
MC64150EUM-2-LT	5,650	248,000	1,390	5,600	-2	0.96	2	5.1
MC64150EUM-3-LT	5,650	248,000	4,700	18,800	-3	0.96	2	5.1
MC64150EUM-4-LT	5,650	248,000	16,000	63,700	-4	0.96	2	5.1

[1] The effective weight range limits can be raised or lowered to special order.
[2] at -50 °C
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

SC33 to SC45

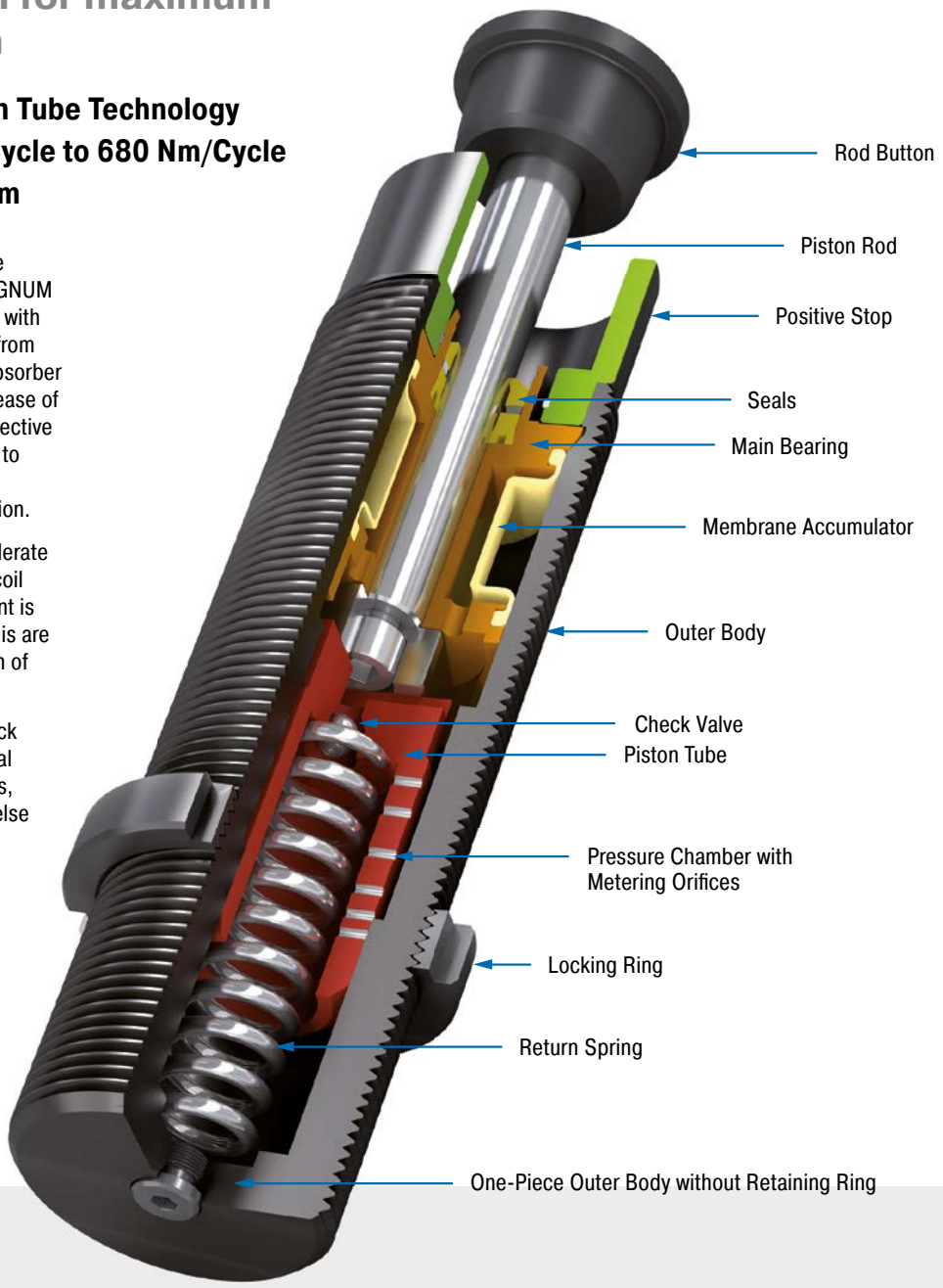
Piston tube design for maximum energy absorption

Self-Compensating, Piston Tube Technology
Energy capacity 155 Nm/Cycle to 680 Nm/Cycle
Stroke 23.1 mm to 48.6 mm

True performers: The combination of the proven sealing technology from the MAGNUM range including membrane accumulator with the well-known piston tube technology from the SC² family makes the SC33 to 45 absorber models so strong and durable. The increase of the oil volume ensures the maximum effective weights. Short stroke lengths of 25 mm to 50 mm lead to shorter braking times in combination with a high energy absorption.

These dampers safely and reliably decelerate rotary movements without unwanted recoil effects. Assembly close to the pivot point is possible. The low impact speeds with this are managed with ease by ACE's generation of piston tubes.

These self-compensating industrial shock absorbers can be relied on in mechanical engineering. They are used in pivot units, rotary tables, robot arms or integrated else where in construction designs.



Technical Data

Energy capacity: 155 Nm/Cycle to 680 Nm/Cycle

Impact velocity range: 0.02 m/s to 0.46 m/s. Other speeds on request.

Operating temperature range: -12 °C to +66 °C. Other temperatures on request.

Mounting: In any position

Positive stop: In any position

Material: Outer body: Nitride hardened steel; Piston rod: Hard chrome plated steel; Rod end button: Hardened steel and corrosion-resistant coating; Accessories: Steel with black oxide finish or nitride hardened

Damping medium: Low temperature hydraulic oil

Application field: Turntables, Swivel units, Robot arms, Linear slides, Pneumatic cylinders, Handling modules, Machines and plants, Finishing and processing centres

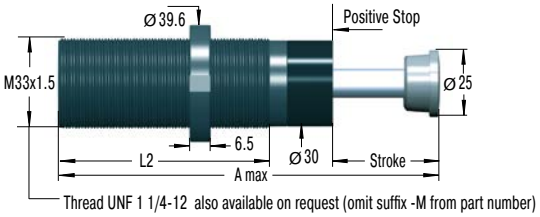
Note: A noise reduction of 3 to 7 dB is possible when using the special impact button (PP).

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

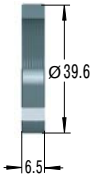
On request: Special oils, mounting inside air cylinders or other special options are available on request.

Issue 07.2017 – Specifications subject to change

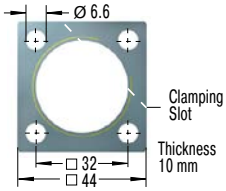
SC33EUM



NM33
Locking Ring

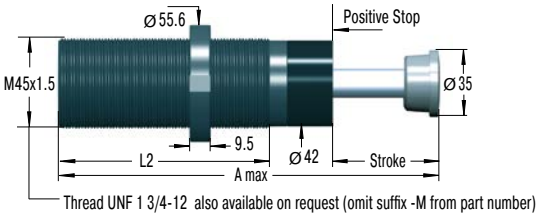


QF33
Square Flange

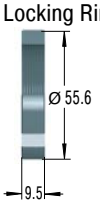


Torque max.: 11 Nm
Clamping torque: > 90 Nm
Install with 4 machine screws

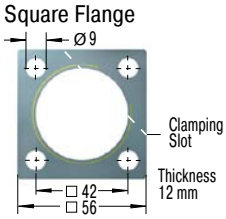
SC45EUM



NM45
Locking Ring



QF45
Square Flange



Torque max.: 27 Nm
Clamping torque: > 200 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Ordering Example **SC4525EUM-5**

- Self-Compensating
- Thread Size M45
- Stroke 25 mm
- EU Compliant
- Metric Thread (omitted when using thread UNF 1 3/4-12)
- Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	L2 mm
SC3325EUM	23.2	178	122
SC3350EUM	48.6	254	173
SC4525EUM	23.1	189	139
SC4550EUM	48.5	265	190

Performance

TYPES	Max. Energy Capacity W_3 Nm/cycle	Max. Energy Capacity W_4 Nm/h	Effective Weight [1] me min. kg	Effective Weight [1] me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
SC3325EUM-5	155	75,000	1,360	2,721	-5	44	89	0.75	4	0.68
SC3325EUM-6	155	75,000	2,500	5,443	-6	44	89	0.75	4	0.68
SC3325EUM-7	155	75,000	4,989	8,935	-7	44	89	0.75	4	0.68
SC3325EUM-8	155	75,000	8,618	13,607	-8	44	89	0.75	4	0.68
SC3350EUM-5	310	85,000	2,721	4,990	-5	51	125	0.90	3	0.92
SC3350EUM-6	310	85,000	4,536	9,980	-6	51	125	0.90	3	0.92
SC4525EUM-5	340	107,000	3,400	6,800	-5	67	104	0.8	4	1.43
SC4525EUM-6	340	107,000	6,350	13,600	-6	67	104	0.8	4	1.43
SC4525EUM-7	340	107,000	12,700	22,679	-7	67	104	0.8	4	1.43
SC4525EUM-8	340	107,000	20,411	39,000	-8	67	104	0.8	4	1.43
SC4550EUM-5	680	112,000	6,800	12,246	-5	47	242	1.0	3	1.90
SC4550EUM-6	680	112,000	11,790	26,988	-6	47	242	1.0	3	1.90
SC4550EUM-7	680	112,000	25,854	44,225	-7	47	242	1.0	3	1.90

[1] The effective weight range limits can be raised or lowered to special order.
[2] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

MA/ML33 to MA/ML64

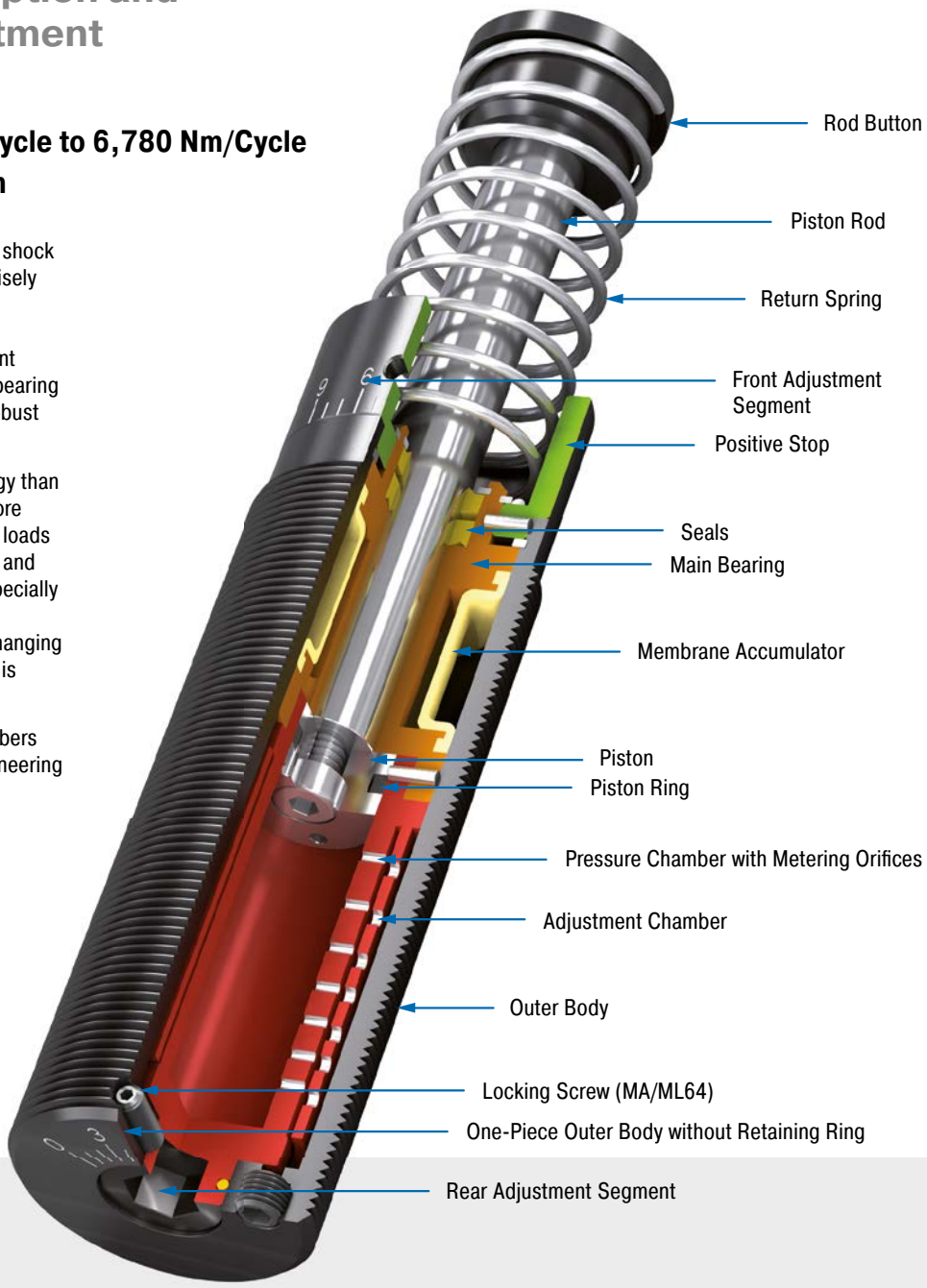
High energy absorption and progressive adjustment

Adjustable
Energy capacity 170 Nm/Cycle to 6,780 Nm/Cycle
Stroke 23.1 mm to 150 mm

Adjustable and unique: These industrial shock absorbers from ACE, which can be precisely adjusted both at the front and rear, also contribute towards the success of the MAGNUM series. Equipped with excellent sealing technology, an annealed guide bearing and integrated positive stop, they are robust and durable.

These dampers absorb 50 % more energy than their predecessors but are built even more compactly. The larger range of effective loads also opens up various options in design and assembly. This makes the ML series especially suitable for effective loads of 300 kg to 500,000 kg. Where work is done with changing application data and wherever flexibility is required, they make the best option.

These adjustable industrial shock absorbers are used in all areas of mechanical engineering - e.g. in automation, integrated in linear carriages or pivoting units and also for gantries.



Technical Data

Energy capacity: 170 Nm/Cycle to 6,780 Nm/Cycle

Impact velocity range: MA: 0.15 m/s to 5 m/s. ML: 0.02 m/s to 0.46 m/s. Other speeds on request.

Operating temperature range: -12 °C to +66 °C

Other temperatures on request.

Mounting: In any position

Positive stop: Integrated

Adjustment: Hard impact at the start of stroke, adjust the ring towards 9 or PLUS. Hard impact at the end of stroke, adjust the ring towards 0 or MINUS.

Material: Outer body: Nitride hardened steel; Piston rod: Hard chrome plated steel; Rod end button: Hardened steel and corrosion-resistant coating; Return spring: Zinc plated or plastic-coated steel; Accessories: Steel with black oxide finish or nitride hardened

Damping medium: Automatic Transmission Fluid (ATF)

Application field: Linear slides, Swivel units, Turntables, Portal systems, Machines and plants, Tool machines, Machining centres, Z-axes, Impact panels

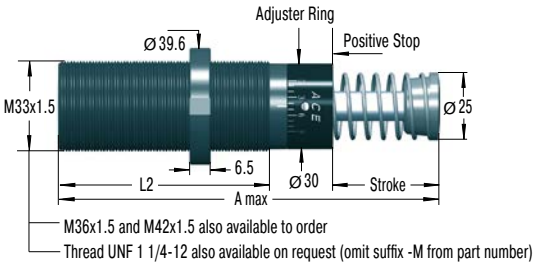
Note: A noise reduction of 3 to 7 dB is possible when using the special impact button (PP). For emergency use only applications and for continous use (with additional cooling) it is sometimes possible to exceed the published max. capacity ratings. In this case, please consult ACE.

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

On request: Special oils, nickel-plated, increased corrosion protection, mounting inside air cylinders or other special options are available on request.

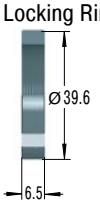
Issue 07.2017 – Specifications subject to change

MA/ML33EUM

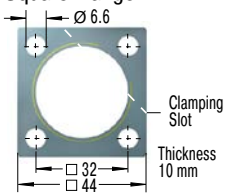


Adjuster

NM33
Locking Ring



QF33
Square Flange



Torque max.: 11 Nm
Clamping torque: > 90 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

MA: Self-Contained with return spring, adjustable
ML: Self-Contained with return spring, adjustable, for lower impact velocity

Special Models

MAA, MLA: Air/Oil return without return spring. Use only with external air/oil tank.
MAS, MLS: Air/Oil Return with return spring. Use only with external air/oil tank.
MAN, MLN: Self-Contained without return spring

Ordering Example **MA/ML3350EUM**

Adjustable
Thread Size M33
Stroke 50 mm
EU Compliant
Metric Thread
(omitted when using thread UNF 1 1/4-12)

Dimensions

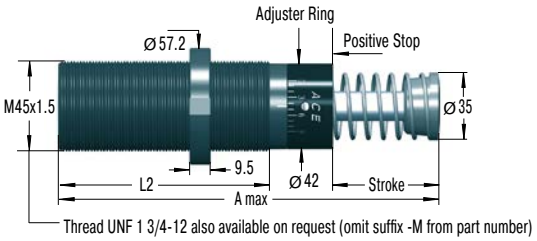
TYPES	Stroke mm	A max. mm	L2 mm
MA3325EUM	23.2	138	83
ML3325EUM	23.2	138	83
MA3350EUM	48.6	189	108
ML3350EUM	48.6	189	108

Performance

	Max. Energy Capacity				Effective Weight						
TYPES	[1] W_3 Nm/cycle	W_4 Nm/h	W_4 with Air/Oil Tank Nm/h	W_4 with Oil Recirculation Nm/h	[2] me min. kg	[2] me max. kg	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MA3325EUM	170	75,000	124,000	169,000	9	1,700	45	90	0.03	4	0.51
ML3325EUM	170	75,000	124,000	169,000	300	50,000	45	90	0.03	4	0.51
MA3350EUM	340	85,000	135,000	180,000	13	2,500	45	135	0.06	3	0.62
ML3350EUM	340	85,000	135,000	180,000	500	80,000	45	135	0.06	3	0.62

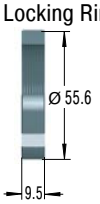
[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] The effective weight range limits can be raised or lowered to special order.
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

MA/ML45EUM

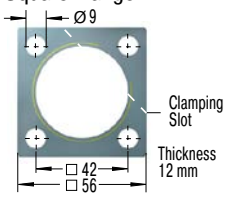


Adjuster

NM45
Locking Ring



QF45
Square Flange



Torque max.: 27 Nm
Clamping torque: > 200 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

MA: Self-Contained with return spring, adjustable
ML: Self-Contained with return spring, adjustable, for lower impact velocity

Special Models

MAA, MLA: Air/Oil return without return spring. Use only with external air/oil tank.
MAS, MLS: Air/Oil Return with return spring. Use only with external air/oil tank.
MAN, MLN: Self-Contained without return spring

Ordering Example **MA/ML4525EUM**

Adjustable
Thread Size M45
Stroke 25 mm
EU Compliant
Metric Thread
(omitted when using thread UNF 1 3/4-12)

Dimensions

TYPES	Stroke mm	A max. mm	L2 mm
MA4525EUM	23.1	145	95
ML4525EUM	23.1	145	95
MA4550EUM	48.5	195	120
ML4550EUM	48.5	195	120
MA4575EUM	73.9	246	145

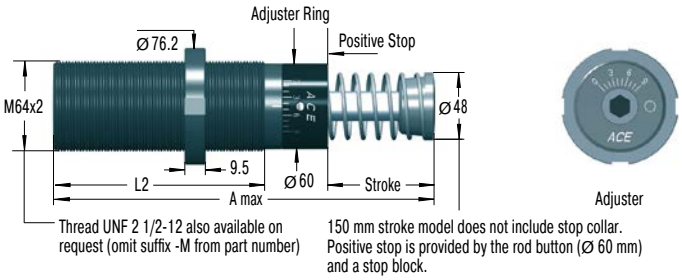
Performance

	Max. Energy Capacity				Effective Weight						
TYPES	[1] W_3 Nm/cycle	W_4 Nm/h	W_4 with Air/Oil Tank Nm/h	W_4 with Oil Recirculation Nm/h	[2] me min. kg	[2] me max. kg	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MA4525EUM	425	107,000	158,000	192,000	40	10,000	70	100	0.03	4	1.13
ML4525EUM	425	107,000	158,000	192,000	3,000	110,000	70	100	0.03	4	1.13
MA4550EUM	850	112,000	192,000	248,000	70	14,500	70	145	0.08	3	1.37
ML4550EUM	850	112,000	192,000	248,000	5,000	180,000	70	145	0.08	3	1.37
MA4575EUM	1,300	146,000	225,000	282,000	70	15,000	50	180	0.11	2	1.59

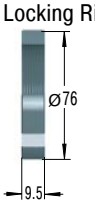
[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] The effective weight range limits can be raised or lowered to special order.
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to77.

Issue 07.2017 – Specifications subject to change

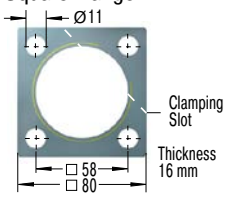
MA/ML64EUM



NM64
Locking Ring



QF64
Square Flange



Torque max.: 50 Nm
Clamping torque: > 210 Nm
Install with 4 machine screws

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

MA: Self-Contained with return spring, adjustable
ML: Self-Contained with return spring, adjustable, for lower impact velocity

Special Models

MAA, MLA: Air/Oil return without return spring. Use only with external air/oil tank.
MAS, MLS: Air/Oil Return with return spring. Use only with external air/oil tank.
MAN, MLN: Self-Contained without return spring

Ordering Example **MA/ML6450EUM**

Adjustable
Thread Size M64
Stroke 50 mm
EU Compliant
Metric Thread
(omitted when using thread UNF 2 1/2-12)

Dimensions

TYPES	Stroke mm	A max. mm	L2 mm
ML6425EUM	23.2	174	114
MA6450EUM	48.6	225	140
ML6450EUM	48.6	225	140
MA64100EUM	99.4	326	191
MA64150EUM	150	450	241

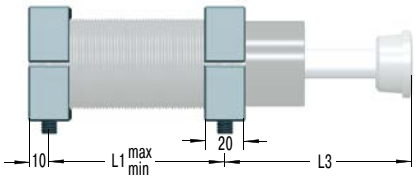
Performance

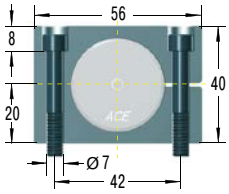
	Max. Energy Capacity				Effective Weight						
TYPES	[1] W_3 Nm/cycle	W_4 Nm/h	W_4 with Air/Oil Tank Nm/h	W_4 with Oil Recirculation Nm/h	[2] me min. kg	[2] me max. kg	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
ML6425EUM	1,135	124,000	248,000	332,000	7,000	300,000	120	155	0.06	5	2.5
MA6450EUM	2,275	146,000	293,000	384,000	220	50,000	90	155	0.12	4	3.0
ML6450EUM	2,275	146,000	293,000	384,000	11,000	500,000	90	155	0.12	4	3.0
MA64100EUM	4,520	192,000	384,000	497,000	270	52,000	105	270	0.34	3	3.7
MA64150EUM	6,780	248,000	497,000	644,000	330	80,000	75	365	0.48	2	5.1

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] The effective weight range limits can be raised or lowered to special order.
[3] For applications with higher side load angles consider using the side load adaptor (BV) pages 74 to 77.

M33x1.5

S33
Side Foot Mounting Kit



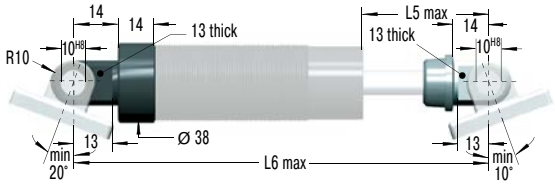


Dimensions

TYPES	L1 min. mm	L1 max. mm	L3 mm
MC, MA, ML3325EUM	25	60	68
MC, MA, ML3350EUM	32	86	93
SC3325EUM	40	98	66
SC3350EUM	60	153	92

S33 = 2 flanges + 4 screws M6x40, DIN 912
Torque max.: 11 Nm
Clamping torque: 90 Nm
Because of the thread pitch the fixing holes for the second foot mount should only be drilled and tapped after the first foot mount has been fixed in position.

C33
Clevis Mounting Kit

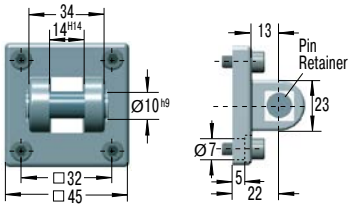


Dimensions

TYPES	L5 max. mm	L6 max. mm
MC, MA, ML3325EUM	39	168
MC, MA, ML3350EUM	64	218
SC3325EUM	39	208
SC3350EUM	64	283

C33 = 2 clevis eyes. Delivered assembled to shock absorber.
Use positive stop at both ends of travel.

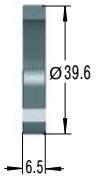
SF33
Clevis Flange



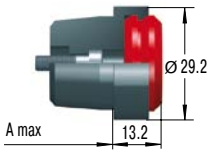
SF33 = flange + 4 screws M6x20, DIN 912
Torque max.: 7.5 Nm
Secure with pin or use additional bar. Due to limited force capacity the respective ability should be reviewed by ACE.

M33x1.5

NM33
Locking Ring



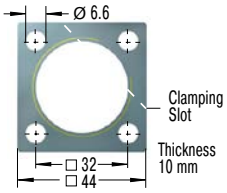
PP33
Poly Button



see shock absorber dims.

