Automation Control

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

Optimum Customization

Tailor-made solutions for any application

ACE universal damping solutions convert kinetic energy in to heat. This makes machines faster, quieter, more durable, lighter and therefore more competitive and profitable.

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

Industrial Shock Absorbers

Standard-setting damping solutions

The name says it all. ACE is considered the technology and market leader worldwide 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.

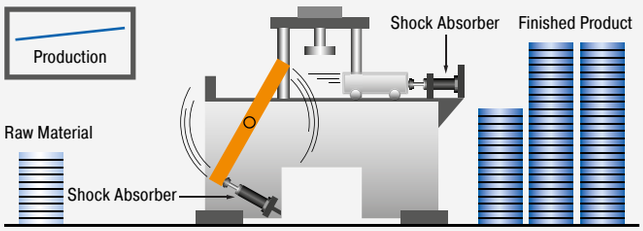
ACE provides the right shock absorber for every industrial application. Over 200 different models are available, from the smallest model with a 4 mm stroke up to the biggest with 406 mm.

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 knowledgeable 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.

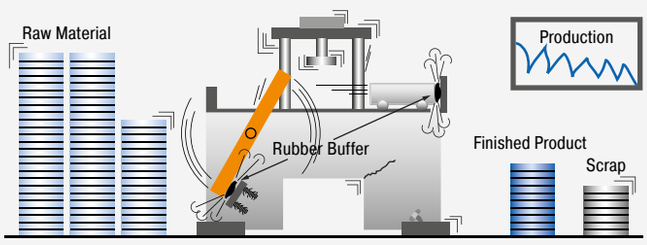
Stopping with Industrial Shock Absorbers



Advantages of using industrial shock absorbers

- Safe, reliable production
- Long service life of the machines
- Easy, inexpensive construction
- 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

Issue 04.2018 – Specifications subject to change

Comparison of Different Damping Elements

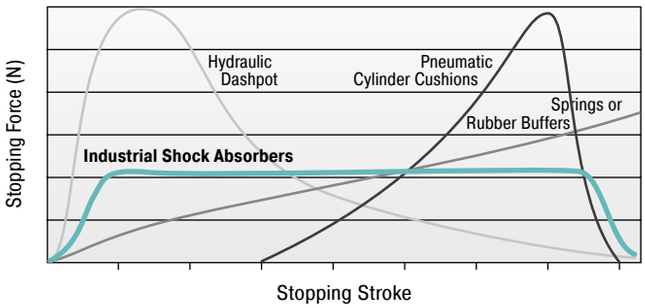
When it comes to slowing down moving masses with constant damping force through the stroke, the industrial shock absorber is the right choice. A comparison demonstrates the differences of the damping elements.

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.

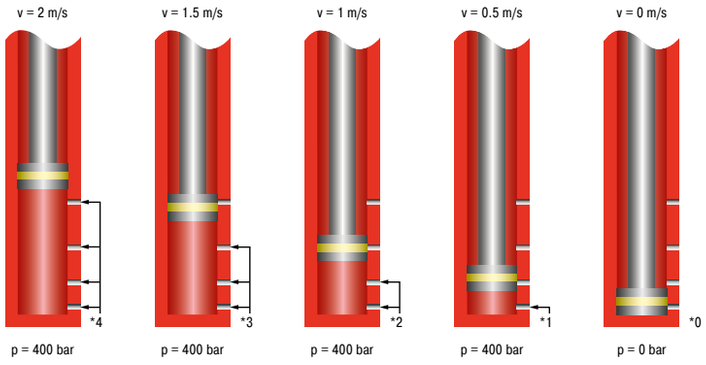
Air Buffers, Pneumatic Cylinder Cushions (High stopping force at end of stroke)
Due to the compressibility of air these have a sharply rising force characteristic towards the end of the stroke. The majority of the energy is absorbed near the end of the stroke.



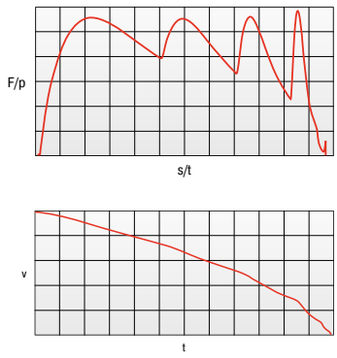
Comparison
The comparison shows the differences of the damping in a direct comparison of stopping force to stopping stroke.

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 dulled 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 Data for the Design of Industrial Shock Absorbers

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

1.	**Weight to be decelerated (weight)**	**W**	**[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

E_1	Kinetic energy per cycle	Nm
E_2	Propelling force energy per cycle	Nm
E_3	Total energy per cycle ($E_1 + E_2$)	Nm
[1] E_4	Total energy per hour ($E_3 \cdot c$)	Nm/hr
We	Effective weight	kg
W	Weight to be decelerated	kg
n	Number of shock absorbers (in parallel)	
[2] v	Velocity at impact	m/s
[2] v_D	Impact velocity at shock absorber	m/s
ω	Angular velocity at impact	rad/s
F	Propelling force	N
c	Cycles per hour	1/hr
P	Motor power	kW

[3] ST	Tall torque factor (normally 2.5)	1 to 3
T	Propelling torque	Nm
I	Moment of Inertia	kgm^2
g	Acceleration due to gravity = 9.81	m/s^2
H	Drop height excl. shock absorber stroke	m
s	Shock absorber stroke	m
L/R/r	Radius	m
Q	Reaction force	N
μ	Coefficient of friction	
t	Deceleration time	s
a	Deceleration	m/s^2
α	Side load angle	°
β	Angle of incline	°

[1] All mentioned values of E_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 (E_3), (E_4), (We) and the desired shock absorber stroke (s).

Note:
When using several shock absorbers in parallel, the values (E_3), (E_4) and (We) are divided according to the number of units used