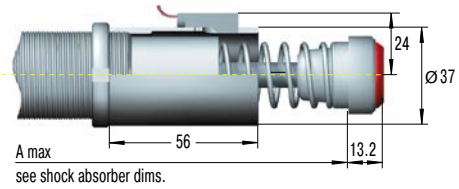
Supplied ready mounted onto the shock absorber.

QF33
Square Flange



Torque max.: 11 Nm
Clamping torque: > 90 Nm
Install with 4 machine screws

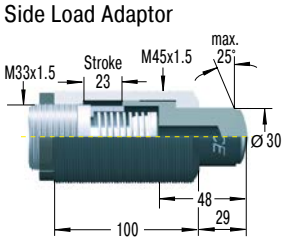
AS33
Switch Stop Collar



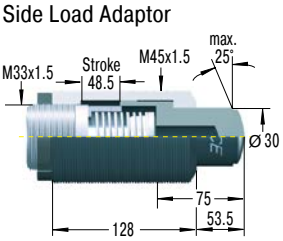
see shock absorber dims.

inc. Proximity Switch and Poly Button with elastomer insert

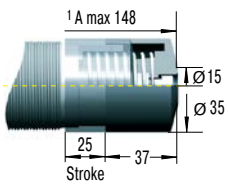
BV3325
Side Load Adaptor



BV3350
Side Load Adaptor

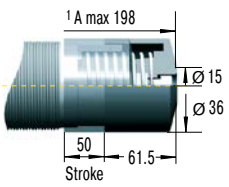


PB3325
Steel Shroud



[1] Total installation length of the shock absorber inc. steel shroud

PB3350
Steel Shroud

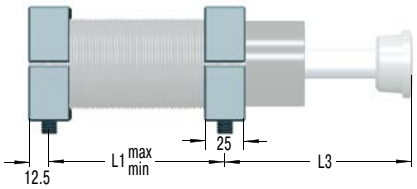


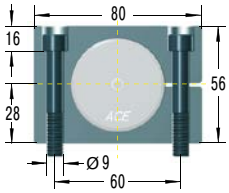
[1] Total installation length of the shock absorber inc. steel shroud

For mounting, installation, ..., see page 77.

M45x1.5

S45
Side Foot Mounting Kit

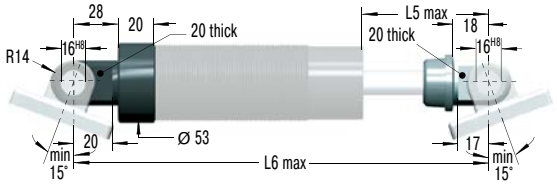




Dimensions	L1 min.	L1 max.	L3
TYPES	mm	mm	mm
MC, MA, ML4525EUM	32	66	66
MC, MA, ML4550EUM	40	92	91
MC, MA4575EUM	50	118	116
SC4525EUM	50	112	62.5
SC4550EUM	64	162	87.5

S45 = 2 flanges + 4 screws M8x50, DIN 912
Torque max.: 27 Nm
Clamping torque: 350 Nm
Because of the thread pitch the fixing holes for the second foot mount should only be drilled and tapped after the first foot mount has been fixed in position.

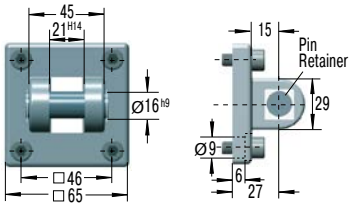
C45
Clevis Mounting Kit



Dimensions	L5 max.	L6 max.
TYPES	mm	mm
MC, MA, ML4525EUM	43	200
MC, MA, ML4550EUM	68	250
MC, MA4575EUM	93	301
SC4525EUM	68	244
SC4550EUM	93	320

C45 = 2 clevis eyes. Delivered assembled to shock absorber.
Use positive stop at both ends of travel.

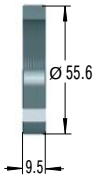
SF45
Clevis Flange



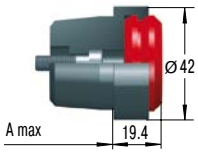
SF45 = flange + 4 screws M8x20, DIN 912
Torque max.: 7.5 Nm
Secure with pin or use additional bar. Due to limited force capacity the respective ability should be reviewed by ACE.

M45x1.5

NM45
Locking Ring



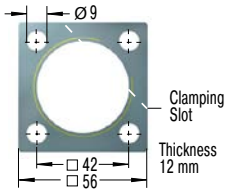
PP45
Poly Button



see shock absorber dims.

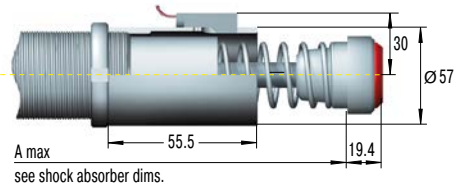
Supplied ready mounted onto the shock absorber.

QF45
Square Flange



Torque max.: 27 Nm
Clamping torque: > 200 Nm
Install with 4 machine screws

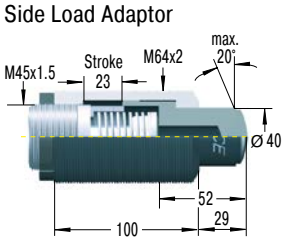
AS45
Switch Stop Collar



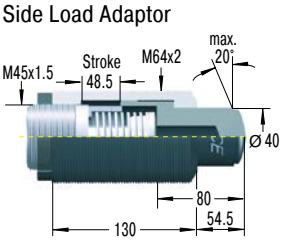
see shock absorber dims.

inc. Proximity Switch and Poly Button with elastomer insert

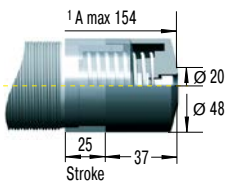
BV4525
Side Load Adaptor



BV4550
Side Load Adaptor

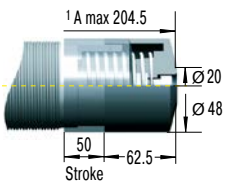


PB4525
Steel Shroud



[1] Total installation length of the shock absorber inc. steel shroud

PB4550
Steel Shroud



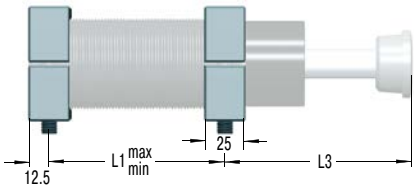
[1] Total installation length of the shock absorber inc. steel shroud

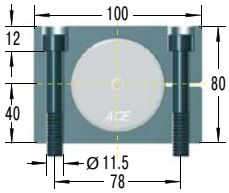
For mounting, installation, ..., see page 77.

ACE Stoßdämpfer GmbH · PO Box 1510 · D-40740 Langenfeld · T +49 (0)2173 - 9226-4100 · F +49 (0)2173 - 9226-89 · info@ace-int.eu · www.ace-ace.com

M64x2

S64
Side Foot Mounting Kit



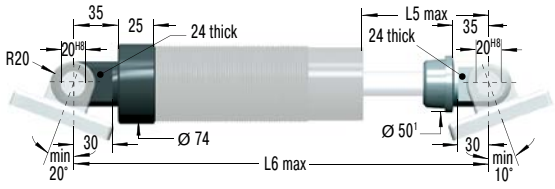


Dimensions

TYPES	L1 min. mm	L1 max. mm	L3 mm
ML6425EUM	40	86	75.5
MC, MA, ML6450EUM	50	112	100
MC, MA64100EUM	64	162	152
MC, MA64150EUM	80	212	226

S64 = 2 flanges + 4 screws M10x80, DIN 912
Torque max.: 50 Nm
Clamping torque: 350 Nm
Because of the thread pitch the fixing holes for the second foot mount should only be drilled and tapped after the first foot mount has been fixed in position.

C64
Clevis Mounting Kit



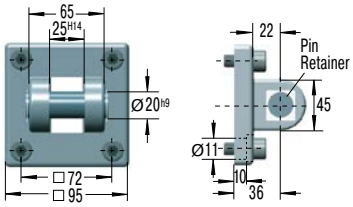
Dimensions

TYPES	L5 max. mm	L6 max. mm
ML6425EUM	60	260
MC, MA, ML6450EUM	85	310
MC, MA64100EUM	136	410
MC, MA64150EUM	187	530

¹ With 150 mm stroke Dia. 60 mm. Order C64-150.

C64 = 2 clevis eyes. Delivered assembled to shock absorber.
Use positive stop at both ends of travel.

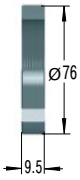
SF64
Clevis Flange



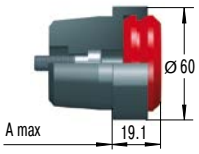
SF64 = flange + 4 screws M10x20, DIN 912
Torque max.: 15 Nm
Secure with pin or use additional bar. Due to limited force capacity the respective ability should be reviewed by ACE.

M64x2

NM64
Locking Ring



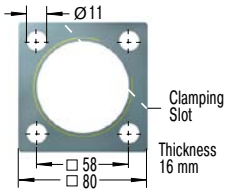
PP64
Poly Button



see shock absorber dims.

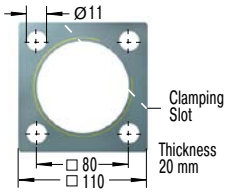
Supplied ready mounted onto the shock absorber.

QF64
Square Flange



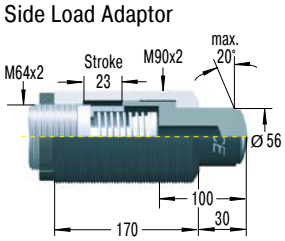
Torque max.: 50 Nm
Clamping torque: > 210 Nm
Install with 4 machine screws

QF90
Square Flange

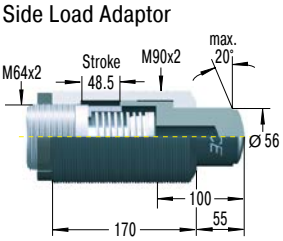


Torque max.: 50 Nm
Clamping torque: > 210 Nm
Install with 4 machine screws

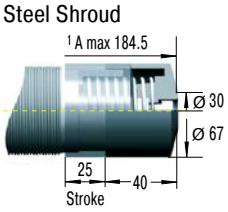
BV6425
Side Load Adaptor



BV6450
Side Load Adaptor

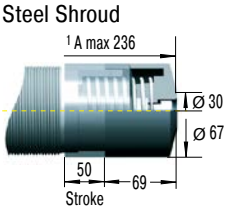


PB6425
Steel Shroud



¹ Total installation length of the shock absorber inc. steel shroud

PB6450
Steel Shroud



¹ Total installation length of the shock absorber inc. steel shroud

For mounting, installation, ..., see page 77.

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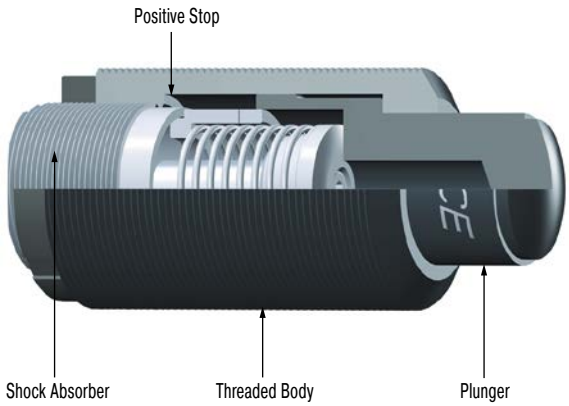
BV



Side Load Adaptor

For side load impact angles from 3° to 25°

With side load impact angles of more than 3° the operation lifetime of the shock absorber reduces rapidly due to increased wear of rod bearings. The optional BV side load adaptor provides long lasting solution.

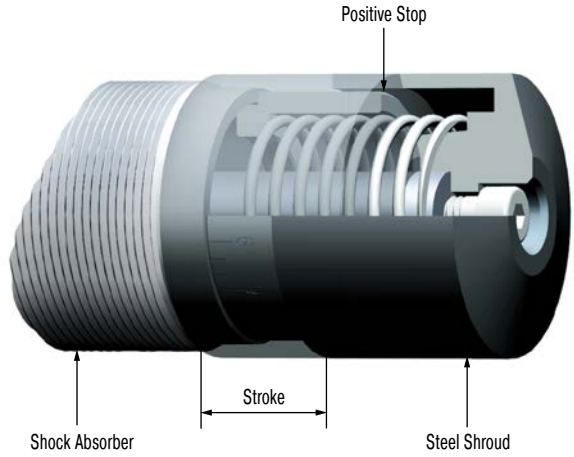
Ordering information
BV3325 (M45x1.5) for MC, MA, ML3325EUM (M33x1.5)
BV3350 (M45x1.5) for MC, MA, ML3350EUM (M33x1.5)
BV4525 (M64x2) for MC, MA, ML4525EUM (M45x1.5)
BV4550 (M64x2) for MC, MA, ML4550EUM (M45x1.5)
BV6425 (M90x2) for ML6425EUM (M64x2)
BV6450 (M90x2) for MC, MA, ML6450EUM (M64x2)

Material
Threaded body and plunger: Hardened high tensile steel, hardened 610 HV1

Mounting information
Directly mount the shock absorber/side mount assembly on the outside thread of the side load adaptor or by using the QF flange. You cannot use a foot mount.

Calculation example and installation hints see page 45.

PB



Steel Shroud

For thread sizes M33x1.5, M45x1.5 and M64x2 with 25 or 50 mm stroke.

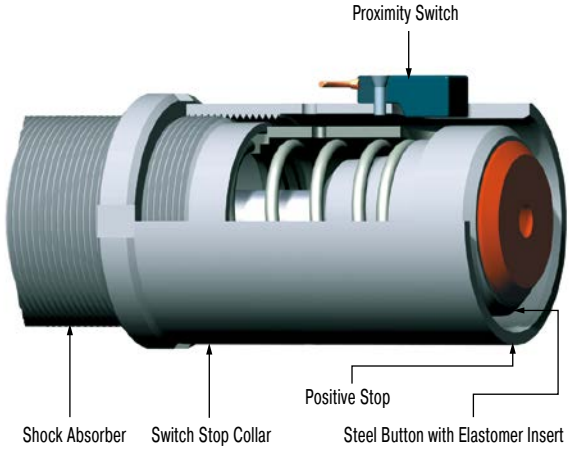
Grinding beads, sand, welding splatter, paints and adhesives etc. can adhere to the piston rod. They then damage the rod seals and the shock absorber quickly fails. In many cases the installation of the optional steel shroud can provide worthwhile protection and increase lifetime.

Material
Hardened high tensile steel

Mounting information
To mount the PB steel shroud it is necessary to remove the rod end button of the shock absorber.

Safety instructions
When installing don't forget to allow operating space for the shroud to move as the shock absorber is cycled.

AS



Switch Stop Collar

For thread sizes M33x1.5 and M45x1.5
The ACE stop light switch stop collar combination serves as a safety element to provide stroke position information for automatically sequenced machines. The compact construction allows its use in nearly any application. The standard rod button is detected by the proximity switch at the end of its stroke to provide switch actuation. The switch is normally open when the shock absorber is extended and only closes when it has completed its operating stroke.

Material
Hardened high tensile steel

Delivery
The AS switch stop collar combination is only delivered ready mounted onto the shock absorber c/w the switch.

For circuit diagram of proximity switch see page 46.

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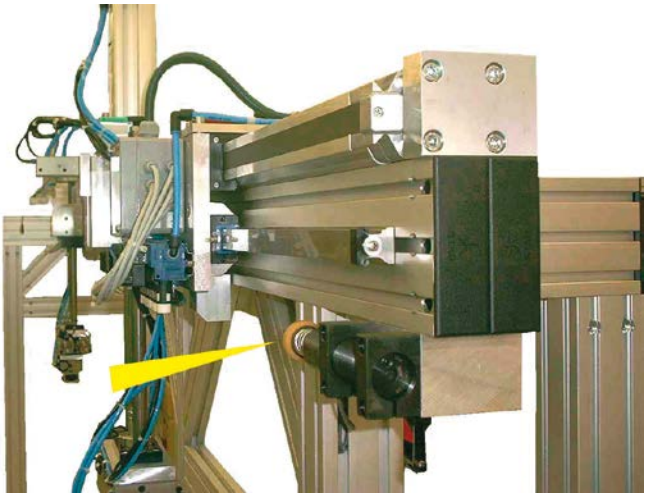
Application Examples

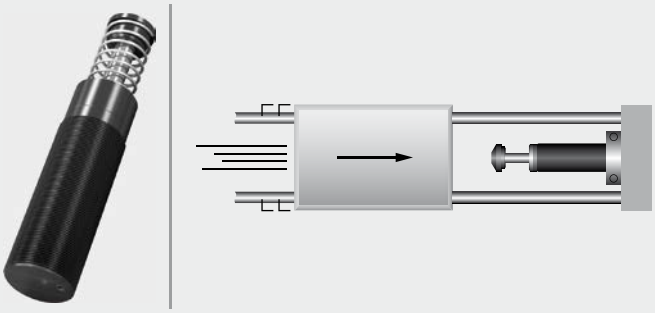
MC33EUM

Quicker, gentle positioning

ACE industrial shock absorbers optimize portal for machine loading and increase productivity. This device driven by piston rodless pneumatic cylinders, in which two gripper slides are moving independently of each other at speeds of 2 to 2.5 m/sec., is equipped with industrial shock absorbers as brake systems. Their function is to stop a mass of 25 kg up to 540 times per hour. The model MC3350EUM-1-S was chosen for this application, allowing easy and extremely accurate adjustment of the end positions of the adjustable limit stops. In comparison to brake systems with other function principles, shock absorbers allow higher travel speeds and shorter cycle sequences.



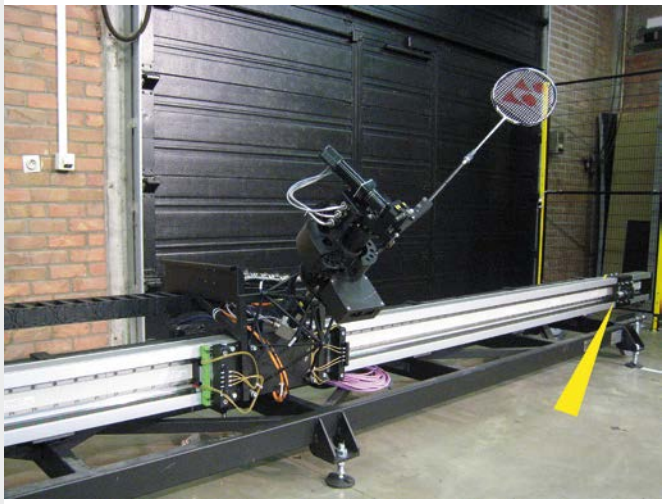
Industrial shock absorbers optimize portal operation



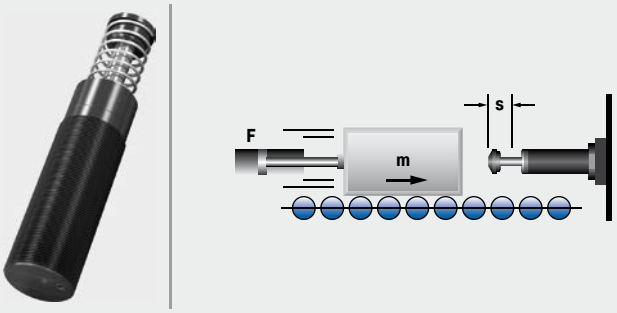
MC45EUM

MAGNUM protection of carriage construction

Serving a similar purpose, several ACE dampers are installed in Jada, the triple-axis, free-moving badminton robot. In order for the badminton robot to be capable of playing, it must be able to change direction in the shortest time possible. Jada is designed therefore to brake at a maximum of 30 m/s². For this task, linear modules are limited by the use of industrial shock absorbers of the type MC4575EUM-0. Miniature shock absorbers and profile dampers are also installed at the location of the “racket hand”. In all cases, the modern ACE machine elements serve to protect the end positions of the construction.



A variety of different dampers are used to slow the rapid movements of a badminton robot
FMTC vzw, 3001 Leuven, Belgium



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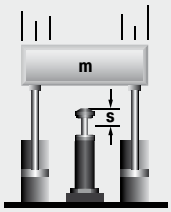
MC64EUM-VA

MAGNUM damper for safety under water

A pipeline from the rig to the well head that is as flexible as possible is considered to be a quick-disconnect connection in an emergency. Nevertheless, this connection made at the oil source on the sea floor is an Achilles heel. If the connection snaps or if it cannot be separated quickly enough during hazards such as storms, unpredictable, often serious consequences can hardly be prevented. With the so-called XR connector, the safety at this critical point is significantly increased. In the innovative design 10 industrial shock absorbers per connection from the MAGNUM series from ACE master this important task.

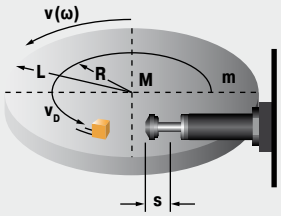


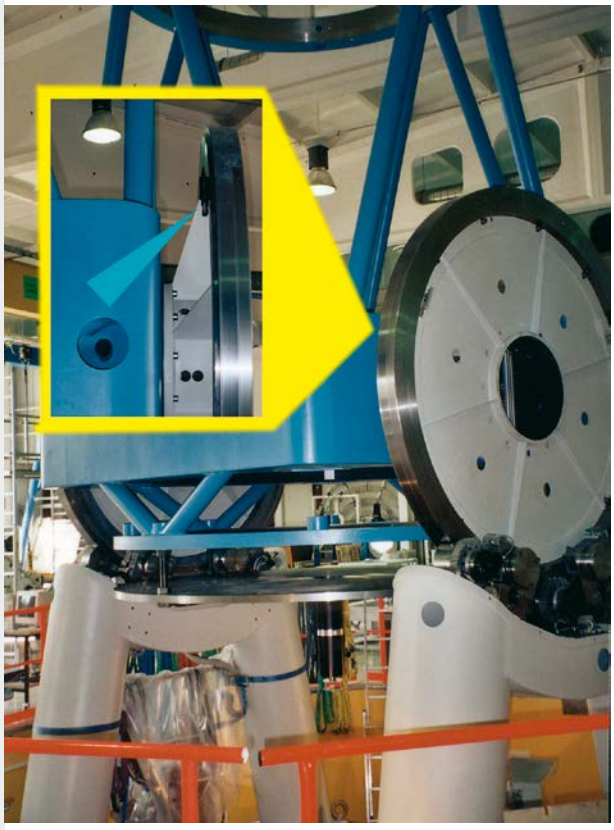
MAGNUMS allow for emergency quick disconnection of the pipelines from the oil rigs
Subsea Technologies Ltd, Aberdeen, AB12 3AY, UK

MA/ML33EUM

Safe swiveling

ACE industrial shock absorbers offer safety to spare for swiveling or braking of large telescope. The optical system of this telescope for special observations is moveable in two space coordinates. The structure in which the telescope is mounted weighs 15,000 kg and consists of a turntable with drives and two wheel disks rotating on bearings. It enables a rotation by ±90° from horizon to horizon. To safeguard the telescope in case of overshooting the respective swiveling limits, industrial shock absorbers of the type ML3325EUM are used as braking elements. Should the telescope inadvertently overshoot the permissible swivel range, they will safely damp the travel of the valuable telescope.





Perfect overshoot protection for precision telescope

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Heavy Industrial Shock Absorbers

Effective shock absorption for heavy loads

The heavy industrial shock absorbers from ACE round off the top of the company‘s offers in damping technology. Designers also have the choice between self-compensating and adjustable machine elements in this category from ACE.

Whichever design is chosen, this type of shock absorber impresses with its robustness and operational readiness wherever heavy loads need reliably stopped on-the-spot at a precise point.

The CA4 models can absorb up to 126,500 Nm of energy. The series of heavy duty, self-compensating CA types are equally suitable for use as an emergency stop as the adjustable types with the designations A1½ to A3. The range of effective loads covered is increased considerably for this purpose.

Heavy Industrial Shock Absorbers

CA2 to CA4

Page 82

Self-Compensating
Deceleration of heavy loads
Portal systems, Machines and plants, Conveyor systems, Crane systems

A1½ to A3

Page 86

Adjustable
Deceleration of heavy loads and progressive adjustment
Portal systems, Machines and plants, Conveyor systems, Crane systems

Rugged and powerful

Gently stops heavy loads with high precision

Also ideal for emergency stop utilisation

Safe, reliable production

Maintenance-free and ready-to-install

Special versions available

CA2 to CA4

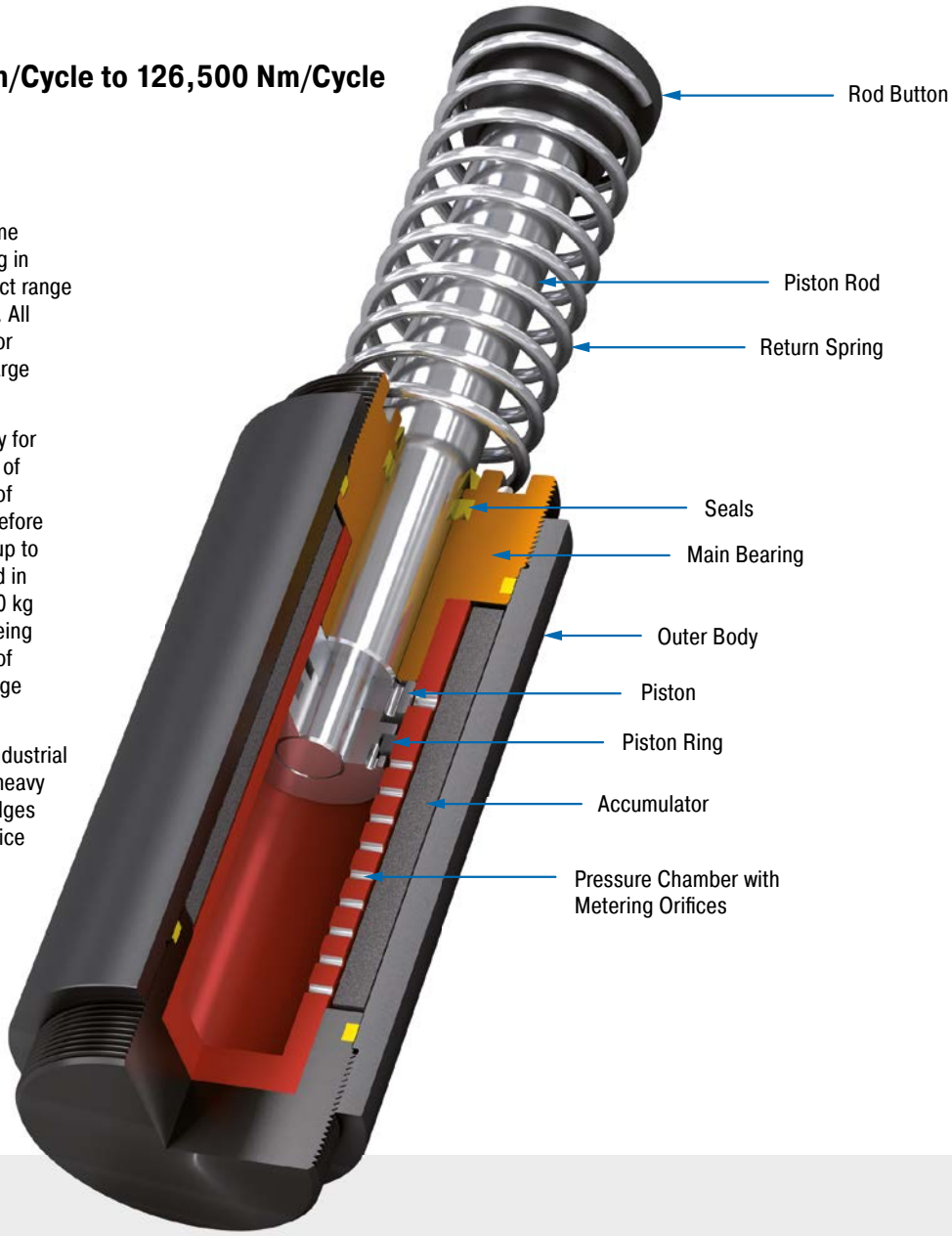
Deceleration of heavy loads

Self-Compensating
Energy capacity 3,600 Nm/Cycle to 126,500 Nm/Cycle
Stroke 50 mm to 406 mm

Powerful: The mass of these high volume absorbers are between 12.8 and 146 kg in weight. They complement ACE's product range of self-compensating shock absorbers. All models from this series are designed for applications where robustness and a large energy absorption are important.

The absorbers are designed specifically for each customer application with the aid of the ACE calculation program. The risk of crashes and incorrect settings are therefore prevented The CA models can absorb up to 126,500 Nm of energy and can be used in the area of effective loads between 700 kg and 326,000 kg. The combination of being extremely solid, absorbing high levels of energy and having a large damping range makes them invaluable.

These heavy duty self-compensating industrial shock absorbers are primarily used in heavy mechanical engineering e.g. on lift bridges and steel structures or for damping sluice systems.



Technical Data

Energy capacity: 3,600 Nm/Cycle to 126,500 Nm/Cycle

Impact velocity range: 0.3 m/s to 5 m/s. Other speeds on request.

Operating temperature range: -12 °C to +66 °C. Other temperatures on request.

Mounting: In any position

Positive stop: External positive stops 2.5 mm to 3 mm before the end of stroke provided by the customer.

Material: Outer body: Steel corrosion-resistant coating; Piston rod: Hard chrome plated steel; Rod end button: Hardened steel and corrosion-resistant coating; Return spring: Zinc plated steel

Damping medium: Automatic Transmission Fluid (ATF)

Application field: Portal systems, Machines and plants, Conveyor systems, Crane systems, Loading and lifting equipment, Shelf storage systems, Heavy load applications, Swivel units

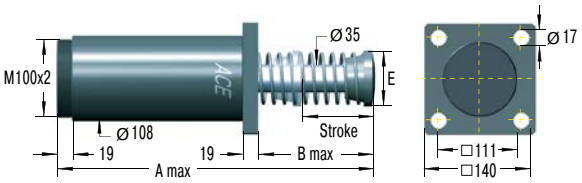
Note: For emergency use only applications and for continous use it is possible to exceed the published max. capacity ratings. In this case, please consult ACE.

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

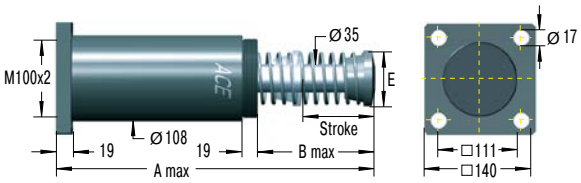
On request: Special oils, nickel-plated, increased corrosion protection or other special options are available on request.

Issue 07.2017 – Specifications subject to change

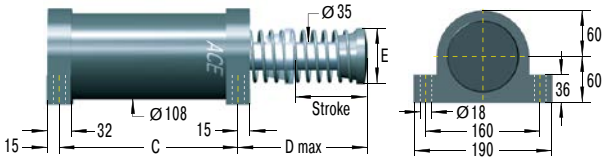
CA2EU-F Front Flange



CA2EU-R Rear Flange



CA2EU-SM Foot Mount



Clevis mounting available on request.

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

CA: Self-contained with return spring, self-compensating

Special Models

CAA: Air/Oil return without return spring.
Use only with external air/oil tank.

CNA: Self-Contained without return spring

CSA: Air/Oil return with return spring.
Use only with external air/oil tank.

Ordering Example **CA2x4EU-3F**

- Self-Compensating
- Bore Size Ø 2"
- Stroke Length 4" = 102 mm
- EU Compliant
- Effective Weight Range Version
- Front Flange Mounting

Dimensions

BASIC TYPES	Stroke mm	A max. mm	B max. mm	C mm	D max. mm	E mm
CA2X2EU	50	313	110	173	125	70
CA2X4EU	102	414	160	224	175	70
CA2X6EU	152	516	211	275	226	70
CA2X8EU	203	643	287	326	302	92
CA2X10EU	254	745	338	377	353	108

Performance

	Max. Energy Capacity			Effective Weight							
TYPES	[1] W_3 Nm/cycle	[2] W_4 Nm/h	[2] W_4 with Air/Oil Tank Nm/h	[3] me min. kg	[3] me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
CA2X2EU-1	3,600	1,100,000	1,350,000	700	2,200	-1	210	285	0.25	3	14.3
CA2X2EU-2	3,600	1,100,000	1,350,000	1,800	5,400	-2	210	285	0.25	3	14.3
CA2X2EU-3	3,600	1,100,000	1,350,000	4,500	13,000	-3	210	285	0.25	3	14.3
CA2X2EU-4	3,600	1,100,000	1,350,000	11,300	34,000	-4	210	285	0.25	3	14.3
CA2X4EU-1	7,200	1,350,000	1,700,000	1,400	4,400	-1	150	285	0.50	3	16.7
CA2X4EU-2	7,200	1,350,000	1,700,000	3,600	11,000	-2	150	285	0.50	3	16.7
CA2X4EU-3	7,200	1,350,000	1,700,000	9,100	27,200	-3	150	285	0.50	3	16.7
CA2X4EU-4	7,200	1,350,000	1,700,000	22,600	68,000	-4	150	285	0.50	3	16.7
CA2X6EU-1	10,800	1,600,000	2,000,000	2,200	6,500	-1	150	400	0.60	3	19.3
CA2X6EU-2	10,800	1,600,000	2,000,000	5,400	16,300	-2	150	400	0.60	3	19.3
CA2X6EU-3	10,800	1,600,000	2,000,000	13,600	40,800	-3	150	400	0.60	3	19.3
CA2X6EU-4	10,800	1,600,000	2,000,000	34,000	102,000	-4	150	400	0.60	3	19.3
CA2X8EU-1	14,500	1,900,000	2,400,000	2,900	8,700	-1	230	650	0.70	3	22.3
CA2X8EU-2	14,500	1,900,000	2,400,000	7,200	21,700	-2	230	650	0.70	3	22.3
CA2X8EU-3	14,500	1,900,000	2,400,000	18,100	54,400	-3	230	650	0.70	3	22.3
CA2X8EU-4	14,500	1,900,000	2,400,000	45,300	136,000	-4	230	650	0.70	3	22.3
CA2X10EU-1	18,000	2,200,000	2,700,000	3,600	11,000	-1	160	460	0.80	3	32.3
CA2X10EU-2	18,000	2,200,000	2,700,000	9,100	27,200	-2	160	460	0.80	3	32.3
CA2X10EU-3	18,000	2,200,000	2,700,000	22,600	68,000	-3	160	460	0.80	3	32.3
CA2X10EU-4	18,000	2,200,000	2,700,000	56,600	170,000	-4	160	460	0.80	3	32.3

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] Figures for oil recirculation systems on request.
[3] The effective weight range limits can be raised or lowered to special order.

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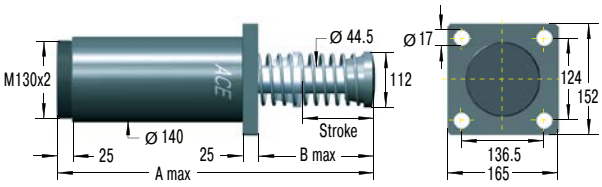
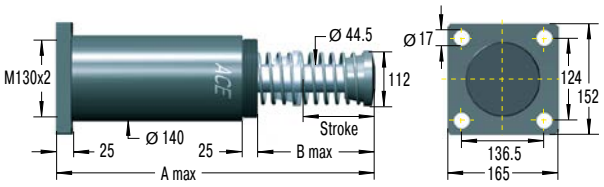
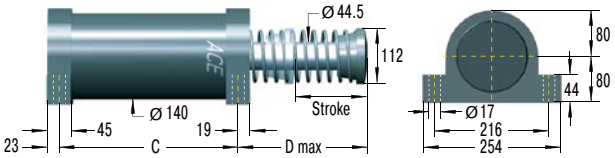
CA3EU-F Front Flange



CA3EU-R Rear Flange



CA3EU-S Foot Mount



Clevis mounting available on request.

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

CA: Self-contained with return spring, self-compensating

Special Models

CAA: Air/Oil return without return spring.
Use only with external air/oil tank.

CNA: Self-Contained without return spring

CSA: Air/Oil return with return spring.
Use only with external air/oil tank.

Ordering Example **CA3x5EU-3F**

- Self-Compensating
- Bore Size Ø 3"
- Stroke Length 5" = 127 mm
- EU Compliant
- Effective Weight Range Version
- Front Flange Mounting

Dimensions

BASIC TYPES	Stroke mm	A max. mm	B max. mm	C mm	D max. mm
CA3X5EU	127	490.5	211	254	224
CA3X8EU	203	641	286	330	300
CA3X12EU	305	890	434	432	447

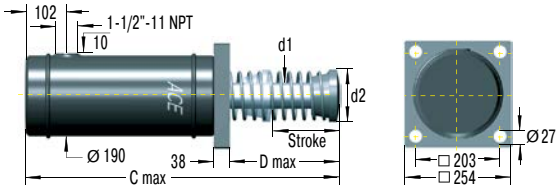
Performance

	Max. Energy Capacity			Effective Weight							
TYPES	[1] W_3 Nm/cycle	[2] W_4 Nm/h	[2] W_4 with Air/Oil Tank Nm/h	[3] me min. kg	[3] me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
CA3X5EU-1	14,125	2,260,000	2,800,000	2,900	8,700	-1	270	710	0.6	3	32.7
CA3X5EU-2	14,125	2,260,000	2,800,000	7,250	21,700	-2	270	710	0.6	3	32.7
CA3X5EU-3	14,125	2,260,000	2,800,000	18,100	54,350	-3	270	710	0.6	3	32.7
CA3X5EU-4	14,125	2,260,000	2,800,000	45,300	135,900	-4	270	710	0.6	3	32.7
CA3X8EU-1	22,600	3,600,000	4,520,000	4,650	13,900	-1	280	740	0.8	3	38.5
CA3X8EU-2	22,600	3,600,000	4,520,000	11,600	34,800	-2	280	740	0.8	3	38.5
CA3X8EU-3	22,600	3,600,000	4,520,000	29,000	87,000	-3	280	740	0.8	3	38.5
CA3X8EU-4	22,600	3,600,000	4,520,000	72,500	217,000	-4	280	740	0.8	3	38.5
CA3X12EU-1	33,900	5,400,000	6,780,000	6,950	20,900	-1	270	730	1.2	3	47.6
CA3X12EU-2	33,900	5,400,000	6,780,000	17,400	52,200	-2	270	730	1.2	3	47.6
CA3X12EU-3	33,900	5,400,000	6,780,000	43,500	130,450	-3	270	730	1.2	3	47.6
CA3X12EU-4	33,900	5,400,000	6,780,000	108,700	326,000	-4	270	730	1.2	3	47.6

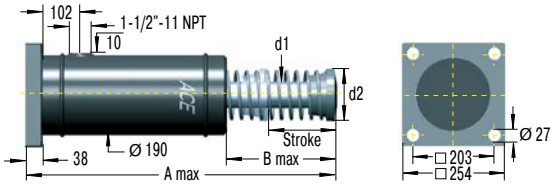
[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] Figures for oil recirculation systems on request.
[3] The effective weight range limits can be raised or lowered to special order.

Issue 07.2017 – Specifications subject to change

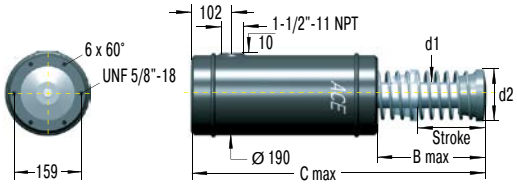
CA4EU-F Front Flange



CA4EU-R Rear Flange

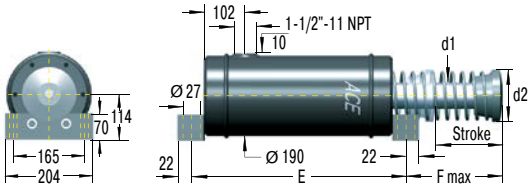


CA4EU-FRP 6 Tapped Holes



Clevis mounting available on request.

CA4EU-S Foot Mount



Clevis mounting available on request.

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

CA: Self-contained with return spring, self-compensating

Special Models

CAA: Air/Oil return without return spring.
Use only with external air/oil tank.

CNA: Self-Contained without return spring

CSA: Air/Oil return with return spring.
Use only with external air/oil tank.

Ordering Example **CA4x8EU-5R**

- Self-Compensating
- Bore Size Ø 4"
- Stroke Length 8" = 203 mm
- EU Compliant
- Effective Weight Range Version
- Rear Flange Mounting

Dimensions

BASIC TYPES	Stroke mm	A max. mm	B max. mm	C max. mm	D max. mm	d1 mm	d2 mm	E mm	F mm
CA4X6EU	152	716	278	678	240	54	114	444	256
CA4X8EU	203	818	329	780	291	54	114	495	307
CA4X16EU	406	1,300	608.5	1,262.6	569	63.5	127	698	585

Performance

	Max. Energy Capacity				Effective Weight						
TYPES	[1] W_3 Nm/cycle	W_4 Nm/h	W_4 with Air/Oil Tank Nm/h	W_4 with Oil Recirculation Nm/h	[2] me min. kg	[2] me max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	Weight kg
CA4X6EU-3	47,500	3,000,000	5,100,000	6,600,000	3,500	8,600	-3	480	1,000	1.8	60
CA4X6EU-5	47,500	3,000,000	5,100,000	6,600,000	8,600	18,600	-5	480	1,000	1.8	60
CA4X6EU-7	47,500	3,000,000	5,100,000	6,600,000	18,600	42,700	-7	480	1,000	1.8	60
CA4X8EU-3	63,300	3,400,000	5,600,000	7,300,000	5,000	11,400	-3	310	1,000	2.3	68
CA4X8EU-5	63,300	3,400,000	5,600,000	7,300,000	11,400	25,000	-5	310	1,000	2.3	68
CA4X8EU-7	63,300	3,400,000	5,600,000	7,300,000	25,000	57,000	-7	310	1,000	2.3	68
CA4X16EU-3	126,500	5,600,000	9,600,000	12,400,000	10,000	23,000	-3	310	1,000	ask	146
CA4X16EU-5	126,500	5,600,000	9,600,000	12,400,000	23,000	50,000	-5	310	1,000	ask	146
CA4X16EU-7	126,500	5,600,000	9,600,000	12,400,000	50,000	115,000	-7	310	1,000	ask	146

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] The effective weight range limits can be raised or lowered to special order.

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A1½ to A3

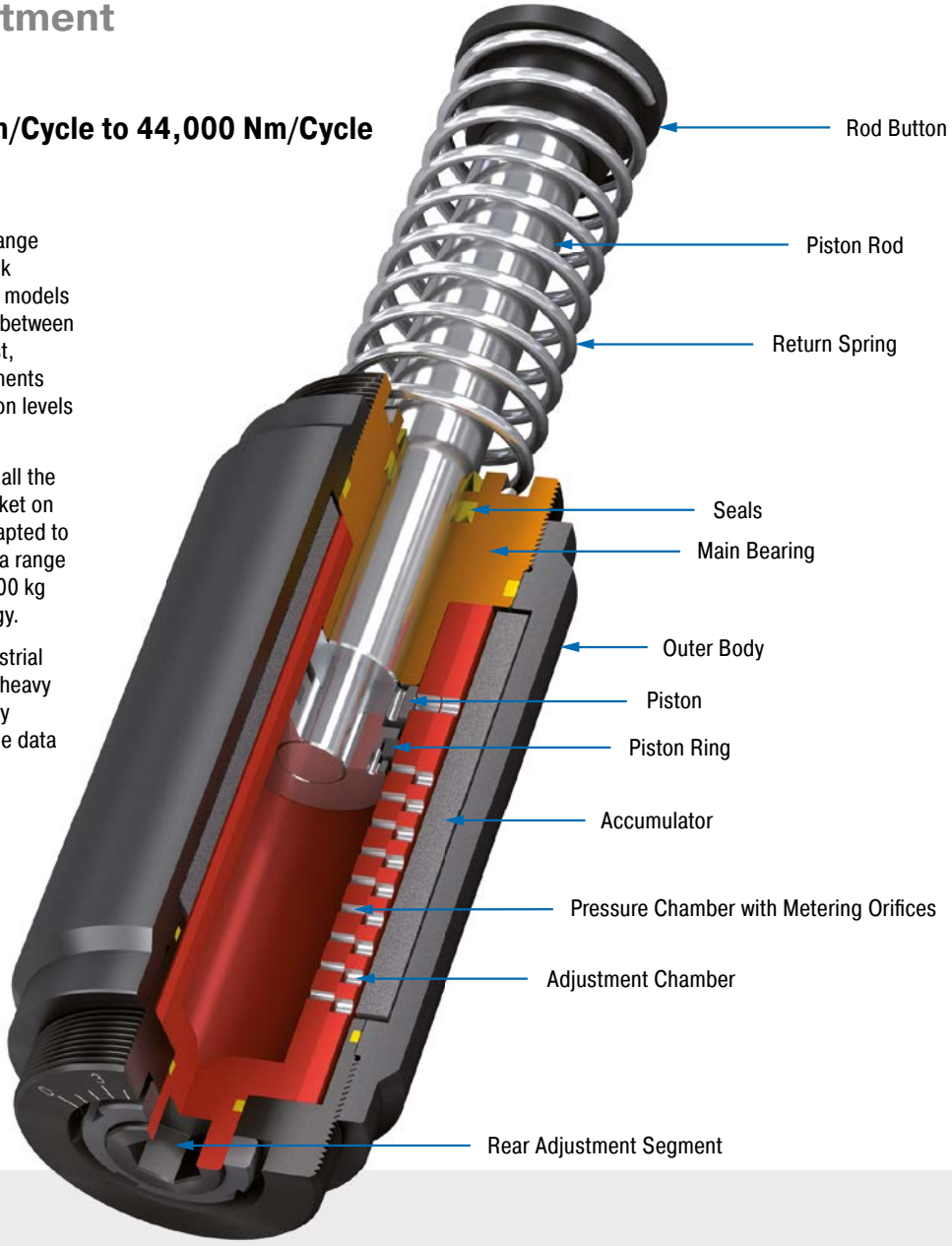
Deceleration of heavy loads and progressive adjustment

Adjustable
Energy capacity 2,350 Nm/Cycle to 44,000 Nm/Cycle
Stroke 50 mm to 305 mm

Strong and adjustable: Also in ACE's range of units ares heavy duty industrial shock absorbers, which can be adjusted. The models from the A1½ to A3 range, which weigh between 7.55 kg and 48 kg, are extremely robust, ready-to-install hydraulic machine elements with impressively high energy absorption levels and a wide range of damping rates.

Their special aspect is the flexibility,as all the absorbers can be adjusted using a socket on the absorber base and be perfectly adapted to the required data. The A models cover a range of effective loads from 0.3 kg to 204,000 kg and can absorb up to 44,000 Nm energy.

These heavy duty, adjustable ACE industrial shock absorbers are the first choice in heavy duty applications and generally in heavy mechanical engineering when the usage data has not been exactly determined.



Technical Data

Energy capacity: 2,350 Nm/Cycle to 44,000 Nm/Cycle

Impact velocity range: 0.1 m/s to 5 m/s. Other speeds on request.

Operating temperature range: -12 °C to +66 °C. Other temperatures on request.

Mounting: In any position

Positive stop: External positive stops 2.5 mm to 3 mm before the end of stroke provided by the customer.

Adjustment: Hard impact at the start of stroke, adjust the ring towards 9. Hard impact at the end of stroke, adjust the ring towards 0.

Material: Outer body: Steel corrosion-resistant coating; Piston rod: Hard chrome plated steel; Rod end button: Hardened steel and corrosion-resistant coating; Return spring: Zinc plated steel

Damping medium: Automatic Transmission Fluid (ATF)

Application field: Portal systems, Machines and plants, Conveyor systems, Crane systems, Loading and lifting equipment, Impact panels, Heavy load applications, Swivel units, Shelf storage systems

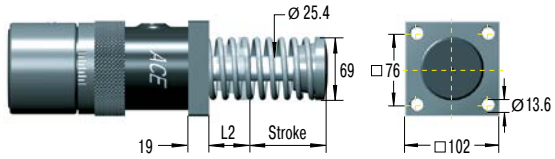
Note: For emergency use only applications and for continous use it is possible to exceed the published max. capacity ratings. In this case, please consult ACE.

Safety instructions: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

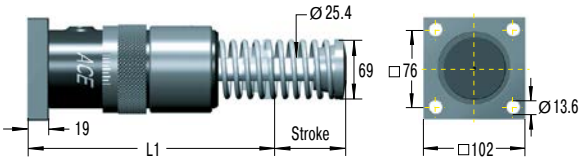
On request: Special oils, nickel-plated, increased corrosion protection or other special options are available on request.

Issue 07.2017 – Specifications subject to change

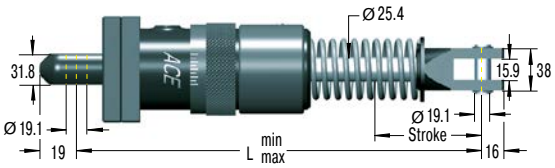
A1½EU-F Front Flange



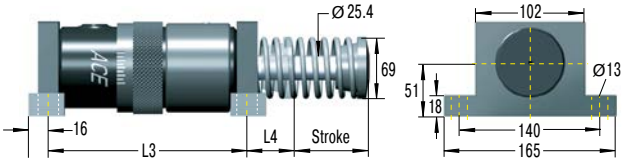
A1½EU-R Rear Flange



A1½EU-C Clevis Mount



A1½EU-S Foot Mount



The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

A: Self-contained with return spring, adjustable

Special Models

AA: Air/Oil return without return spring.
Use only with external air/oil tank.

NA: Self-contained without return spring

SA: Air/Oil return with return spring.
Use only with external air/oil tank.

Ordering Example **A1½x2EU-R**

Adjustable
Bore Size Ø 1½"
Stroke Length 2" = 50.8 mm
EU Compliant
Rear Flange Mounting

Dimensions

TYPES	Stroke mm	L min. mm	L max. mm	L1 mm	L2 mm	L3 mm	L4 mm
A1½X2EU	50	277.8	328.6	195.2	54.2	-	-
A1½X3½EU	89	316.6	405.6	233	54.2	170	58.6
A1½X5EU	127	354.8	481.8	271.5	54.2	208	58.6
A1½X6½EU	165	412	577	329	73	246	78

Performance

	Max. Energy Capacity			Effective Weight						
TYPES	[1] W_3 Nm/cycle	[2] W_4 Nm/h	[2] W_4 with Air/Oil Tank Nm/h	[3] me min. kg	[3] me max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
A1½X2EU	2,350	362,000	452,000	195	32,000	160	210	0.10	5	7.6
A1½X3½EU	4,150	633,000	791,000	218	36,000	110	210	0.25	4	8.9
A1½X5EU	5,900	904,000	1,130,000	227	41,000	90	230	0.40	3	9.4
A1½X6½EU	7,700	1,180,000	1,469,000	308	45,000	90	430	0.40	2	12.0

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[2] Figures for oil recirculation systems on request.
[3] The effective weight range limits can be raised or lowered to special order.

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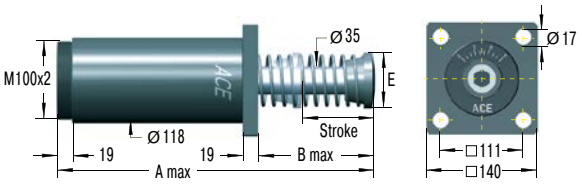
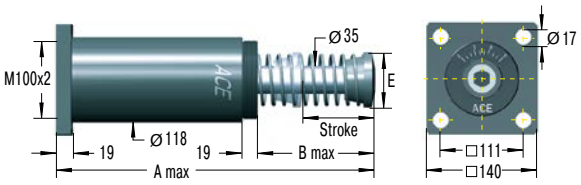
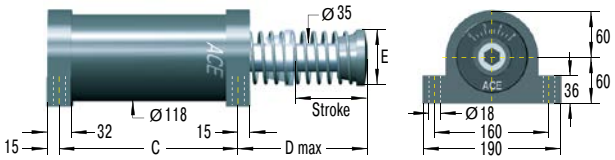
A2EU-F Front Flange



A2EU-R Rear Flange



A2EU-SM Foot Mount



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Model Type Prefix

Standard Models

A: Self-contained with return spring, adjustable

Special Models

AA: Air/Oil return without return spring.
Use only with external air/oil tank.

NA: Self-contained without return spring

SA: Air/Oil return with return spring.
Use only with external air/oil tank.

Ordering Example **A2x6EU-R**

Adjustable
Bore Size Ø 2"
Stroke Length 6" = 152 mm
EU Compliant
Rear Flange Mounting

Dimensions

TYPES	Stroke mm	A max. mm	B max. mm	C mm	D max. mm	E mm
A2X2EU	50	313	110	173	125	70
A2X4EU	102	414	160	224	175	70
A2X6EU	152	516	211	275	226	70
A2X8EU	203	643	287	326	302	92
A2X10EU	254	745	338	377	353	108

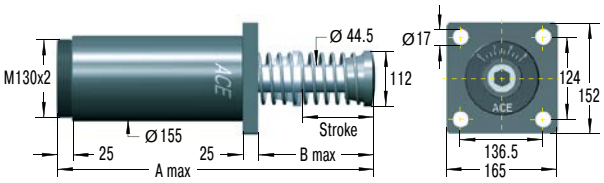
Performance

	Max. Energy Capacity			Effective Weight						
TYPES	[1] W_3 Nm/cycle	[2] W_4 Nm/h	[2] W_4 with Air/Oil Tank Nm/h	[3] me min. kg	[3] me max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
A2X2EU	3,600	1,100,000	1,350,000	250	77,000	210	285	0.25	3	14.3
A2X4EU	9,000	1,350,000	1,700,000	250	82,000	150	285	0.50	3	16.7
A2X6EU	13,500	1,600,000	2,000,000	260	86,000	150	400	0.60	3	19.3
A2X8EU	19,200	1,900,000	2,400,000	260	90,000	230	650	0.70	3	22.3
A2X10EU	23,700	2,200,000	2,700,000	320	113,000	160	460	0.80	3	26.2

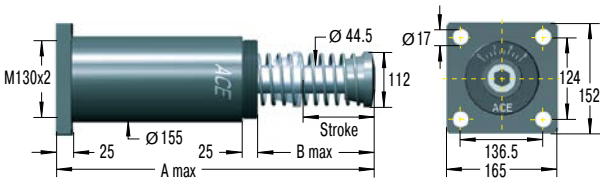
[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] Figures for oil recirculation systems on request.
[3] The effective weight range limits can be raised or lowered to special order.

Issue 07.2017 – Specifications subject to change

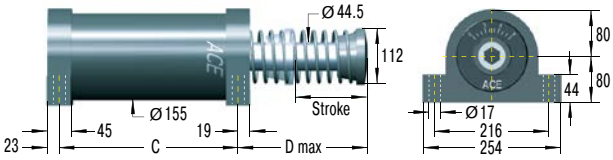
A3EU-F Front Flange



A3EU-R Rear Flange



A3EU-S Foot Mount



The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Model Type Prefix

Standard Models

A: Self-contained with return spring, adjustable

Special Models

AA: Air/Oil return without return spring.
Use only with external air/oil tank.

NA: Self-contained without return spring

SA: Air/Oil return with return spring.
Use only with external air/oil tank.

Ordering Example **A3x8EU-R**

Adjustable
Bore Size Ø 3"
Stroke Length 8" = 203 mm
EU Compliant
Rear Flange Mounting

Dimensions

TYPES	Stroke mm	A max. mm	B max. mm	C mm	D max. mm
A3X5EU	127	490.5	211	254	224
A3X8EU	203	641	286	330	300
A3X12EU	305	890	434	432	447

Performance

	Max. Energy Capacity			Effective Weight						
TYPES	[1] W_3 Nm/cycle	[2] W_4 Nm/h	[2] W_4 with Air/Oil Tank Nm/h	[3] me min. kg	[3] me max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
A3X5EU	15,800	2,260,000	2,800,000	480	154,000	270	710	0.6	3	32.7
A3X8EU	28,200	3,600,000	4,520,000	540	181,500	280	740	0.8	3	38.5
A3X12EU	44,000	5,400,000	6,780,000	610	204,000	270	730	1.2	3	48.0

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] Figures for oil recirculation systems on request.
[3] The effective weight range limits can be raised or lowered to special order.

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Air/Oil Tanks
for industrial shock absorbers

For high cycle rates and extreme temperatures with limited mounting space

Shock absorbers convert the introduced energy into heat. The more frequently a shock absorber is stressed per hour, the hotter the oil volume becomes over time. If the requirements placed on the impact frequency of a shock absorber are especially high the use of an air-oil tank is just the right thing.

Thanks to the increased oil volume and the resulting heat dissipation, the upper limit of the possible hourly energy capacity of the shock absorber increases significantly.

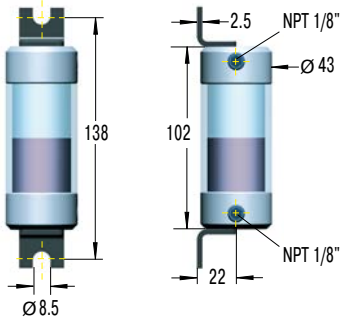
Another characteristic of the air-oil tank is the opportunity for controlled piston return if no permanent return force through an integrated spring in the shock absorber is desired.

Air/Oil Tanks AO

AO1

Oil capacity 20 cm³

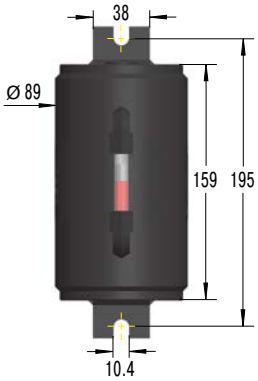
Material: Aluminium caps



AO3

Oil capacity 370 cm³

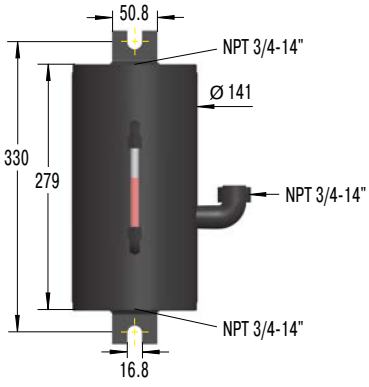
Material: Steel



AO6

Oil capacity 2,600 cm³

Material: Steel



Detail drawings on request

Technical Data

Operating pressure: Max. 8 bar

Operating temperature range: 80 °C

Damping medium: ATF-Oil 42 cSt at 40 °C
Mount air/oil tank higher than shock absorber. Bleed all air from system before operating.

Safety instructions: Exhaust tank before carrying out service. Check valve holds pressure!

Suggested air/oil tanks in accordance with W_4 ratings

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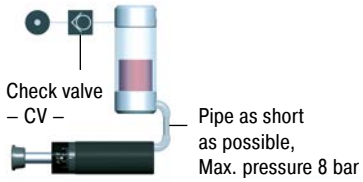
Connection Examples

1

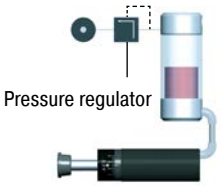


Piston rod returns immediately to extended position when load moves away. Operation without main air supply possible for short periods.

2

Return stroke may be sequenced by pneumatic valve at any desired time. No return force until valve energised.

3

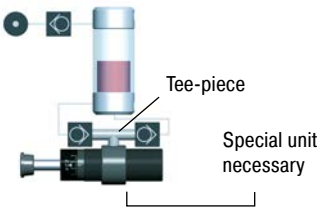


Return force can be adjusted by pressure regulator. Ensure safe minimum pressure to return shock absorber.

4

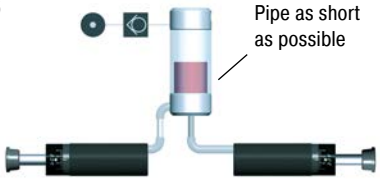
Spring return with air/oil tank. No air supply connected. Note: Will extend return time.

5



Oil recirculation circuit for extreme high cycle rates. Warm oil is positively circulated through air/oil tank for increased heat dissipation.

6



Connection of two shock absorbers to one air/oil tank is possible. Use next larger size tank. Combination with examples 2, 3 and 5 possible.

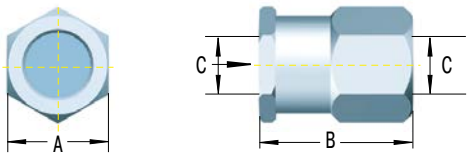
Selection Chart Air/Oil Tanks

	With Tank Example 1 to 4		With Recirc. Circuits Example 5 to 6		Min. Conn. Pipe Ø	Thread Sizes for Connection to Air/Oil Tank	
Shock Absorber Type	Tank	Check Valve	Tank	Check Valve	mm	Thread Bottom	[2] Thread Side
MCA, MAA, MLA33...	AO1	CV1/8	AO3	CV1/4	4	[1] 1/8-27 NPTF inside	1/8-27 NPTF inside
MCA, MAA, MLA45...	AO1	CV1/8	AO3	CV3/8	6	1/8-27 NPTF inside	1/8-27 NPTF inside
MCA, MAA, MLA64...	AO3	CV1/4	AO6	CV3/4	8	1/4-18 NPTF inside	1/4-18 NPTF inside
CAA, AA2...	AO6	CV3/4	AO82	CV3/4	15	–	–
CAA, AA3...	AO6	CV3/4	AO82	CV3/4	19	–	–
CAA4...	AO82	CV3/4	AO82	CV3/4	38	–	–

AO82 and connection accessories: Details on request
[1] adapted
[2] on request (add suffix -PG/-P)

Check Valves CV

Through an oil circuit fresh oil is drawn in from the industrial shock absorber and warm oil is pumped off (see example 5). To obtain this function, ACE offers suitable check valves of the CV series.



Technical Data

Operating pressure: 20 bar
Operating temperature range: 95 °C
Suitable for: Oil, air, water
Material: Aluminium

Check Valves – Dimensions

TYPES	A mm	B mm	C
CV1/8	19	24	1/8-27 NPT
CV1/4	29	33	1/4-18 NPT
CV3/8	29	33	3/8-18 NPT
CV1/2	41	40	1/2-14 NPT
CV3/4	48	59	3/4-14 NPT

Pallet Stoppers

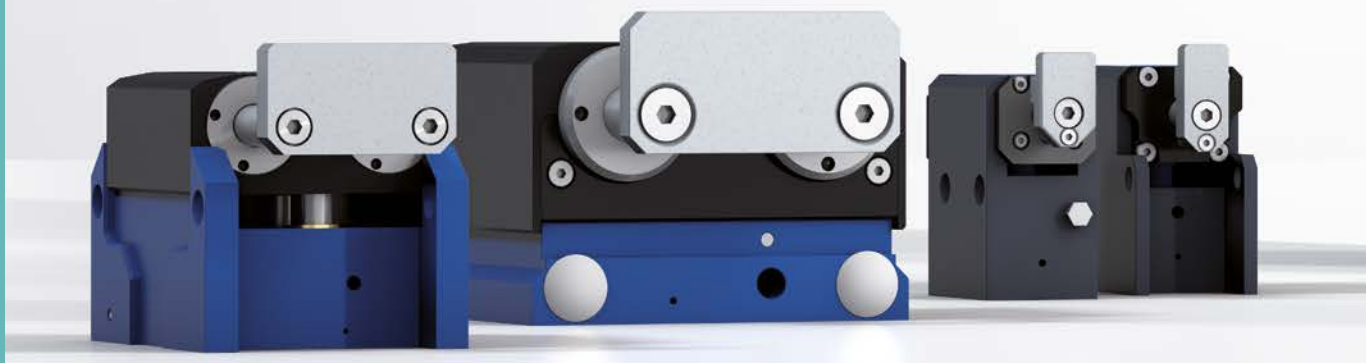
Control the flow of mass goods

NEW

ACE offers a wide range of products for the most varied requirements in transfer technology – known as pallet stoppers or separators. These allow workpiece carriers with masses from 0.25 kg up to 1,200 kg to be separated from one another and forwarded individually. Further products such as positioning units or non-return devices and an extensive range of accessories are available on request.

Pallet stoppers are used between individual processing stations within transport systems. Most objects transported on small pallets are halted at the processing stations or separated from a convoy.

Our compact machine elements operate pneumatically or electrically, with damping provided pneumatically or via integrated ACE shock absorbers. The pneumatic versions offer a choice between single-acting and double-acting separators that function either with or without inductive or electronic monitoring. The electric versions all provide shock-free operation in environments without compressed air.



Transfer Technology Components

Greatest process reliability and cycle stability

ACE pallet stoppers ensure gentle, precise and accurate damping of pallets and workpiece carriers on belt and roller conveyor systems and accumulating roller conveyors. This leaves transported goods and machinery unharmed and optimises process engineering. The high product quality increases speed along with improved longevity and reliability.

Our complete range of pallet stoppers combined with comprehensive accessories guarantees the greatest possible flexibility and maximum compatibility with a multitude of standard transfer systems.

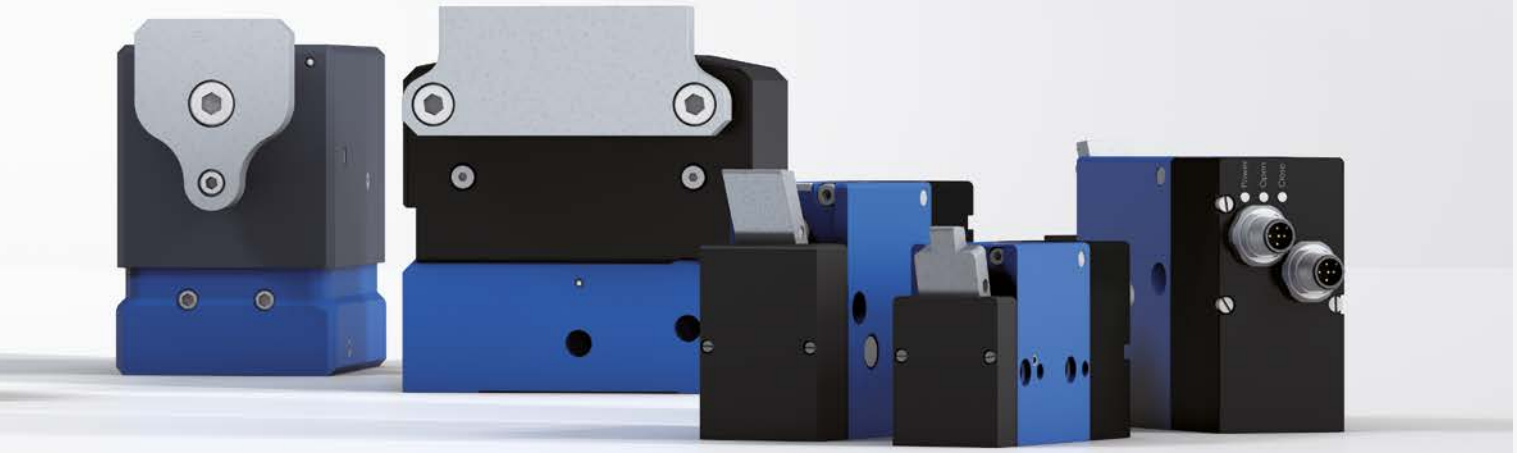
High product quality

Cost-effective, sturdy solutions

Wide selection, even independent of compressed air

Suitable for high speeds

Space-saving and easy to install



More information about pallet stoppers can be found on our Website www.ace-ace.com

Pneumatic Pallet Stoppers

Gentle deceleration of light to heavy loads

The pneumatic ACE separators are divided into seven product families that cover mass ranges from 1 kg to 1,200 kg. A distinction is made in the case of attenuated products between monitoring options and between single-acting and double-acting models.

Speed and precise working are the top priority in production. ACE pallet stoppers are the ideal aids whenever workpieces have to be manoeuvred quickly and gently through production. This is because they provide shock-free deceleration of workpiece carriers, bring them to a pinpoint standstill and use pneumatic lowering to release them again to the next processing station after a freely definable waiting time – jointly or individually. Pneumatic damping force can be continuously adapted to the weight of the workpiece carrier.

P-P60

Our smallest: stops masses between 1 kg and 60 kg

These are the smallest of the pneumatically-operated damping modules offered by ACE and they reliably stop masses from 1 kg up to 60 kg. They are used whilst manoeuvring sensitive products on transfer systems.

Strong, precise, self-compensating or adjustable

P-H1200

The largest: gentle and precise with an ACE shock absorber.

For heavy workpiece carriers up to 1.2 tons!

Pure performance. Our largest pneumatic pallet stopper with integrated ACE shock absorber decelerates even high masses of 40 kg to 1,200 kg extremely effectively. Ideal for transferring sensitive products with significant weight.

Electric Pallet Stoppers

Perfect for safe and quiet operation

ACE electrically controlled separators come in four product families and cover a mass range from 0.25 kg up to 600 kg. The fact that these separators can manage without compressed air results in numerous benefits.

Quiet, without compressed air, simple installation

The positive aspects include less noise, greater environmental protection and higher efficiency. Electric models also work intelligently due to their sophisticated technology because they are self-compensating within larger weight ranges. The individual models are available with a 2x5-pin M12x1 connector, which can be attached to separators and cabled to a PLC. All in all, this provides a very convenient solution thanks to a reduced requirement for maintenance.

P-E600

Impressive: with an integrated ACE shock absorber for maximum accumulated loads up to 600 kg

These electrically-operated ACE modules reliably stop even large masses, among other things using the built-in ACE shock absorber. A guarantee for quiet and safe operation.

P-E20

Small and delicate – for accumulated loads from 0.25 kg up to 20 kg

These are the smallest, electrically-operated damping modules offered by ACE and are optimised for stopping lighter masses. They are used for the transfer of sensitive products at high speeds.

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Profile Dampers

The low cost alternative for continuous duty

The exceedingly successful TUBUS series from ACE is a perfect alternative, when masses don't need to be decelerated to an exact point. Available in more than 140 different versions, the profile dampers are used to slow down masses, particularly under extreme conditions.

They are also recommended for use if there is little installation space available. Manufactured in co-polyester elastomer, the highly resistant absorbers provide the best benefits in areas where other materials fail or where a similarly high service life of up to 1 million load changes cannot be achieved. They are affordable, compact and light and absorb the energy with different damping characteristics depending on the design.

- Very good price/performance ratio
- Reliable in extreme situations
- Highly resistant material
- Compact and lightweight design
- Easy to mount
- Long service life

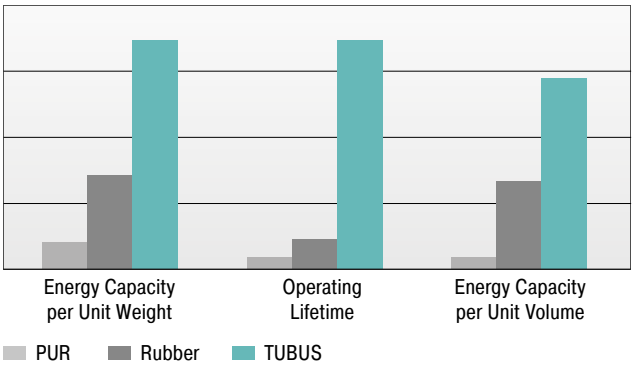
Physical Properties of TUBUS Profile Dampers

ACE TUBUS profile dampers are high performance damping elements made from a special Co-Polyester Elastomer. They have a high energy absorbing capacity compared with other materials.

The excellent damping characteristics are achieved as a result of the special elastomer material and the worldwide unique construction design. This enables us to change the characteristics of the elastomer material so that individual and distinct damping curves are possible.

TUBUS dampers offer a considerable performance advantage when compared to other materials such as rubber, urethanes (PUR) and steel springs.

A further advantage compared to other damping elements is the operating life expectancy – up to twenty times longer than with urethane dampers, up to ten times longer than with rubber dampers and up to five times longer than with steel spring dampers.



Comparison of Damping Characteristics

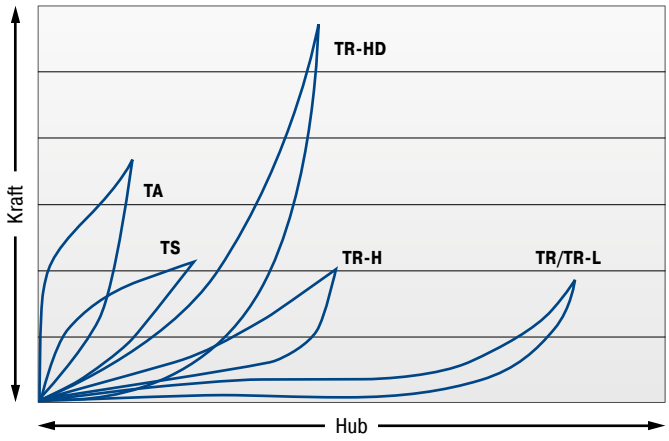
The innovative TUBUS dampers absorb energy while exhibiting the following damping characteristics:

Product family TA
Degressive characteristic with max. energy absorption with min. stroke.
Energy absorption: 58 % to 73 %

Product family TS
Almost linear characteristic with low reaction force over a short operating stroke.
Energy absorption: 35 % to 64 %

Product family TR/TR-L/TR-H
Progressive characteristic with gradually increasing reaction force over a long stroke.
Energy absorption TR: 25 % to 45 %
Energy absorption TR-L: 26 % to 41 %
Energy absorption TR-H: 39 % to 62 %

Product family TR-HD
Progressive characteristic with high energy absorption with a short stroke.
Energy absorption: 43 % to 72 %



Characteristics of dynamic energy absorption for impact velocity over 0.5 m/s.

or impact velocities under 0.5 m/s, please request a static characteristic curve.

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TUBUS TA, TS, TR, TR-H, TR-HD

TYPES	Max. Energy Capacity [1] W_3 Nm/cycle	Max. Energy Capacity Emergency Stop W_3 Nm/cycle	Stroke max. mm	Page
TA12-5	2.0	3	5	101
TA17-7	6.0	9	7	101
TA21-9	10.0	16	9	101
TA22-10	11.5	21	10	101
TA28-12	29.0	46	12	101
TA34-14	48.0	87	14	101
TA37-16	65.0	112	16	101
TA40-16	82.0	130	16	101
TA43-18	112.0	165	18	101
TA47-20	140.0	173	20	101
TA50-22	170.0	223	22	101
TA54-22	201.0	334	22	101
TA57-24	242.0	302	24	101
TA62-25	304.0	361	25	101
TA65-27	374.0	468	27	101
TA70-29	421.0	524	29	101
TA72-31	482.0	559	31	101
TA80-32	570.0	831	32	101
TA82-35	683.0	921	35	101
TA85-36	797.0	1,043	36	101
TA90-38	934.0	1,249	38	101
TA98-40	1,147.0	1,555	40	101
TA116-48	2,014.0	2,951	48	101
TS14-7	2.0	3	7	103
TS18-9	4.0	6	9	103
TS20-10	6.0	7	10	103
TS26-15	11.5	15	15	103
TS32-16	23.0	26	16	103
TS35-19	30.0	36	19	103
TS40-19	34.0	42	19	103
TS41-21	48.0	63	21	103
TS44-23	63.0	72	23	103
TS48-25	81.0	91	25	103
TS51-27	92.0	114	27	103
TS54-29	122.0	158	29	103
TS58-30	149.0	154	30	103
TS61-32	163.0	169	32	103
TS64-34	208.0	254	34	103
TS68-36	227.0	272	36	103
TS75-39	291.0	408	39	103
TS78-40	352.0	459	40	103
TS82-44	419.0	620	44	103
TS84-43	475.0	635	43	103
TS90-47	580.0	778	47	103
TS107-56	902.0	966	56	103
TR29-17	1.2	1.8	17	105
TR37-22	2.3	5.4	22	105
TR43-25	3.5	8.1	25	105
TR50-35	5.8	8.3	35	105
TR63-43	12.0	17.0	43	105
TR67-40	23.0	33.0	40	105
TR76-46	34.5	43.0	46	105
TR83-50	45.0	74.0	50	105
TR85-50	68.0	92.0	50	105
TR93-57	92.0	122.0	57	105
TR100-60	115.0	146.0	60	105
TR30-15H	2.7	5.7	15	107
TR39-19H	6.0	18.0	19	107
TR45-23H	8.7	24.0	23	107
TR52-32H	11.7	20.0	32	107
TR64-41H	25.0	46.0	41	107
TR68-37H	66.5	98.0	37	107
TR79-42H	81.5	106.0	42	107
TR86-45H	124.0	206.0	45	107
TR87-46H	158.0	261.0	46	107
TR95-50H	228.0	342.0	50	107
TR102-56H	290.0	427.0	56	107
TR42-14HD	405	567	14	111
TR47-12HD	857	1,200	12	111
TR47-17HD	850	1,190	17	111
TR52-14HD	1,634	2,288	14	111
TR57-21HD	1,194	1,672	21	111

TUBUS TA, TS, TR, TR-H, TR-HD

TYPES	Max. Energy Capacity [1] W_3 Nm/cycle	Max. Energy Capacity Emergency Stop W_3 Nm/cycle	Stroke max. mm	Page
TR62-15HD	2,940	4,116	15	111
TR62-19HD	2,940	4,116	19	111
TR63-24HD	2,061	2,885	24	111
TR72-26HD	1,700	2,380	26	111
TR79-20HD	2,794	3,912	20	111
TR79-31HD	2,975	4,165	31	111
TR85-33HD	2,526	3,536	33	111
TR89-21HD	4,438	6,213	21	111
TR90-37HD	3,780	5,292	37	111
TR93-24HD	3,421	4,789	24	111
TR97-31HD	7,738	10,833	31	111
TR97-35HD	2,821	3,949	35	111
TR102-44HD	4,697	6,576	44	111
TR105-28HD	5,641	7,897	28	111
TR117-30HD	8,457	11,840	30	111

[1] Max. energy capacity per cycle for continous use.

TUBUS TR-L

TYPES	Max. Energy Capacity [1] W_3 Nm/cycle	Max. Energy Capacity Emergency Stop W_3 Nm/cycle	Stroke max. mm	Page
TR29-17L	7.2	10.9	17	109
TR43-25L	14.0	32.7	25	109
TR63-43L	21.9	32.0	43	109
TR66-40L-1	102.0	143.0	40	109
TR66-40L-2	204.0	286.0	40	109
TR66-40L-3	306.0	428.0	40	109
TR66-40L-4	408.0	571.0	40	109
TR66-40L-5	510.0	714.0	40	109
TR76-45L-1	145.0	203.0	45	109
TR76-45L-2	290.0	406.0	45	109
TR76-45L-3	435.0	609.0	45	109
TR76-45L-4	580.0	812.0	45	109
TR76-45L-5	725.0	1,015.0	45	109
TR83-48L-1	180.0	252.0	48	109
TR83-48L-2	360.0	504.0	48	109
TR83-48L-3	540.0	756.0	48	109
TR83-48L-4	720.0	1,008.0	48	109
TR83-48L-5	900.0	1,260.0	48	109
TR99-60L-1	270.0	378.0	60	109
TR99-60L-2	540.0	756.0	60	109
TR99-60L-3	810.0	1,134.0	60	109
TR99-60L-4	1,080.0	1,512.0	60	109
TR99-60L-5	1,350.0	1,890.0	60	109
TR99-60L-6	1,620.0	2,268.0	60	109
TR99-60L-7	1,890.0	2,646.0	60	109
TR143-86L-1	600.0	840.0	86	109
TR143-86L-2	1,200.0	1,680.0	86	109
TR143-86L-3	1,800.0	2,520.0	86	109
TR143-86L-4	2,400.0	3,360.0	86	109
TR143-86L-5	3,000.0	4,200.0	86	109
TR143-86L-6	3,600.0	5,040.0	86	109
TR143-86L-7	4,200.0	5,880.0	86	109
TR188-108L-1	1,100.0	1,540.0	108	109
TR188-108L-2	2,200.0	3,080.0	108	109
TR188-108L-3	3,300.0	4,620.0	108	109
TR188-108L-4	4,400.0	6,160.0	108	109
TR188-108L-5	5,500.0	7,700.0	108	109
TR188-108L-6	6,600.0	9,240.0	108	109
TR188-108L-7	7,700.0	10,780.0	108	109

[1] Max. energy capacity per cycle for continous use.

Profile Dampers

TUBUS TA

Page 100

Axial Damping
Compact size and strong force absorption
Linear slides, Pneumatic cylinders, Handling modules, Machines and plants

TUBUS TS

Page 102

Axial Soft Damping
Compact size and smooth deceleration
Linear slides, Pneumatic cylinders, Handling modules, Machines and plants

TUBUS TR

Page 104

Radial Damping
Compact size and soft deceleration
Furniture industry, Sports equipment, Linear slides, Pneumatic cylinders

TUBUS TR-H

Page 106

Radial Damping, Hard Version
Compact size with soft deceleration and high energy absorption
Furniture industry, Sports equipment, Linear slides, Pneumatic cylinders

TUBUS TR-L

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Radial Damping, Long Version
Powerhouse in long body length
Offshore industry, Agricultural machinery, Impact panels, Conveyor systems

TUBUS TR-HD

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Radial Damping, Heavy Duty Version
Compact powerhouse in solid material
Offshore industry, Agricultural machinery, Impact panels, Conveyor systems

TUBUS TA

Compact size and strong force absorption

Axial Damping
Energy capacity 2 Nm/Cycle to 2,951 Nm/Cycle
Maximum stroke 5 mm bis 48 mm

Very efficient energy guzzlers: The TA profile dampers from the ACE TUBUS-Series are maintenance-free and ready to install. They consist of co-polyester elastomer; a material that only heats up slightly and ensures consistent damping. The TA models absorb a lot of energy at the start of the stroke.

The TA family has been specially developed for maximum energy absorption within a range of 2 Nm to 2,951 Nm. The minimum height is thanks to the space-saving shape with Ø 12 mm to Ø 116 mm. The dampers can be very easily and quickly fixed with the provided special screw.

These compact, cost-effective machine elements are ideal as end position dampers in linear axes, in toolmaking and tool machines, in hydraulic and pneumatic equipment, handling equipment and other applications.

Technical Data

Energy capacity: 2 Nm/Cycle to 2,951 Nm/Cycle

Energy absorption: 58 % to 73 %

Dynamic force range: 870 N to 90,000 N

Operating temperature range: -40 °C to +90 °C

Construction size: 12 mm to 116 mm

Mounting: In any position

Material hardness rating: Shore 55D

Material: Profile body: Co-Polyester Elastomer

Environment: Resistant to microbes, seawater or chemical attack. Excellent UV and ozone resistance. Material does not absorb water or swell.

Impact velocity range: Max. 5 m/s

Torque max.:
M3: 1 Nm
M4: 1.7 Nm
M5: 2.3 Nm
M6: 6 Nm
M8: 20 Nm
M12: 50 Nm
M16: 120 Nm

Application field: Linear slides, Pneumatic cylinders, Handling modules, Machines and plants, Swivel units, Electro-mechanical drives, Hydraulic devices, Conveyor systems, Crane systems

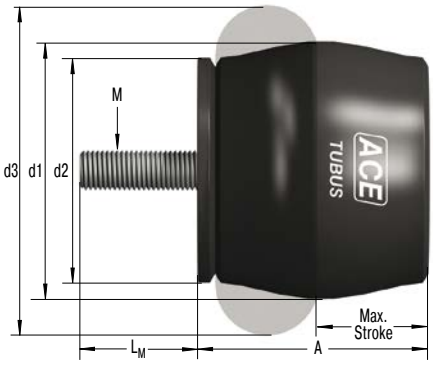
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

Safety instructions: Mounting screw should additionally be secured with Loctite.

On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

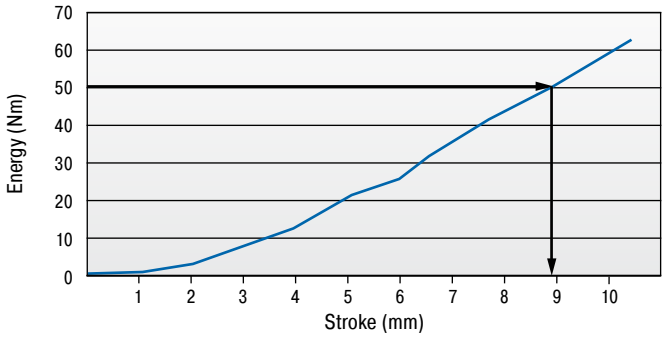
Issue 07.2017 – Specifications subject to change

TA

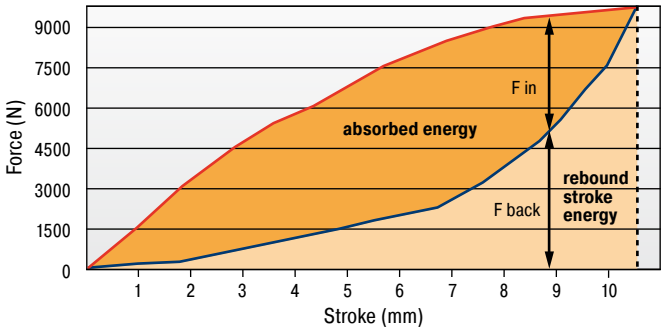


Characteristics

Type TA37-16
Energy-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



Type TA37-16
Force-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



With the aid of the characteristic curves above you can estimate the proportion of the total energy that will be absorbed.
Example: With impact energy of 50 Nm the Energy-Stroke diagram shows that a stroke of about 8.8 mm is needed.
On the Force-Stroke diagram you can estimate the proportion of absorbed energy to rebound energy at this stroke length.
Dynamic (v > 0.5 m/s) and static (v ⩽ 0.5 m/s) characteristics of all types are available on request.

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Ordering Example **TA37-16**

TUBUS Axial
Outer-Ø 37 mm
Stroke 16 mm

Performance and Dimensions

TYPES	[1] W_3 Nm/cycle	Emergency Stop W_3 Nm/cycle	Stroke max. mm	A mm	d1 mm	d2 mm	d3 mm	L_M mm	M	Weight kg
TA12-5	2.0	3	5	11	12	11	15	3	M3	0.001
TA17-7	6.0	9	7	16	17	15	22	4	M4	0.004
TA21-9	10.0	16	9	18	21	18	26	5	M5	0.007
TA22-10	11.5	21	10	19	22	19	27	6	M6	0.008
TA28-12	29.0	46	12	26	28	25	36	6	M6	0.016
TA34-14	48.0	87	14	30	34	30	43	6	M6	0.024
TA37-16	65.0	112	16	33	37	33	48	6	M6	0.030
TA40-16	82.0	130	16	35	40	34	50	8	M8	0.040
TA43-18	112.0	165	18	38	43	38	55	8	M8	0.051
TA47-20	140.0	173	20	41	47	41	60	12	M12	0.070
TA50-22	170.0	223	22	45	50	44	64	12	M12	0.085
TA54-22	201.0	334	22	47	54	47	68	12	M12	0.100
TA57-24	242.0	302	24	51	57	50	73	12	M12	0.116
TA62-25	304.0	361	25	54	62	53	78	12	M12	0.132
TA65-27	374.0	468	27	58	65	57	82	12	M12	0.153
TA70-29	421.0	524	29	61	70	60	86	12	M12	0.174
TA72-31	482.0	559	31	65	72	63	91	16	M16	0.257
TA80-32	570.0	831	32	69	80	69	100	16	M16	0.311
TA82-35	683.0	921	35	74	82	72	105	16	M16	0.350
TA85-36	797.0	1,043	36	76	85	75	110	16	M16	0.391
TA90-38	934.0	1,249	38	80	90	78	114	16	M16	0.414
TA98-40	1,147.0	1,555	40	86	98	85	123	16	M16	0.513
TA116-48	2,014.0	2,951	48	101	116	98	146	16	M16	0.803

[1] Max. energy capacity per cycle for continous use.
All specifications are nominal dimensions. Tolerances are available on request.

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TUBUS TS

Compact size and smooth deceleration

Axial Soft Damping
Energy capacity 2 Nm/Cycle to 966 Nm/Cycle
Maximum stroke 7 mm to 56 mm

Energy absorption in a compact and uniform way: The TS (TUBUS soft) profile dampers are also manufactured from co-polyester elastomer. Due to the almost linear damping characteristic curve, the maintenance-free, ready-to-install components softly absorb the energy with minimum strain on the machine. Consistent damping is helped by the low temperature increase of the material during operation.

The TS-Series impresses with maximum energy absorption within a range of 2 Nm to 966 Nm within a minimum height. The space-saving design has been implemented from Ø 14 mm to Ø 107 mm. The special screw supplied is used to simply and quickly fix the profile dampers in place.

Suitable for emergency stop and permanent applications, the cost-effective, durable TUBUS TS can be used as end position dampers in linear axes, in toolmaking and tool machines and in hydraulic, pneumatic and handling equipment.

Technical Data

Energy capacity: 2 Nm/Cycle to 966 Nm/Cycle

Energy absorption: 35 % to 64 %

Dynamic force range: 533 N to 23,500 N

Operating temperature range: -40 °C to +90 °C

Construction size: 14 mm to 107 mm

Mounting: In any position

Material hardness rating: Shore 40D

Material: Profile body: Co-Polyester Elastomer

Environment: Resistant to microbes, seawater or chemical attack. Excellent UV and ozone resistance. Material does not absorb water or swell.

Impact velocity range: Max. 5 m/s

Torque max.:
M4: 1.7 Nm
M5: 2.3 Nm
M6: 6 Nm
M12: 50 Nm
M16: 120 Nm

Application field: Linear slides, Pneumatic cylinders, Handling modules, Machines and plants, Swivel units, Electro-mechanical drives, Crane systems, Conveyor systems, Crane systems

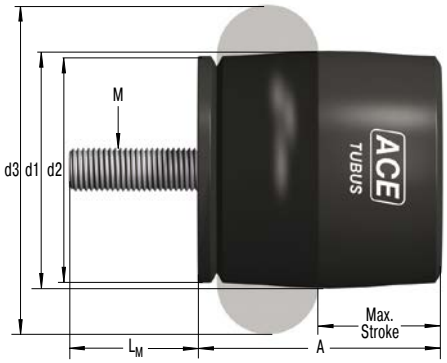
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

Safety instructions: Mounting screw should additionally be secured with Loctite.

On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

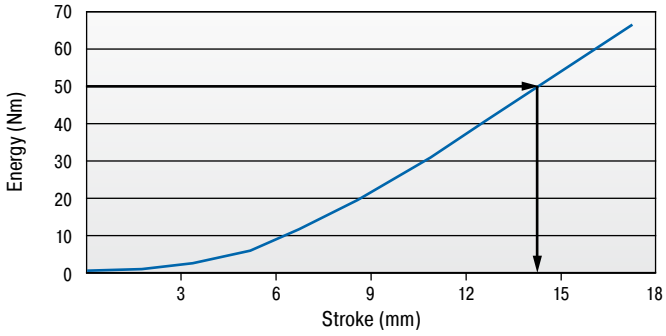
Issue 07.2017 – Specifications subject to change

TS

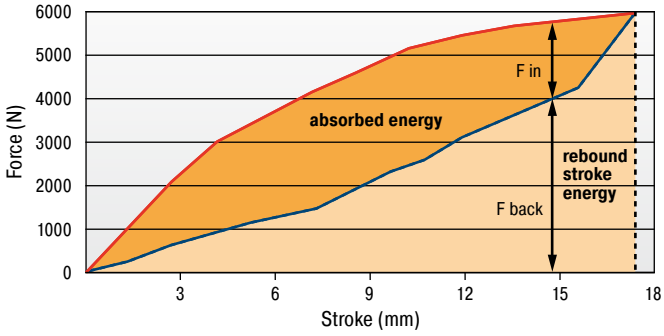


Characteristics

Type TS44-23
Energy-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



Type TS44-23
Force-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



With the aid of the characteristic curves above you can estimate the proportion of the total energy that will be absorbed.
Example: With impact energy of 50 Nm the Energy-Stroke diagram shows that a stroke of about 14 mm is needed.
On the Force-Stroke diagram you can estimate the proportion of absorbed energy to rebound energy at this stroke length.
Dynamic (v > 0.5 m/s) and static (v ⩽ 0.5 m/s) characteristics of all types are available on request.

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Ordering Example **TS44-23**

TUBUS Axial Soft
Outer-Ø 44 mm
Stroke 23 mm

Performance and Dimensions

TYPES	[1] W_3 Nm/cycle	Emergency Stop W_3 Nm/cycle	Stroke max. mm	A mm	d1 mm	d2 mm	d3 mm	L_M mm	M	Weight kg
TS14-7	2.0	3	7	15	14	13	19	4	M4	0.003
TS18-9	4.0	6	9	18	18	16	24	5	M5	0.006
TS20-10	6.0	7	10	21	20	19	27	6	M6	0.009
TS26-15	11.5	15	15	28	26	25	37	6	M6	0.016
TS32-16	23.0	26	16	32	32	30	44	6	M6	0.021
TS35-19	30.0	36	19	36	35	33	48	6	M6	0.028
TS40-19	34.0	42	19	38	40	34	51	6	M6	0.031
TS41-21	48.0	63	21	41	41	38	55	12	M12	0.060
TS44-23	63.0	72	23	45	44	40	60	12	M12	0.070
TS48-25	81.0	91	25	49	48	44	64	12	M12	0.080
TS51-27	92.0	114	27	52	51	47	69	12	M12	0.095
TS54-29	122.0	158	29	55	54	50	73	12	M12	0.105
TS58-30	149.0	154	30	59	58	53	78	12	M12	0.132
TS61-32	163.0	169	32	62	61	56	83	16	M16	0.203
TS64-34	208.0	254	34	66	64	60	87	16	M16	0.232
TS68-36	227.0	272	36	69	68	63	92	16	M16	0.248
TS75-39	291.0	408	39	75	75	69	101	16	M16	0.301
TS78-40	352.0	459	40	79	78	72	105	16	M16	0.339
TS82-44	419.0	620	44	84	82	75	110	16	M16	0.346
TS84-43	475.0	635	43	85	84	78	115	16	M16	0.402
TS90-47	580.0	778	47	92	90	84	124	16	M16	0.490
TS107-56	902.0	966	56	110	107	100	147	16	M16	0.733

[1] Max. energy capacity per cycle for continous use.
All specifications are nominal dimensions. Tolerances are available on request.

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TUBUS TR

Compact size and soft deceleration

Radial Damping
Energy capacity 1.2 Nm/Cycle to 146 Nm/Cycle
Maximum stroke 17 mm bis 60 mm

For long, soft braking action: The Radial damping forces in this model from the ACE TUBUS-Series provides the TR range. These maintenance-free, ready-to-install elements are made of co-polyester elastomer, which only heats up slightly during operation and therefore provides consistent damping.

The radial loading enables a very long and soft deceleration with progressive energy reduction at the end of the stroke. The TR-Series has been specially designed for maximum stroke with a minimum height, producing an energy absorption per stroke extending from 1.2 Nm to 146 Nm. The dampers are available in compact formats of Ø 29 mm to Ø 100 mm and are supplied with a special screw for simple, quick assembly.

The TUBUS TR products are suitable as end position dampers in linear axes, in toolmaking and tool machines, in hydraulic and pneumatic equipment, handling equipment and other applications.

Technical Data

Energy capacity: 1.2 Nm/Cycle to 146 Nm/Cycle

Energy absorption: 25 % to 45 %

Dynamic force range: 218 N to 7,500 N

Operating temperature range: -40 °C to +90 °C

Construction size: 29 mm to 100 mm

Mounting: In any position

Material hardness rating: Shore 40D

Material: Profile body: Co-Polyester Elastomer

Environment: Resistant to microbes, seawater or chemical attack. Excellent UV and ozone resistance. Material does not absorb water or swell.

Impact velocity range: Max. 5 m/s

Torque max.:
M5: 3 Nm
M6: 6 Nm
M8: 20 Nm

Application field: Furniture industry, Sports equipment, Linear slides, Pneumatic cylinders, Handling modules, Machines and plants, Stacking units, Electro-mechanical drives, Conveyor systems

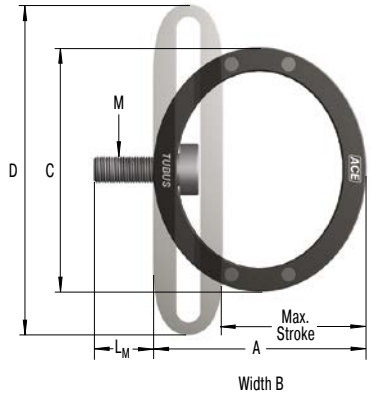
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

Safety instructions: Mounting screw should additionally be secured with Loctite.

On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

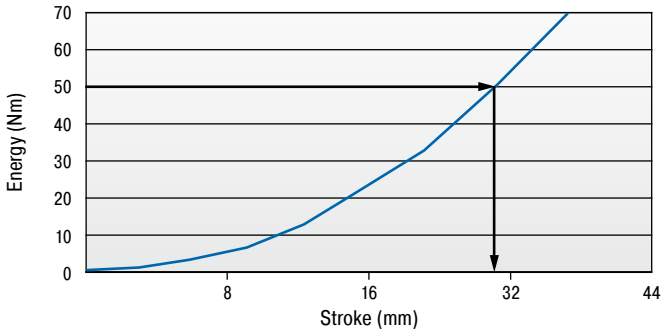
Issue 07.2017 – Specifications subject to change

TR

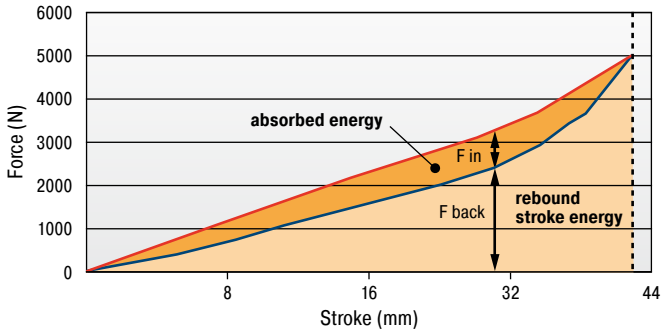


Characteristics

Type TR93-57
Energy-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



Type TR93-57
Force-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



With the aid of the characteristic curves above you can estimate the proportion of the total energy that will be absorbed.
Example: With impact energy of 50 Nm the Energy-Stroke diagram shows that a stroke of about 31 mm is needed.
On the Force-Stroke diagram you can estimate the proportion of absorbed energy to rebound energy at this stroke length.
Dynamic (v > 0.5 m/s) and static (v ⩽ 0.5 m/s) characteristics of all types are available on request.

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Ordering Example **TR93-57**

TUBUS Radial
Outer-Ø 93 mm
Stroke 57 mm

Performance and Dimensions

TYPES	[1] W_3 Nm/cycle	Emergency Stop W_3 Nm/cycle	Stroke max. mm	A mm	B mm	C mm	D mm	L_M mm	M	Weight kg
TR29-17	1.2	1.8	17	25	13	29	38	5	M5	0.010
TR37-22	2.3	5.4	22	32	19	37	50	5	M5	0.013
TR43-25	3.5	8.1	25	37	20	43	58	5	M5	0.017
TR50-35	5.8	8.3	35	44	34	50	68	5	M5	0.025
TR63-43	12.0	17.0	43	55	43	63	87	5	M5	0.051
TR67-40	23.0	33.0	40	59	46	67	88	5	M5	0.089
TR76-46	34.5	43.0	46	67	46	76	102	6	M6	0.104
TR83-50	45.0	74.0	50	73	51	83	109	6	M6	0.142
TR85-50	68.0	92.0	50	73	68	85	111	8	M8	0.206
TR93-57	92.0	122.0	57	83	83	93	124	8	M8	0.297
TR100-60	115.0	146.0	60	88	82	100	133	8	M8	0.308

[1] Max. energy capacity per cycle for continous use.
All specifications are nominal dimensions. Tolerances are available on request.

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TUBUS TR-H

Compact size with soft deceleration and high energy absorption

Radial Damping, Hard Version
Energy capacity 2.7 Nm/Cycle to 427 Nm/Cycle
Maximum stroke 15 mm bis 56 mm

Harder mixture of materials for higher energy absorption: The maintenance-free and ready-to-install TR-H-Series profile dampers, are stressed radially in the same way as the basic TR model. With almost the same dimensions, they also decelerate with a very long and soft action. The harder co-polyester elastomer mixture leads to significantly high energy absorption of 2.7 Nm to 427 Nm in these models. Easy to mount due to the supplied special screw.

The TR-H-Series is space-saving with dimensions of Ø 30 mm to Ø 102 mm. It complements the TUBUS range between the progressive TR and almost linear TS models. Users are therefore provided with a full range of deceleration curves within the ACE TUBUS family.

The TUBUS TR-H products are suitable end position dampers in linear axes, in toolmaking and tool machines and in hydraulic, pneumatic and handling equipment as well as other applications.

Technical Data

Energy capacity: 2.7 Nm/Cycle to 427 Nm/Cycle

Energy absorption: 39 % to 62 %

Dynamic force range: 550 N to 21,200 N

Operating temperature range: -40 °C to +90 °C

Construction size: 30 mm to 102 mm

Mounting: In any position

Material hardness rating: Shore 55D

Material: Profile body: Co-Polyester Elastomer

Environment: Resistant to microbes, seawater or chemical attack. Excellent UV and ozone resistance. Material does not absorb water or swell.

Impact velocity range: Max. 5 m/s

Torque max.:
M5: 3 Nm
M6: 6 Nm
M8: 20 Nm

Application field: Furniture industry, Sports equipment, Linear slides, Pneumatic cylinders, Handling modules, Machines and plants, Stacking units, Electro-mechanical drives, Conveyor systems

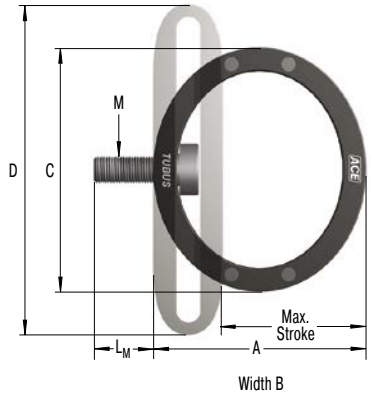
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

Safety instructions: Mounting screw should additionally be secured with Loctite.

On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

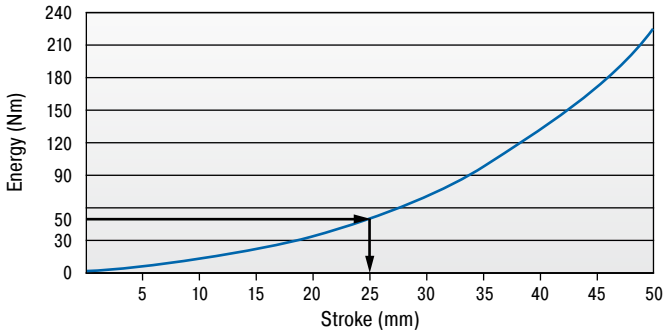
Issue 07.2017 – Specifications subject to change

TR-H

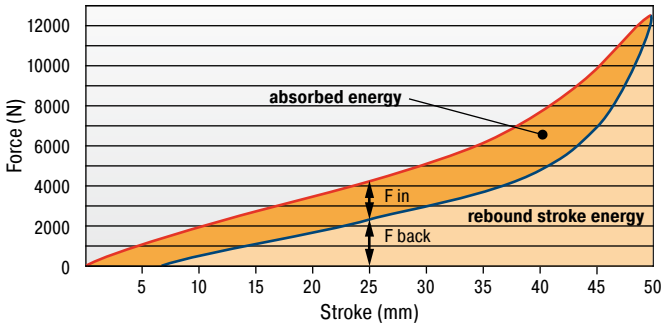


Characteristics

Type TR95-50H
Energy-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



Type TR95-50H
Force-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



With the aid of the characteristic curves above you can estimate the proportion of the total energy that will be absorbed.
Example: With impact energy of 50 Nm the Energy-Stroke diagram shows that a stroke of about 25 mm is needed.
On the Force-Stroke diagram you can estimate the proportion of absorbed energy to rebound energy at this stroke length.
Dynamic (v > 0.5 m/s) and static (v ⩽ 0.5 m/s) characteristics of all types are available on request.

The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Ordering Example **TR95-50H**

TUBUS Radial
Outer-Ø 95 mm
Stroke 50 mm
Hard Version

Performance and Dimensions

TYPES	[1] W_3 Nm/cycle	Emergency Stop W_3 Nm/cycle	Stroke max. mm	A mm	B mm	C mm	D mm	L_M mm	M	Weight kg
TR30-15H	2.7	5.7	15	23	13	30	38	5	M5	0.009
TR39-19H	6.0	18.0	19	30	19	39	50	5	M5	0.013
TR45-23H	8.7	24.0	23	36	20	45	58	5	M5	0.019
TR52-32H	11.7	20.0	32	42	34	52	68	5	M5	0.030
TR64-41H	25.0	46.0	41	53	43	64	87	5	M5	0.054
TR68-37H	66.5	98.0	37	56	46	68	88	5	M5	0.095
TR79-42H	81.5	106.0	42	64	46	79	102	6	M6	0.107
TR86-45H	124.0	206.0	45	69	51	86	109	6	M6	0.152
TR87-46H	158.0	261.0	46	68	67	86	111	8	M8	0.188
TR95-50H	228.0	342.0	50	77	82	95	124	8	M8	0.281
TR102-56H	290.0	427.0	56	84	81	102	133	8	M8	0.334

[1] Max. energy capacity per cycle for continous use.
All specifications are nominal dimensions. Tolerances are available on request.

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TUBUS TR-L

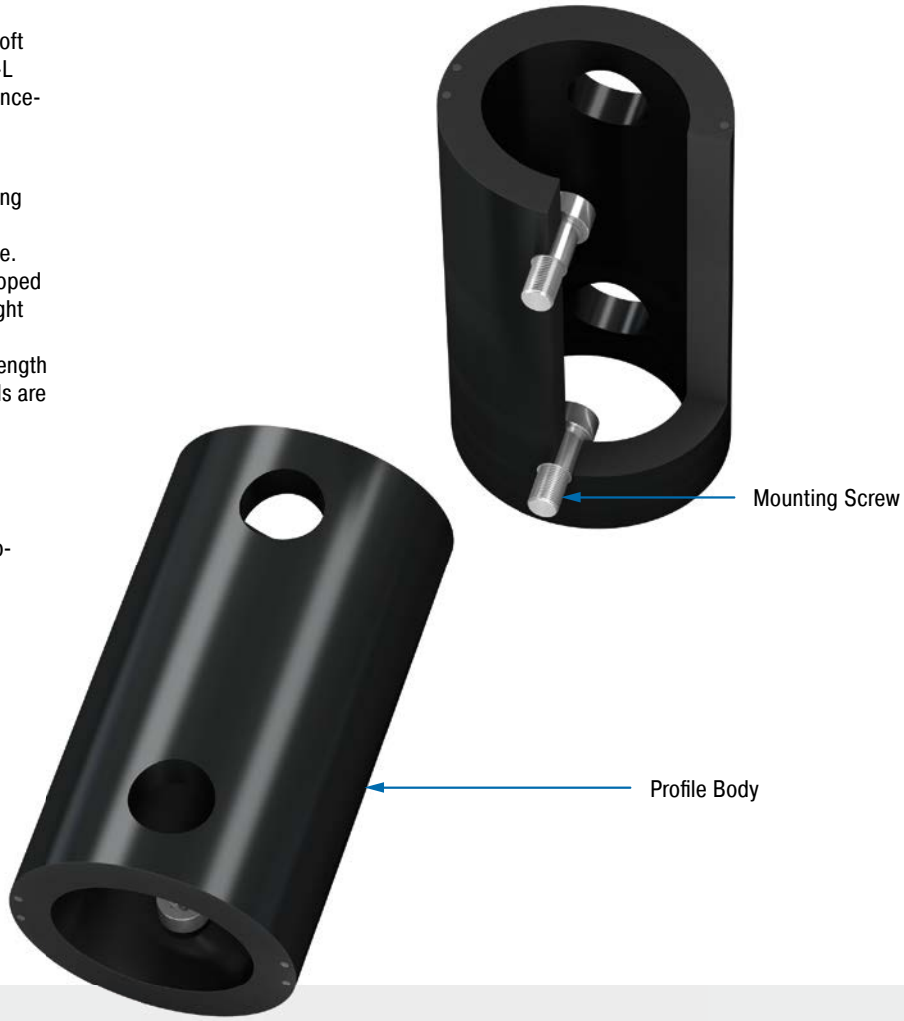
Powerhouse in long body length

Radial Damping, Long Version
Energy capacity 7.2 Nm/Cycle to 10,780 Nm/Cycle
Maximum stroke 17 mm bis 108 mm

Especially for applications with long and soft deceleration: The radial tube dampers TR-L from the ACE TUBUS-Series are maintenance-free, ready-to-install elements made of co-polyester elastomer.

Their radial load offers designers a very long and soft deceleration with a progressive reduction in energy at the end of the stroke. The TR-L-Series has been specially developed for a maximum stroke with a minimum height and a range of 7.2 Nm to 10,780 Nm. The absorption capacity is dependent on the length of the selected tube damper. These models are available in sizes between Ø 29 mm and Ø 188 mm.

The TUBUS TR-L is used where impact or collision protection is necessary along a straight line e.g. on shovels in mining equipment, loading and lifting devices, dock systems in shipbuilding or luggage and transport belts.



Technical Data

Energy capacity: 7.2 Nm/Cycle to 10,780 Nm/Cycle

Energy absorption: 26 % to 41 %

Dynamic force range: 1,312 N to 217,700 N

Operating temperature range: -40 °C to +90 °C

Construction size: 29 mm to 188 mm

Mounting: In any position

Material hardness rating: Shore 55D

Material: Profile body: Co-Polyester Elastomer

Environment: Resistant to microbes, seawater or chemical attack. Excellent UV and ozone resistance. Material does not absorb water or swell.

Impact velocity range: Max. 5 m/s

Torque max.:
M5: 3 Nm
M8: 20 Nm
M16: 40 Nm (DIN912)
M16: 120 Nm (shouldered screw)

Application field: Offshore industry, Agricultural machinery, Impact panels, Conveyor systems, Stacking units, Shipbuilding, Shovels or articulated joints for construction machinery, Transport roads, Loading and lifting equipment

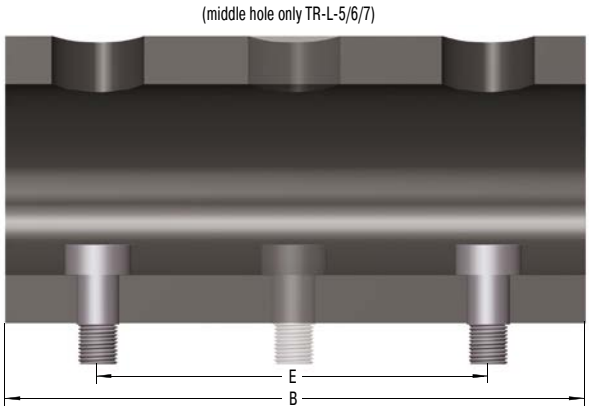
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

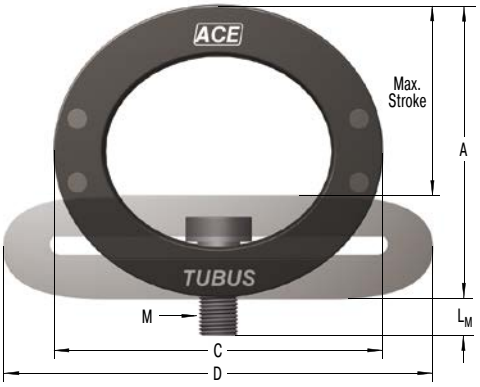
Safety instructions: Mounting screw should additionally be secured with Loctite.

On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

Issue 07.2017 – Specifications subject to change

TR-L





The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Ordering Example **TR66-40L-2**

TUBUS Radial
Outer-Ø 66 mm
Stroke 40 mm
Long Version
Length 2 = 305 mm

Performance and Dimensions

TYPES	[1] W_3 Nm/cycle	Emergency Stop W_3 Nm/cycle	Stroke max. mm	A mm	B mm	C mm	D mm	E mm	L_M mm	M	Weight kg
TR29-17L	7.2	10.9	17	25	80	29	38	40	5	M5	0.044
TR43-25L	14.0	32.7	25	37	80	43	58	40	5	M5	0.072
TR63-43L	21.9	32.0	43	55	80	63	87	40	5	M5	0.106
TR66-40L-1	102.0	143.0	40	59	152	66	87	102	8	M8	0.284
TR66-40L-2	204.0	286.0	40	59	305	66	87	254	8	M8	0.580
TR66-40L-3	306.0	428.0	40	59	457	66	87	406	8	M8	0.830
TR66-40L-4	408.0	571.0	40	59	610	66	87	559	8	M8	1.130
TR66-40L-5	510.0	714.0	40	59	762	66	87	711	8	M8	1.330
TR76-45L-1	145.0	203.0	45	68	152	76	100	102	8	M8	0.380
TR76-45L-2	290.0	406.0	45	68	305	76	100	254	8	M8	0.696
TR76-45L-3	435.0	609.0	45	68	457	76	100	406	8	M8	1.130
TR76-45L-4	580.0	812.0	45	68	610	76	100	559	8	M8	1.430
TR76-45L-5	725.0	1,015.0	45	68	762	76	100	711	8	M8	1.780
TR83-48L-1	180.0	252.0	48	73	152	83	106	102	8	M8	0.480
TR83-48L-2	360.0	504.0	48	73	305	83	106	254	8	M8	0.930
TR83-48L-3	540.0	756.0	48	73	457	83	106	406	8	M8	1.380
TR83-48L-4	720.0	1,008.0	48	73	610	83	106	559	8	M8	1.810
TR83-48L-5	900.0	1,260.0	48	73	762	83	106	711	8	M8	2.260
TR99-60L-1	270.0	378.0	60	88	152	99	130	102	8	M8	0.790
TR99-60L-2	540.0	756.0	60	88	305	99	130	254	8	M8	1.290
TR99-60L-3	810.0	1,134.0	60	88	457	99	130	406	8	M8	1.940
TR99-60L-4	1,080.0	1,512.0	60	88	610	99	130	559	8	M8	2.660
TR99-60L-5	1,350.0	1,890.0	60	88	762	99	130	711	8	M8	3.100
TR99-60L-6	1,620.0	2,268.0	60	88	914	99	130	864	8	M8	3.700
TR99-60L-7	1,890.0	2,646.0	60	88	1,067	99	130	1,016	8	M8	4.300
TR143-86L-1	600.0	840.0	86	127	152	143	191	76	22	M16	1.440
TR143-86L-2	1,200.0	1,680.0	86	127	305	143	191	203	22	M16	2.900
TR143-86L-3	1,800.0	2,520.0	86	127	457	143	191	355	22	M16	3.880
TR143-86L-4	2,400.0	3,360.0	86	127	610	143	191	508	22	M16	5.420
TR143-86L-5	3,000.0	4,200.0	86	127	762	143	191	660	22	M16	6.590
TR143-86L-6	3,600.0	5,040.0	86	127	914	143	191	812	22	M16	7.890
TR143-86L-7	4,200.0	5,880.0	86	127	1,067	143	191	965	22	M16	9.190
TR188-108L-1	1,100.0	1,540.0	108	165	152	188	245	76	26	M16	2.340
TR188-108L-2	2,200.0	3,080.0	108	165	305	188	245	203	26	M16	4.640
TR188-108L-3	3,300.0	4,620.0	108	165	457	188	245	355	26	M16	6.890
TR188-108L-4	4,400.0	6,160.0	108	165	610	188	245	508	26	M16	9.190
TR188-108L-5	5,500.0	7,700.0	108	165	762	188	245	660	26	M16	11.390
TR188-108L-6	6,600.0	9,240.0	108	165	914	188	245	812	26	M16	13.640
TR188-108L-7	7,700.0	10,780.0	108	165	1,067	188	245	965	26	M16	15.940

[1] Max. energy capacity per cycle for continous use.
All specifications are nominal dimensions. Tolerances are available on request.

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TUBUS TR-HD

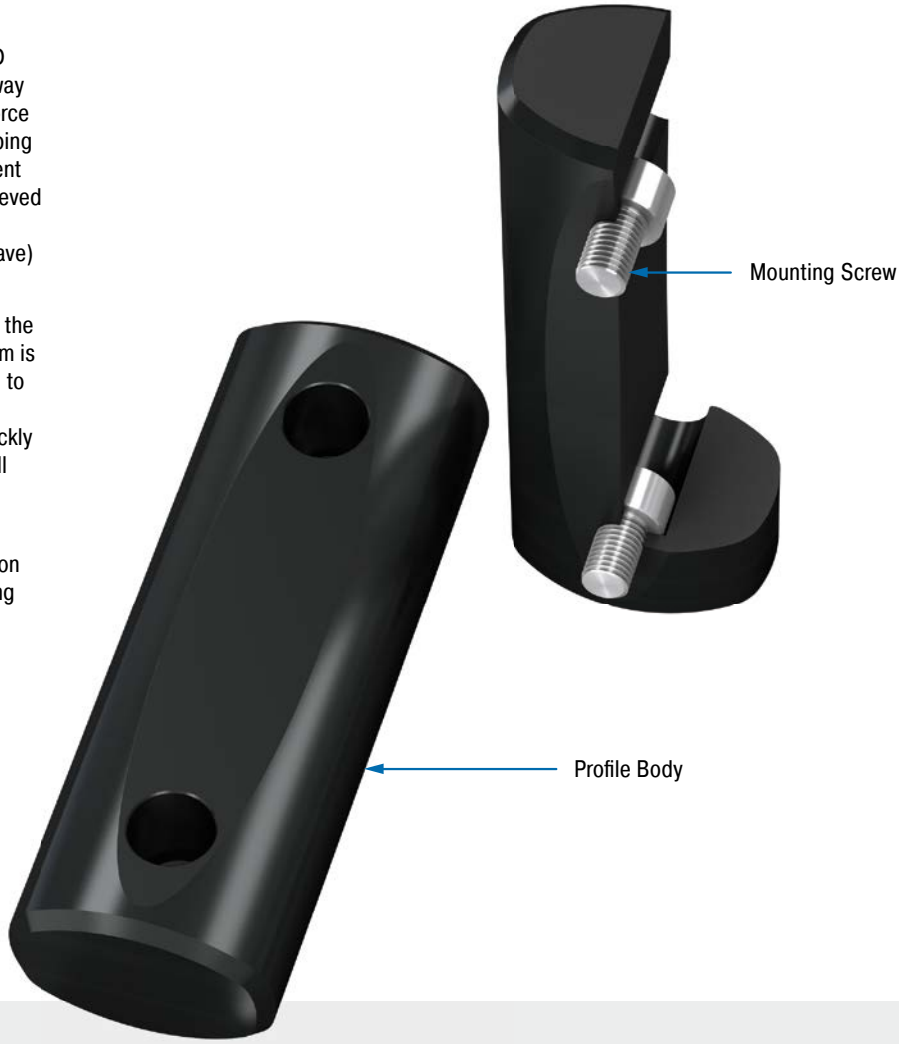
Compact powerhouse in solid material

Radial Damping, Heavy Duty Version
Energy capacity 405 Nm/Cycle to 11,840 Nm/Cycle
Maximum stroke 12 mm to 44 mm

Impact and collision protection: The TR-HD profile dampers are stressed in the same way as the basic model TR but offer a higher force and energy absorption with a shorter damping distance thanks to the solid design. Different damping characteristic curves can be achieved with two different co-polyester elastomer hardness levels. The slightly oval (bi-concave) shape also ensures a softer force intake.

This series absorbs a lot of energy despite the low height: a range of 405 Nm to 11,840 Nm is progressively covered by strokes of 12 mm to 44 mm. With two screws, included in the delivery, the damper can be easily and quickly fixed both horizontally or vertically. The drill hole distance is adapted if required.

These dampers are used in agricultural technology and on shovels or break joints on construction machines as well as on loading and lifting or similar equipment.



Technical Data

Energy capacity: 405 Nm/Cycle to 11,840 Nm/Cycle

Energy absorption: 43 % to 72 %

Dynamic force range: 78.800 N to 812,900 N

Operating temperature range: -40 °C to +90 °C

Construction size: 42 mm to 117 mm

Mounting: In any position

Material hardness rating: Shore 40D, Shore 55D

Material: Profile body: Co-Polyester Elastomer

Environment: Resistant to microbes, seawater or chemical attack. Excellent UV and ozone resistance. Material does not absorb water or swell.

Impact velocity range: Max. 5 m/s

Torque max.:
M10: 7 Nm
M12: 12 Nm

Application field: Offshore industry, Agricultural machinery, Impact panels, Conveyor systems, Stacking units, Shipbuilding, Shovels or articulated joints for construction machinery, Transport roads, Loading and lifting equipment

Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

Safety instructions: Mounting screw should additionally be secured with Loctite.

On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

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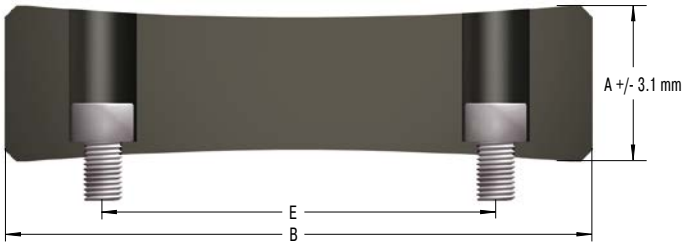
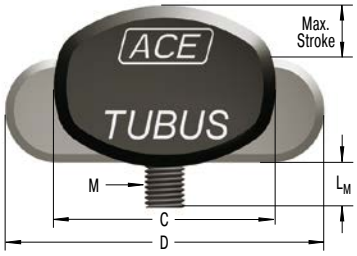
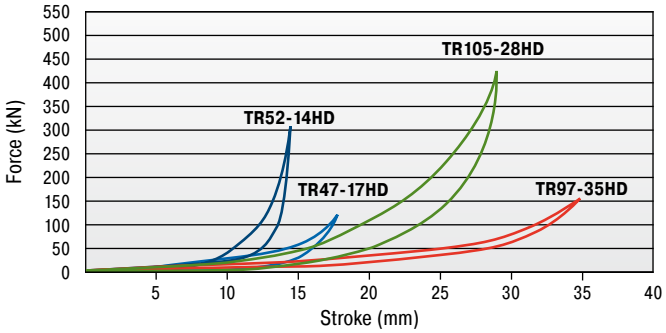
TR-HD





Characteristics

TUBUS TR-HD
Force-Stroke Characteristics (static)



The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Ordering Example **TR63-24HD**

TUBUS Radial
Outer-Ø 63 mm
Stroke 24 mm
Heavy Duty Version

Performance and Dimensions

TYPES	[1] W_3 Nm/cycle	Emergency Stop W_3 Nm/cycle	F max. static N	Stroke max. mm	A mm	B mm	C mm	D mm	E mm	L_M mm	M	Weight kg
TR42-14HD	405	567	63,900	14	34	148	42	59	102	20	M10	0.170
TR47-12HD	857	1,200	149,600	12	31	150	47	58	102	19	M10	0.170
TR47-17HD	850	1,190	122,100	17	32	150	47	70	102	24	M10	0.180
TR52-14HD	1,634	2,288	304,500	14	29	153	52	69	102	22	M10	0.180
TR57-21HD	1,194	1,672	104,800	21	48	149	57	79	102	18	M10	0.340
TR62-15HD	1,790	2,506	245,000	15	40	153	62	77	102	16	M10	0.330
TR62-19HD	2,940	4,116	389,900	19	41	152	62	94	102	16	M10	0.360
TR63-24HD	2,061	2,885	194,400	24	46	153	63	92	102	20	M10	0.330
TR72-26HD	1,700	2,380	124,800	26	59	149	72	98	102	23	M12	0.560
TR79-20HD	2,794	3,912	289,300	20	54	153	79	98	102	24	M12	0.570
TR79-31HD	2,975	4,165	226,600	31	58	155	79	112	102	23	M12	0.560
TR85-33HD	2,526	3,536	146,100	33	71	150	85	111	102	23	M12	0.710
TR89-21HD	4,438	6,213	477,400	21	48	162	89	112	102	22	M12	0.560
TR90-37HD	3,780	5,292	240,700	37	69	155	90	128	102	23	M12	0.750
TR93-24HD	3,421	4,789	302,500	24	64	155	93	115	102	23	M12	0.790
TR97-31HD	7,738	10,833	575,200	31	63	159	97	129	102	21	M12	0.800
TR97-35HD	2,821	3,949	152,800	35	82	151	97	131	102	20	M12	1.060
TR102-44HD	4,697	6,576	254,500	44	81	156	102	147	102	22	M12	1.050
TR105-28HD	5,641	7,897	427,600	28	72	156	105	126	102	21	M12	1.000
TR117-30HD	8,457	11,840	639,100	30	66	166	117	143	102	25	M12	1.010

[1] Max. energy capacity per cycle for continous use.
All specifications are nominal dimensions. Tolerances are available on request.

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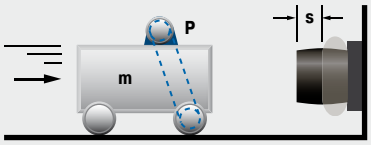
Application Examples

TUBUS TA

Safe end position damping

ACE TUBUS profile dampers protect the integrated loading station on a new high speed machining centre. The ACE TUBUS damper is designed to prevent overrun on the high speed loading station of a Camshaft machining centre used in the automobile industry. In the event that the drive train fails during operation or incorrect data is inputted the ACE TUBUS damper absorbs the impact preventing costly damage to the machine. The TA98-40 TUBUS damper impressed engineers with this exceptionally long service life in operation. When used as an emergency stop the TUBUS damper can absorb up to 73 % of the impact energy.

Safety with ultra high speed operation

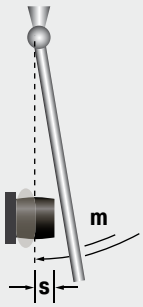


TUBUS TS

Safe braking of maintenance boats

The maintenance of wind turbines in open seas has long resulted in damage to maintenance boats. Because of impact velocity and swell, an increase in the boat‘s mass of up to 20 percent must be taken into account when landing on a rigid mooring structure. It is only since the landing operation has been carried out with the aid of the ACE company‘s TUBUS series that cable repair and maintenance work on wind turbines has been made safe for both personnel and equipment. TUBUS of the type TS84-43 are seawater resistant and can withstand ambient temperatures from -40 °C to + 90 °C.

Seawater-resistant, robust TUBUS profile dampers made of co-polyester elastomer allow boats and crew to dock safely
Wals Diving and Marine Service, 1970AC Ijmuiden, Netherlands



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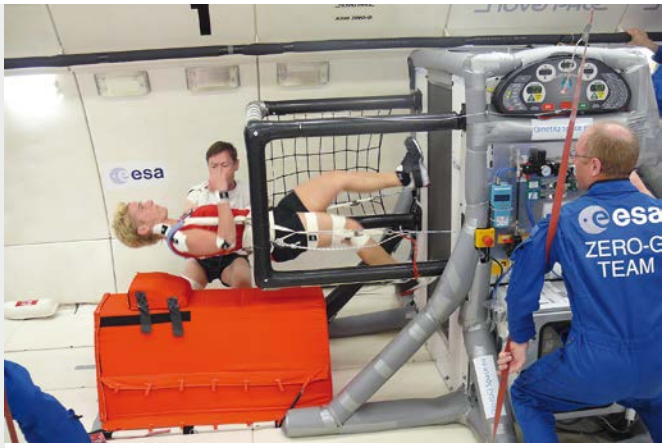
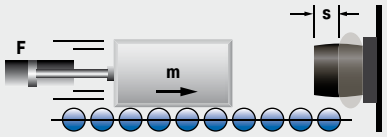
TUBUS TS

Protection of drive used in space treadmill

When training in zero gravity, a harness with bungee cords is used to ensure that trainees do not become disengaged. Three ACE profile dampers with a linear-working facility are utilized in this case. One so-called TUBUS is positioned in the pneumatic cylinder, while the other two are put in place in the rest of the system. All the dampers have the task of protecting the system if the treadmill drive belts become damaged. Otherwise, the cylinder would reach a very high speed and become seriously damaged at the end of the stroke.



TUBUS are used to protect a fitness machine in zero gravity
QinetiQ Space nv, 9150 Kruibeke, Belgium

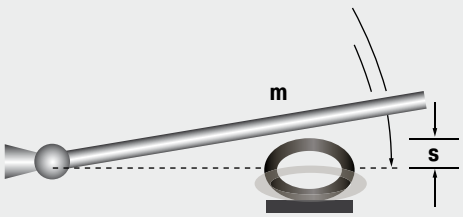


TUBUS TR

Gentle damping for electric scooters

TUBUS profile dampers make driving an e-scooter a real experience. The footboard of an electric scooter should be dampened to enable the driver to experience a comfortable ride even over potholes and other bumpy surfaces. Ideally, the characteristic line should be furnished with a soft increase in force over a long stroke. The elegant look of the scooter as well as the folding mechanism designed to save space have not allowed the use of feasible damper solutions up to now. Inferior alternatives such as rubber dampers made of polyurethane or simple steel springs could not be considered from the start. The TUBUS profile damper TR52-32H offered the perfect solution with its compact construction design paired with progressive damping action.

Profile dampers increase the riding comfort of an electric scooter



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ACE
A STABILUS COMPANY

Special Profile Dampers

Costs-effective tuning for your pressing tools

ACE provides TUBUS profile dampers in many variations. Special solutions for presses can now be cost-effectively achieved with down holder dampers, damping plugs, lift dampers and press dampers from ACE.

They replace the PU-springs previously used in the automotive industry. It was no longer possible for them to fulfil the required tasks due to the higher return stroke speeds in modern pressing tools. Made of co-polyester elastomers, the TUBUS special takes care of the protection of mounting bolts and insert bolts much more reliably. On the one hand they protect a so-called down holders during the return stroke after the forming of sheet metal parts, and on the other they function as protection for hoisting lifters.

- High reliability
- Long service life
- High power and energy absorption
- Efficient working through higher cycle rates
- Extreme abrasion hardness and shear strength
- Noise reduction

TUBUS Special Profile Dampers

A wide range of solutions for your tools

Small but effective: These versatile, custom-manufactured components make all the difference during sheet metal forming in the automotive and tool industries thanks to long service lives and high power absorption.

TUBUS Down Holder Dampers

The innovation as a substitute for overburdened PU springs

The axial-functioning elements are ideal for different diameters of mounting bolts from M10 to M30 in the press tools. They increase clock rates, service lives and reliability during increased cushioning strokes there.

TUBUS Lift Dampers

The brother of the down holder damper

Used in the end position damping in ProgDie presses, they sit on the mounting bolts of the spring-loaded belt guide rails or hoisting lifters in the bottom part of the tool of the follow-on composite tool, protect it and accelerate production.

TUBUS Damping Plugs

A special kind of emergency plug

These side-mounted, radial damping elements also protect the mounting bolts and insert bolts during the opening of the pressing tools. They are available in four different sizes and are used in large tools.

TUBUS Press Dampers

When a side effect (nearly) becomes the main thing

All TUBUS specials additionally reduce noise. In press dampers, used particularly in eccentric presses by manufacturers of large household appliances, this is however the main task. Screwed into a hole pocket, they also effectively protect the tools.

More information about TUBUS special profile dampers can be found in our special catalogue and on our Website www.ace-ace.com / Downloads

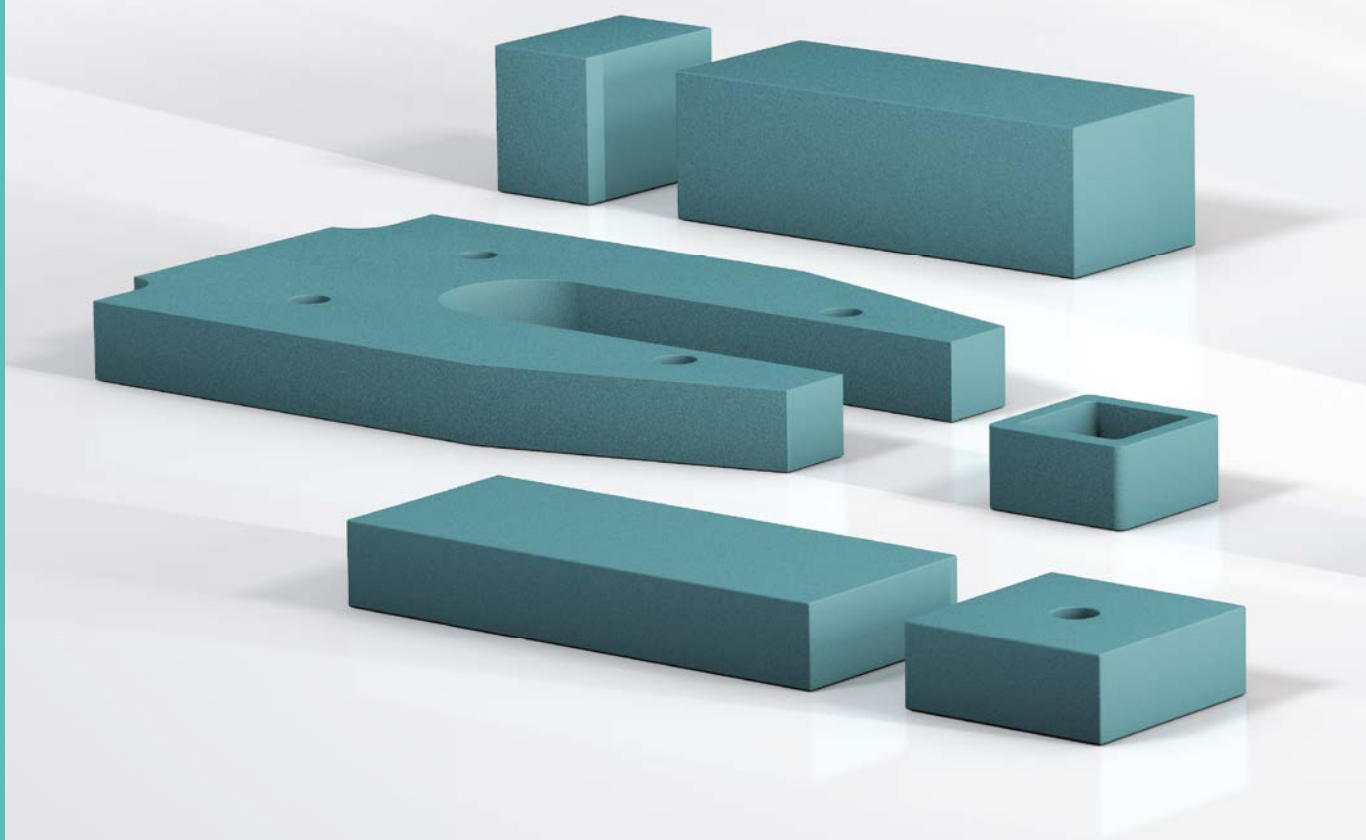
Issue 07.2017 – Specifications subject to change

Damping Pads

Customised damping technology

With damping pads from the SLAB series, ACE provides solutions to effectively slow down impact loads over large and small surfaces. This means that these products are found in a wide range of damping technologies from ACE where oscillation begins or where damaging impacts in construction designs need to be slowed over a large surface.

The ACE SLAB pads, available to choose in any size, absorb static loads from 3 N/cm² to 30 N/cm² and can be either cut to size two-dimensionally according to each requirement or designed as a moulded part. It is simply adhered to assemble. The standard plate heights are between 12.5 mm and 25 mm. Many different coatings clear the way for numerous applications and not least because they can be used in a temperature range from -5 °C to +50 °C.



Individual Pad Cutting

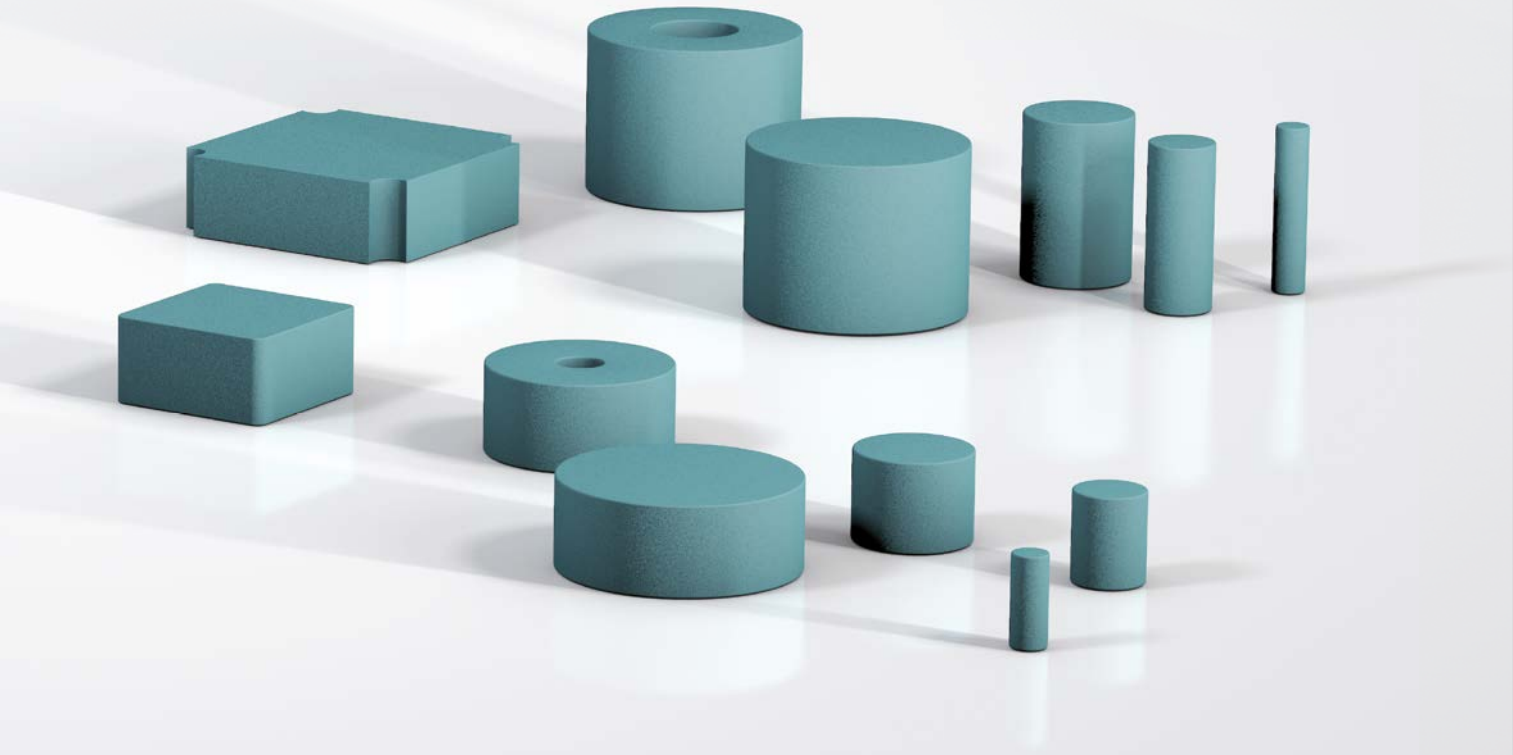
SLAB pads pre-assembled for each project

Ask for special solutions !!!

Whether pads, cuts or drawing parts, stocked SLAB pads in combination with our freely programmable cutting machine ensure maximum flexibility with excellent delivery speed.

Fast, flexible and adapted to your conditions.

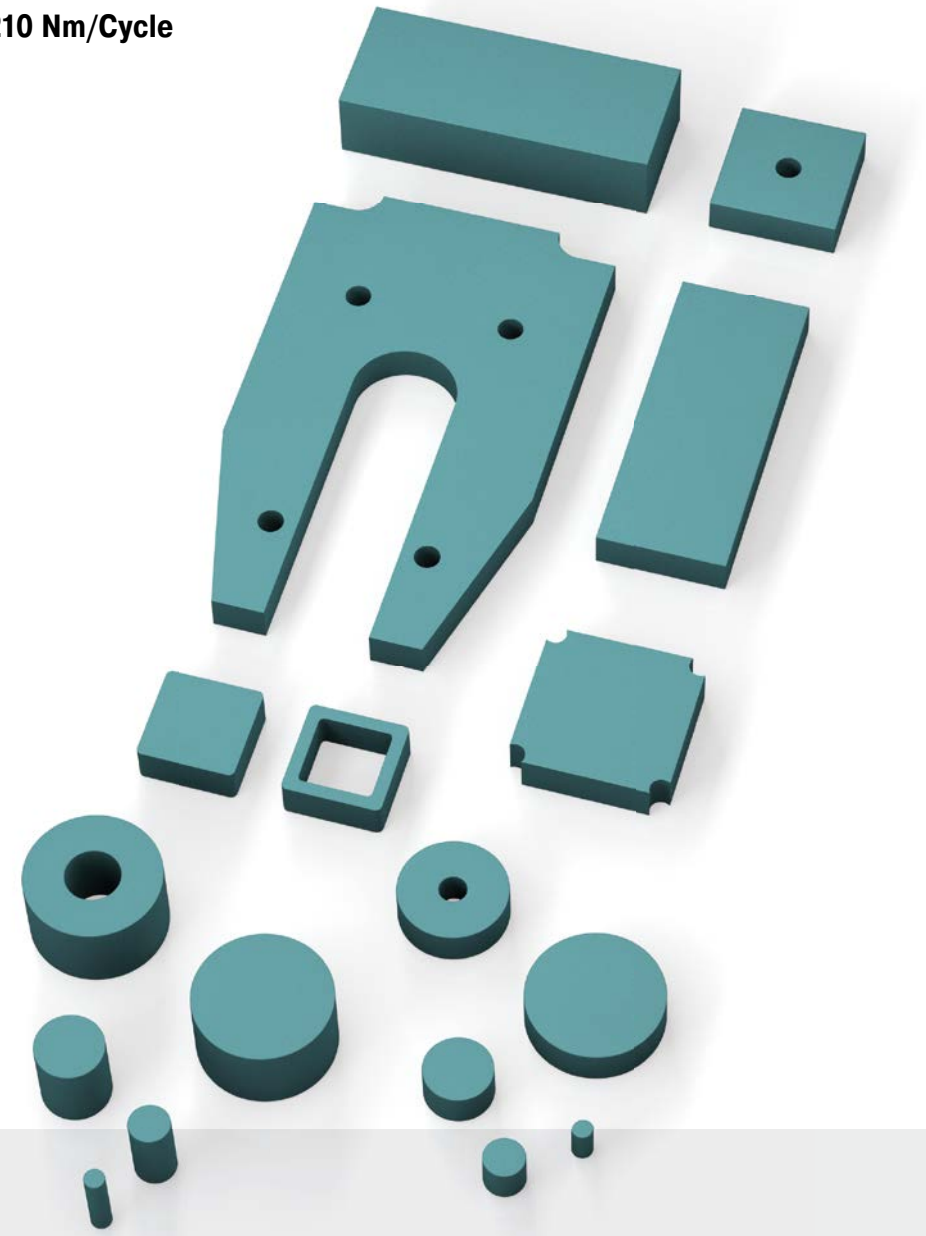
- Can be integrated quickly and cost-effectively
- Immense inner damping
- Pad thicknesses up to 80 mm on request
- Can be assembled with CNC cutting machines
- Patented formula
- Environmentally-friendly H_2O-foamed



SLAB 030 to SLAB 300

Energy absorption in pad format

Confectioning and Combinable
Energy capacity 3.1 Nm/Cycle to 210 Nm/Cycle
Stroke 6.5 mm to 12.5 mm



Tailor made damping material in pad format: SLAB damping pads are made of a viscoelastic PUR-material. They absorb impact loads extremely effectively and are also suitable for insulating or damping vibration.

The pad series SL-030 to SL-300 are quickly adapted to the relevant type of application. This is in part achieved through the configuration of the calculating tool or directly by the ACE specialist engineers. Furthermore, this is possible because the standard material can be cut exactly and quickly to any customer requirement with our new cutting system. It is also possible to obtain a sample to find an optimum solution.

The SLAB damping pads are proven impact or collision protection. They are used on luggage and transport belts, conveyor systems, pneumatic, electromechanical and hydraulic drives as well as on linear carriages.

Technical Data

Energy capacity: 3.1 Nm/Cycle to 210 Nm/Cycle

Standard density:
SL-030 = approx. 220 kg/m³
SL-100 = approx. 440 kg/m³
SL-300 = approx. 680 kg/m³

Standard colour: Green

Dimensions:
Widths: up to 1,500 mm
Lengths: up to 5,000 mm
Thicknesses: 12.5 mm and 25 mm

Environment: Resistant against ozone and UV radiation. Chemical resistancy on request.

Operating temperature range: -5 °C to +50 °C

Material: Profile body: Mixed cellular PUR-Elastomer (polyurethane)

Application field: Linear slides, Handling modules, Luggage and transport belts, Impact panels, Pipeline insulation, Foundation mounting, Conveyor technology, Electronic systems and controls, Medical technology

Note: Possibilities for cutting: Water jet cutting, stamping, splitting, sawing and drilling

Safety instructions: Fire rating: B2, normally flammable, according to DIN 4102

On request: Special versions with further dimensions such as thicknesses, colours, shapes and drawing parts e.g. curves. Different wear layers.

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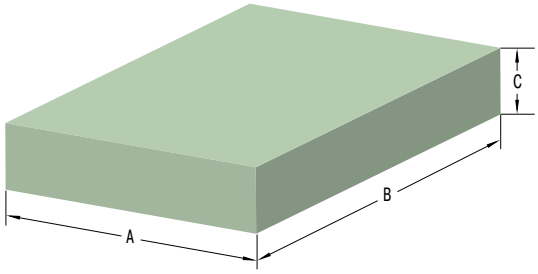
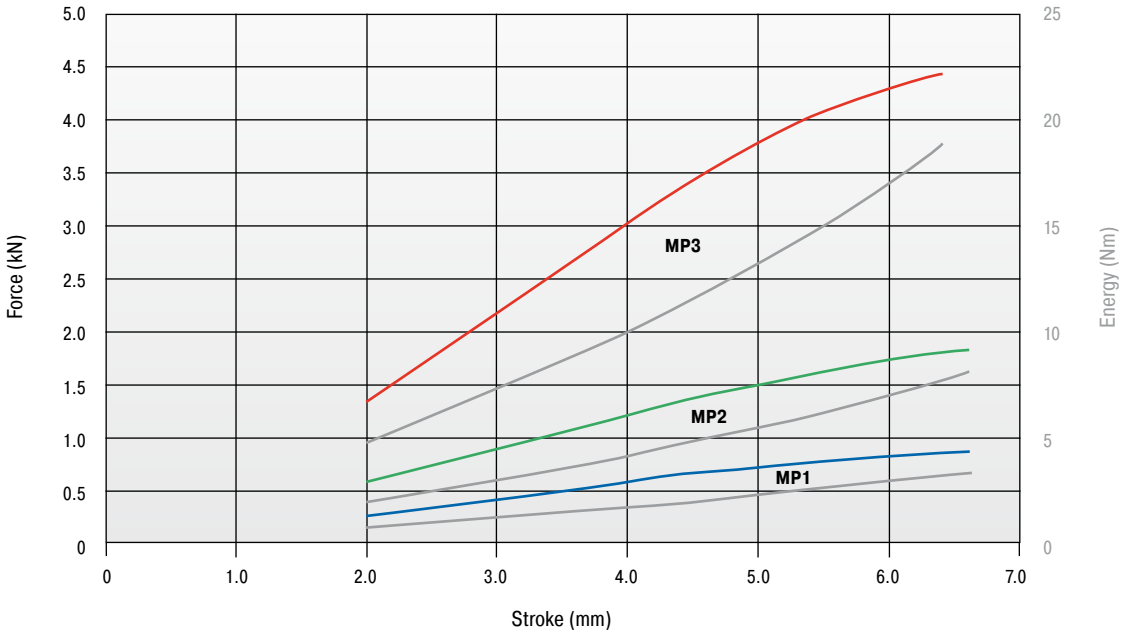
SL-030-12



Characteristics

Type SL-030-12
Force-Stroke Characteristic (dynamic)
Stroke Utilization 6.5 mm



Load data
Dynamic load, impact velocity: approx. 1 m/s

Area 10,000 mm²
Area 5,000 mm²
Area 2,500 mm²

The chosen damping plate should be tested by the customer on the specific application.

Ordering Example **SL-030-12-Dxxxx**

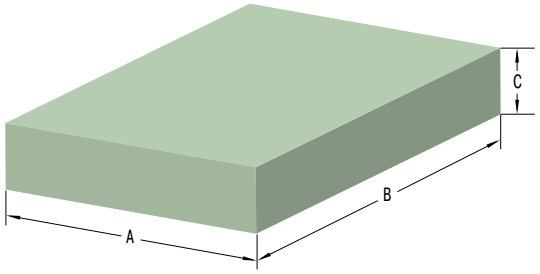
ACE-SLAB
Material Type
Material Thickness 12.5 mm
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] W_3 max. Nm/cycle	[1] Stroke mm	A mm	B mm	C mm	Area mm²	Standard density kg/m³	Return Time s	Weight kg
SL-030-12-D-MP1	3.1	6.5	50.0	50.0	12.5	2,500	200	4	0.006
SL-030-12-D-MP2	8.0	6.5	70.7	70.7	12.5	5,000	200	4	0.013
SL-030-12-D-MP3	19.0	6.5	100.0	100.0	12.5	10,000	200	4	0.025

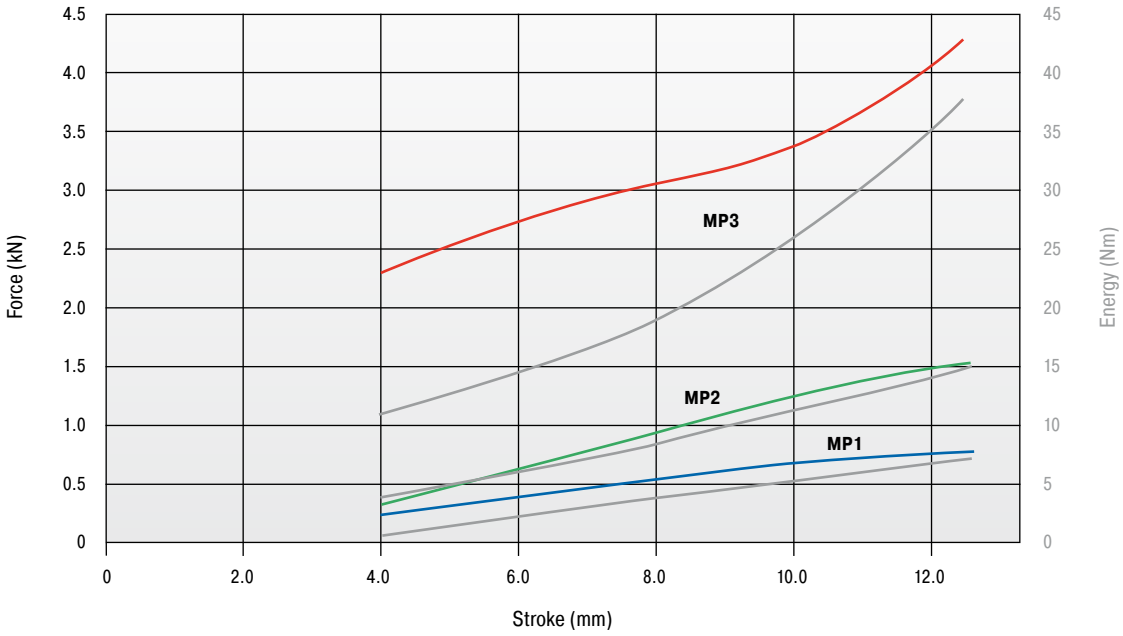
[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

SL-030-25



Characteristics

Type SL-030-25
Force-Stroke Characteristic (dynamic)
Stroke Utilization 12.5 mm



Load data
Dynamic load, impact velocity: approx. 1 m/s

Area 10,000 mm²
Area 5,000 mm²
Area 2,500 mm²

The chosen damping plate should be tested by the customer on the specific application.

Ordering Example **SL-030-25-Dxxxx**

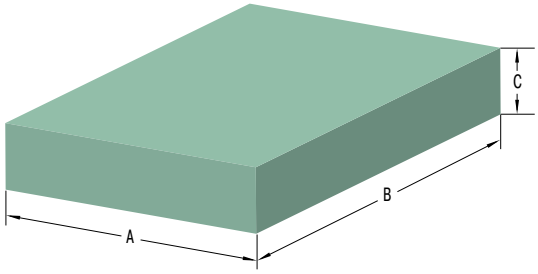
ACE-SLAB
Material Type
Material Thickness 25 mm
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] W_3 max. Nm/cycle	[1] Stroke mm	A mm	B mm	C mm	Area mm²	Standard density kg/m³	Return Time s	Weight kg
SL-030-25-D-MP1	6.7	12.5	50.0	50.0	25.0	2,500	200	5	0.013
SL-030-25-D-MP2	15.0	12.5	70.7	70.7	25.0	5,000	200	5	0.025
SL-030-25-D-MP3	42.0	12.5	100.0	100.0	25.0	10,000	200	5	0.050

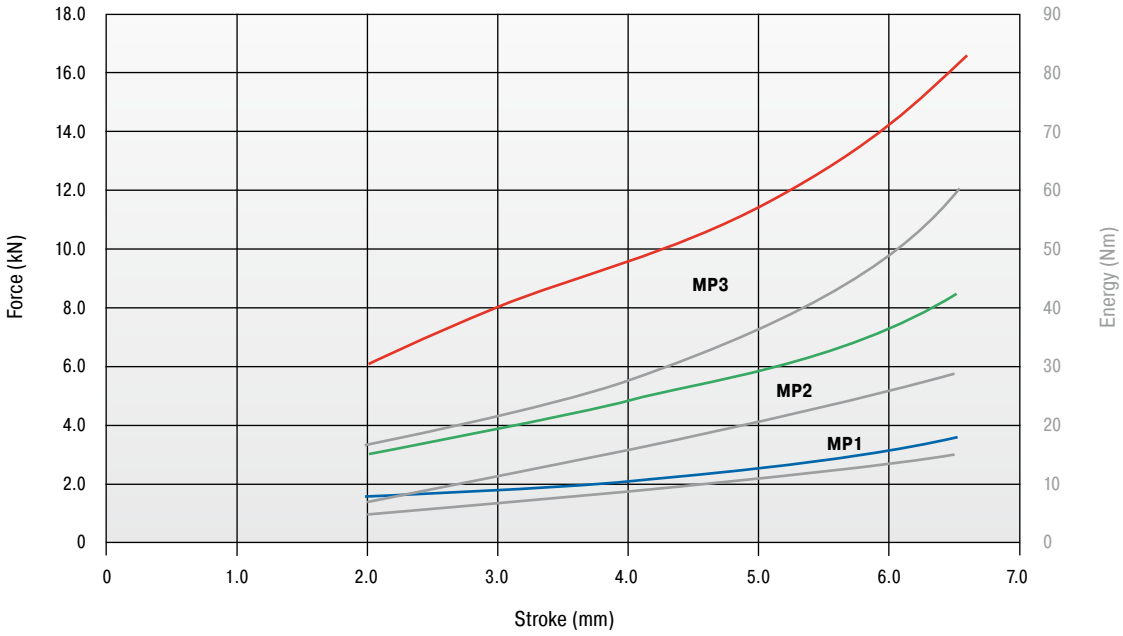
[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

SL-100-12



Characteristics

Type SL-100-12
Force-Stroke Characteristic (dynamic)
Stroke Utilization 6.5 mm



Load data
Dynamic load, impact velocity: approx. 1 m/s

Area 10,000 mm²
Area 5,000 mm²
Area 2,500 mm²

The chosen damping plate should be tested by the customer on the specific application.

Ordering Example **SL-100-12-Dxxxx**

ACE-SLAB
Material Type
Material Thickness 12.5 mm
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] W_3 max. Nm/cycle	[1] Stroke mm	A mm	B mm	C mm	Area mm²	Standard density kg/m³	Return Time s	Weight kg
SL-100-12-D-MP1	15.0	6.5	50.0	50.0	12.5	2,500	440	4	0.014
SL-100-12-D-MP2	30.0	6.5	70.7	70.7	12.5	5,000	440	4	0.028
SL-100-12-D-MP3	60.0	6.5	100.0	100.0	12.5	10,000	440	4	0.055

[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

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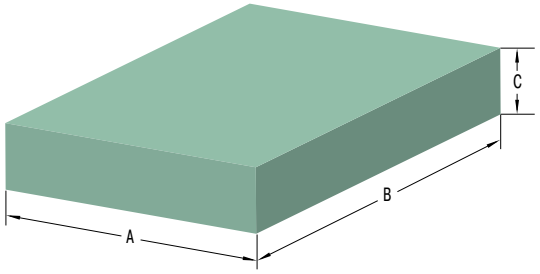
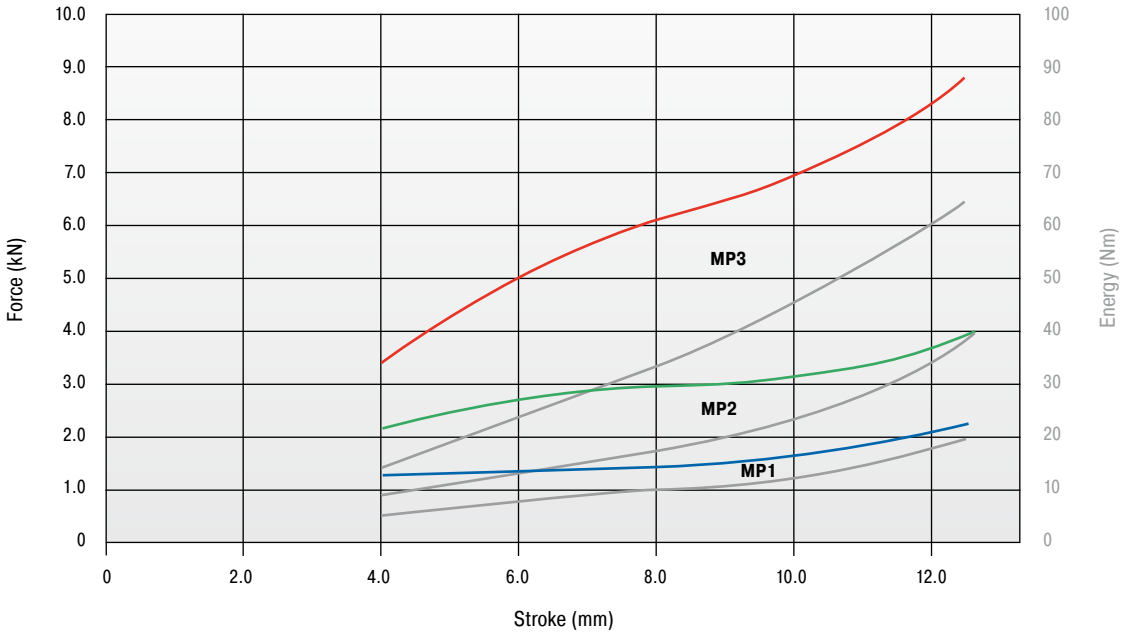
SL-100-25



Characteristics

Type SL-100-25
Force-Stroke Characteristic (dynamic)
Stroke Utilization 12.5 mm



Load data
Dynamic load, impact velocity: approx. 1 m/s

Area 10,000 mm²
Area 5,000 mm²
Area 2,500 mm²

The chosen damping plate should be tested by the customer on the specific application.

Ordering Example **SL-100-25-Dxxxx**

ACE-SLAB
Material Type
Material Thickness 25 mm
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

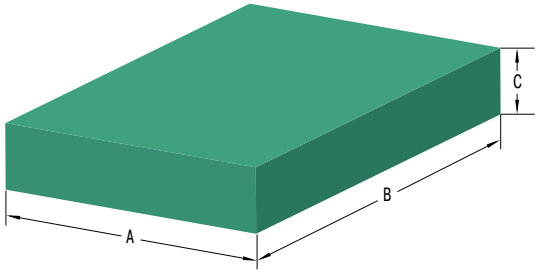
Performance and Dimensions

TYPES	[1] W_3 max. Nm/cycle	[1] Stroke mm	A mm	B mm	C mm	Area mm²	Standard density kg/m³	Return Time s	Weight kg
SL-100-25-D-MP1	20.0	12.5	50.0	50.0	25.0	2,500	440	5	0.028
SL-100-25-D-MP2	40.0	12.5	70.7	70.7	25.0	5,000	440	5	0.055
SL-100-25-D-MP3	63.0	12.5	100.0	100.0	25.0	10,000	440	5	0.110

[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

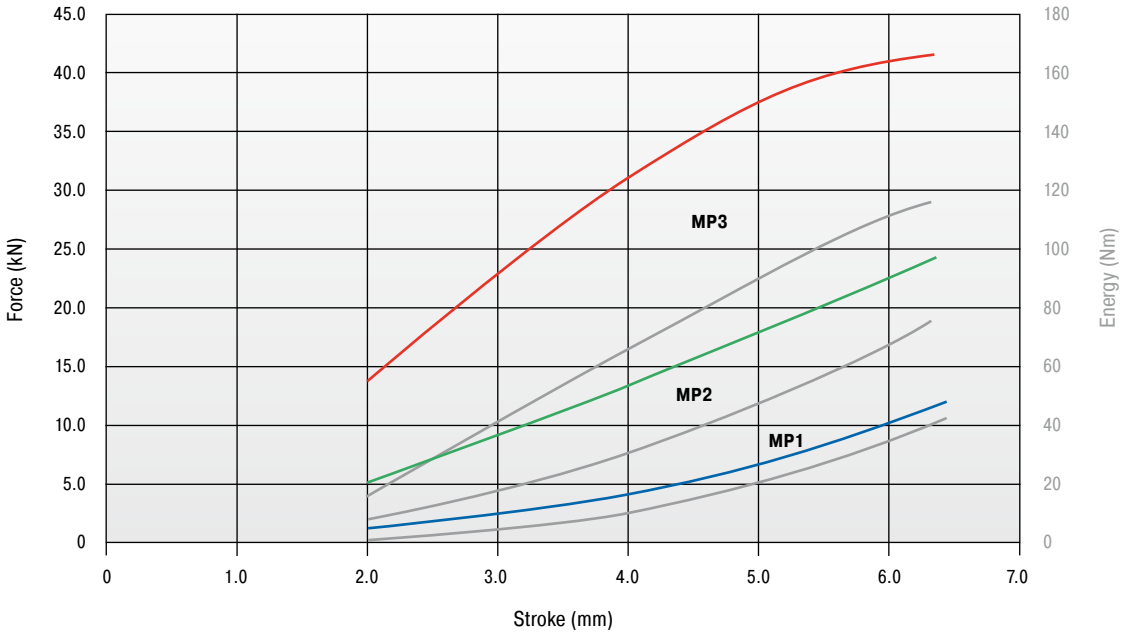
Issue 07.2017 – Specifications subject to change

SL-300-12



Characteristics

Type SL-300-12
Force-Stroke Characteristic (dynamic)
Stroke Utilization 6.5 mm



Load data
Dynamic load, impact velocity: approx. 1 m/s

Area 10,000 mm²
Area 5,000 mm²
Area 2,500 mm²

The chosen damping plate should be tested by the customer on the specific application.

Ordering Example **SL-300-12-Dxxxx**

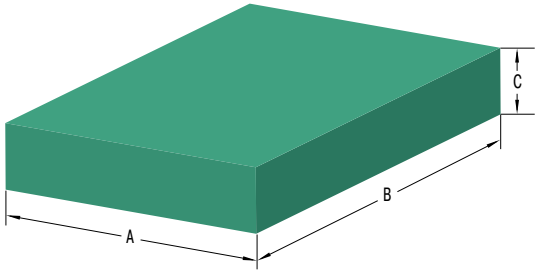
ACE-SLAB
Material Type
Material Thickness 12.5 mm
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] W_3 max. Nm/cycle	[1] Stroke mm	A mm	B mm	C mm	Area mm²	Standard density kg/m³	Return Time s	Weight kg
SL-300-12-D-MP1	38.0	6.5	50.0	50.0	12.5	2,500	680	3	0.021
SL-300-12-D-MP2	65.0	6.5	70.7	70.7	12.5	5,000	680	3	0.043
SL-300-12-D-MP3	121.0	6.5	100.0	100.0	12.5	10,000	680	3	0.085

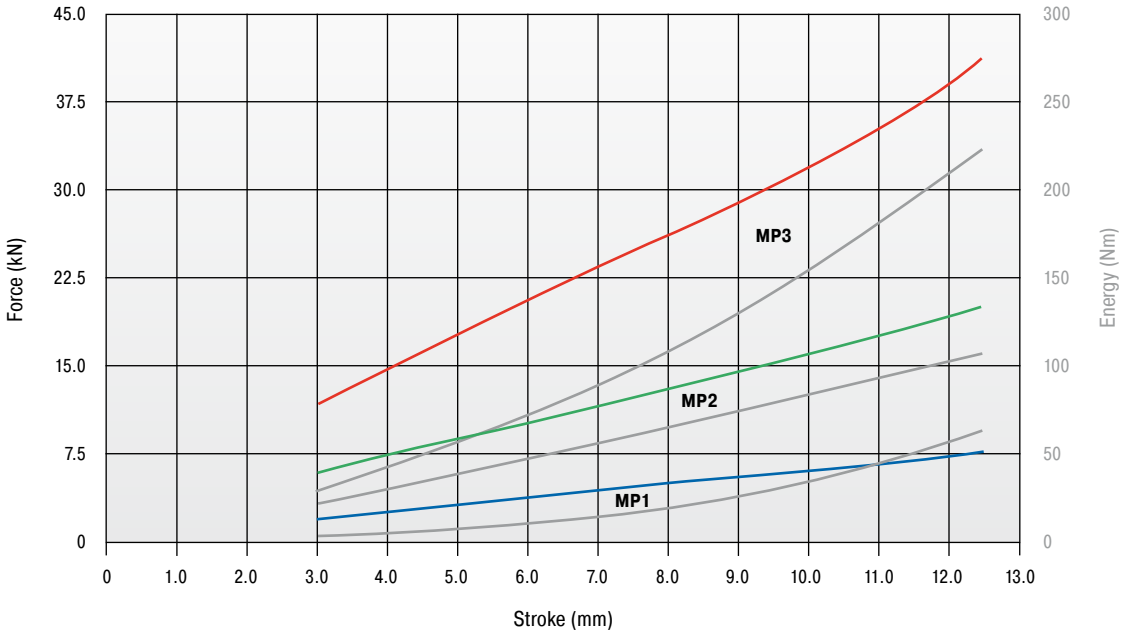
[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

SL-300-25



Characteristics

Type SL-300-25
Force-Stroke Characteristic (dynamic)
Stroke Utilization 12.5 mm



Load data
Dynamic load, impact velocity: approx. 1 m/s

Area 10,000 mm²
Area 5,000 mm²
Area 2,500 mm²

The chosen damping plate should be tested by the customer on the specific application.

Ordering Example **SL-300-25-Dxxxx**

ACE-SLAB
Material Type
Material Thickness 25 mm
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] W_3 max. Nm/cycle	[1] Stroke mm	A mm	B mm	C mm	Area mm²	Standard density kg/m³	Return Time s	Weight kg
SL-300-25-D-MP1	59.0	12.5	50.0	50.0	25.0	2,500	680	4	0.043
SL-300-25-D-MP2	101.0	12.5	70.7	70.7	25.0	5,000	680	4	0.085
SL-300-25-D-MP3	210.0	12.5	100.0	100.0	25.0	10,000	680	4	0.170

[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

Bonding of Polyurethane (PUR) Elastomers

Cellular and compact parts of polyurethane (PUR) elastomers SLAB damping pads can be bonded according to the following recommendations. If treatment instructions are followed, the strengths of the bonded joint can be equivalent to the elastomer material itself.

1. General Information

To achieve the required bonding strength it is necessary to ensure the correct adhesive is chosen for each individual application.

Contact bonding material
Thin adhesive film, with little filling of the gaps. Correcting or moving of the areas covered with bonding material is no longer possible after the first contact is made (contact effect).

Once a bonding is separated, the bonding process must be renewed.

Please note that creases, ripples or blisters cannot be straightened once the contact is made.

Hardening bonding material
(As thin as possible) the film of glue fills the joint. The gluing can be done after the edges are brought together.

2. Preparation

The preparation of bonding surfaces is of significant importance for the bonding strength. The surfaces must be adapted to each other and available in plain, clean form.

Careful removal of
Adhesive remnants, oil, fat,separating agents, dirt, dust, scales, molding layers, protective coating, finish, paint, sweat etc.

Mechanical support
Stripping, brushing, scraping, grinding, sandblasting.

Chemical support
Degreasing (washing off with grease remover), etching, priming; pay attention to chemical resistancy on the following page!

In general, SLAB damping pads in sheet form can be bonded without pretreatment. Molded parts, with or without special skin, have to be cleaned from left-over separating agents, if necessary by grinding. When bonding with other materials like plastic, wood, metal or concrete, mechanical and/or chemical additives have to be used.

The adhesive has to be prepared according to the formula, observing the manufacturer's recommendations. The adhesive film is also to be carefully applied pursuant to these details. (Tools: brush, spatula, adhesive spreader, airless spray gun).

Contact bonding material
Apply the non-gap-filling adhesive film to both bonding surfaces – the thinner, the better. To close the pores of low density materials, two layers may be necessary.

Hardening bonding material
Apply evenly. Possible irregularities can be compensated by the film thickness.

3. Bonding

When using contact bonding material, the flash off time has to be kept in mind. Especially, with systems containing water instead of usual solvents, the adhesive film must be as dry as possible in order to pass the 'finger test' – no marks appear when touching the adhesive surface. When using hardening bonding material, the parts have to be joined immediately after applying the bonding material.

4. Pressing

Contact bonding material	Contact pressure up to 0.5 N/mm²
Hardening bonding material	Fix firmly

It is important to carefully follow the manufacturer's instructions with regard to processing temperature, hardening time and earliest possible loading.

5. Selection of Approved Bonding Materials

Because of the variety of materials that can be bonded together as well as numerous suitable bonding materials, we refer you to a worldwide leading producer of bonding and sealing materials.

Sika Deutschland GmbH
Kornwestheimer Straße 103-107
D-70439 Stuttgart

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Issue 07.2017 – Specifications subject to change

Chemical Resistance

Test (following DIN 53428)

Exposure time of the medium: 6 weeks at room temperature, but for concentrated acids and bases as well as solvents: 7 days at room temperature

Evaluation Criteria

Changing of tensile strength and elongation of break (dry samples), change in volume

Evaluation Standard

1	**Excellent resistance**	change in characteristics <10 %
2	**Good resistance**	hange in characteristics between 10 % and 20 %
3	**Conditional resistance**	change in characteristics partly above 20 %
4	**Not resistant**	change in characteristics all above 20 %

All information is based on our current knowledge and experiences. We reserve the rights for changes towards product refinement.

Chemical Resistance

Water/Watery Solutions	**SL-030 to SL-300**
Water	1
Iron (III) chloride 10 %	1
Sodium carbonate	1
Sodium chlorate 10 %	1
Sodium chloride 10 %	1
Sodium nitrate 10 %	1
Tensides (div.)	1
Hydrogen peroxide 3 %	1
Laitance	1

Oils and Greases	
ASTM Oil No. 1	1
ASTM Oil No. 3	1
Laitance	2
Hydraulic oils	depends on consistency/additives
Motor oil	1
Formwork oil	1
High performance grease	1-2
Railroad switch lubricant	1-2

Acids and Bases	
Formic acid 5 %	3
Acetic acid 5 %	2
Phosphoric acid 5 %	1
Nitic acid 5 %	4
Hydrochloric acid 5 %	1
Sulphuric acid 5 %	1
Ammonia solution 5 %	1
Caustic potash solution 5 %	1
Caustic soda solution 5 %	1

Solvents	**SL-030 to SL-300**
Acetone	4
Diesel/Fuel oil	2
Carburetor fuel/Benzine	3
Glycerin	1
Glycols	1-2
Cleaning solvents/Hexane	1
Methanol	3
Aromatic hydrocarbons	4

Other Factors	
Hydrolysis *	1
Ozone	1
UV radiation and weathering	1-2
Biological resistance	1

* 28 days, 70 °C, 95 % relative humidity

Issue 07.2017 – Specifications subject to change

Sample Pads and Sample Sets

Sample Pads

Part Number	Dimensions and Type
SL-030-12-D-MP4	220 x 150 x 12.5 mm
SL-030-25-D-MP4	220 x 150 x 25 mm
SL-100-12-D-MP4	220 x 150 x 12.5 mm
SL-100-25-D-MP4	220 x 150 x 25 mm
SL-300-12-D-MP4	220 x 150 x 12.5 mm
SL-300-25-D-MP4	220 x 150 x 25 mm
SL-030-12-D-MP5	1500 x 800 x 12 mm
SL-030-25-D-MP5	1500 x 800 x 25 mm
SL-100-12-D-MP5	1500 x 800 x 12 mm
SL-100-25-D-MP5	1500 x 800 x 25 mm
SL-300-12-D-MP5	1500 x 800 x 12 mm
SL-300-25-D-MP5	1500 x 800 x 25 mm

Sample Sets
Individually arranged sample sets are available on request!
3 densities. Dimensions: 50 x 50 mm, 70.7 x 70.7 mm and 100 x 100 mm. Thickness: 12.5 and 25 mm

Set “Sizes”

comprising 1 model, 1 type of thickness, 3 sizes = 3 sample pads

Part Number	Content	Dimensions
SL-SET-1.1	SL-030-12-MP1 to MP3	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm
SL-SET-1.2	SL-030-25-MP1 to MP3	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm
SL-SET-1.3	SL-100-12-MP1 to MP3	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm
SL-SET-1.4	SL-100-25-MP1 to MP3	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm
SL-SET-1.5	SL-300-12-MP1 to MP3	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm
SL-SET-1.6	SL-300-25-MP1 to MP3	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm

Set “Types”

comprising 3 models, 1 type of thickness, 1 size = 3 sample plates

Part Number	Content	Dimensions
SL-SET-2.1	SL-030-12-D-MP1, SL-100-12-D-MP1, SL-300-12-D-MP1	50 x 50 mm
SL-SET-2.2	SL-030-25-D-MP1, SL-100-25-D-MP1, SL-300-25-D-MP1	50 x 50 mm
SL-SET-2.3	SL-030-12-D-MP2, SL-100-12-D-MP2, SL-300-12-D-MP2	70.7 x 70.7 mm
SL-SET-2.4	SL-030-25-D-MP2, SL-100-25-D-MP2, SL-300-25-D-MP2	70.7 x 70.7 mm
SL-SET-2.5	SL-030-12-D-MP3, SL-100-12-D-MP3, SL-300-12-D-MP3	100 x 100 mm
SL-SET-2.6	SL-030-25-D-MP3, SL-100-25-D-MP3, SL-300-25-D-MP3	100 x 100 mm

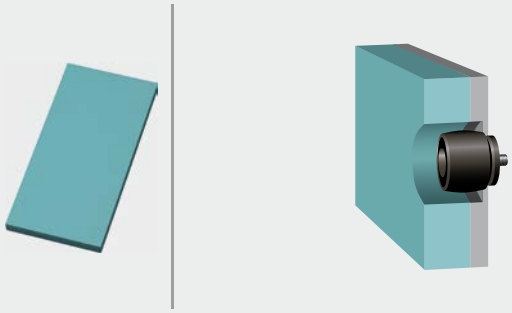
Application Examples

SL-030, TA

Damping combination SLAB and TUBUS

SLAB-TUBUS-Combination ensures fast luggage transport. Airports endeavour to shorten air passengers' waiting times as much as possible. This aim is met with a solution especially developed for luggage transport systems and has solved previous damping issue. Transport carriers with a weight of up to 120 kg can now be moved at the desired conveyor belt speeds. A SLAB-combination of the material SL-030-12(25)-Dxxxx together with two TA40-16 type TUBUS profile dampers are used here.

Fast luggage transport for airport customers

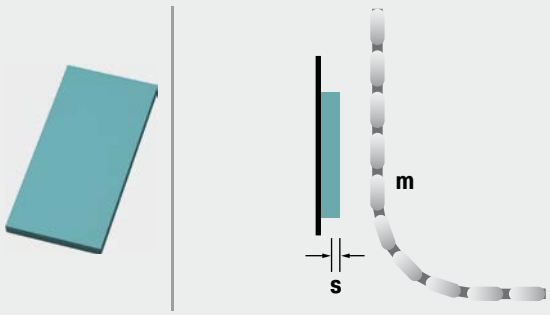


SL-030

Noise reduction

ACE-SLAB damping pads protect man and machine. At the beginning of the construction phase of a modern processing centre at the end position, a 25 kg cable channel collided with force against the housing and produced a deafening noise and mechanical strain on the energy chain. A reliable solution for compliance with the operational parameters was realized with the SL-030-25-Dxxxx type ACE-SLAB damping pads even before the milling machine was finished.

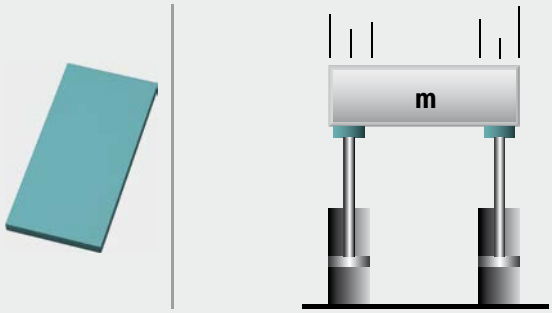
Low-noise energy chain

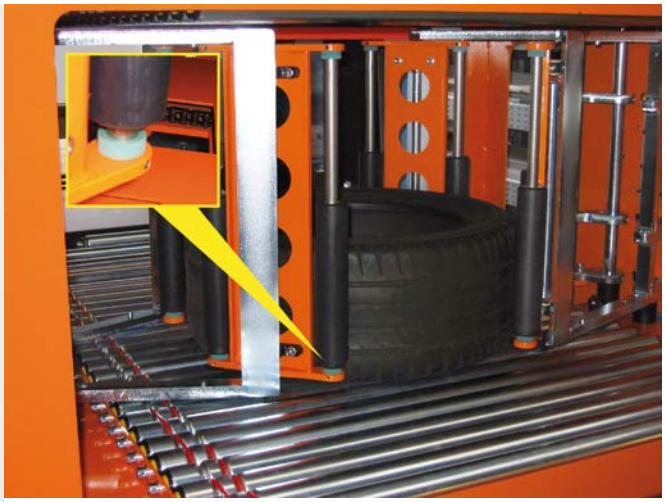


SL-030

Impact reduction in ring form

ACE-SLAB damping pads make tyre transport safer. Developed for absorbing the impact of forces, the ACE-SLAB damping pads SL-030-121-Dxxxx applied in this tyre testing system are ideal for protecting the sliding parts of the machine during quality tests. The individual customisation of the ring form of the centre arm and simple integration into the equipment also support the decision for applying these innovative absorber elements.



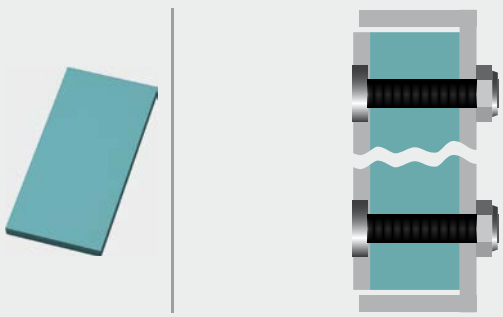


Perfectly fitted machine protection
SDS Systemtechnik GmbH, 75365 Calw, Germany

SL-030

Impact protection for large areas

ACE-SLAB damping pads offer impact protection for wooden battens. To protect wooden battens with differing weights and impact speeds of approx. 2 m/s, the SLAB-material SL-030-12-Dxxxx was screwed across the whole surface between two steel sheets in this application. This creates an even damping effect over the whole impact area, which protects the impact surfaces of the battens from an excessive impact load. The minimisation of recoil as well as reduction of noise are further positive side effects of this construction.



Impact protection for wooden battens

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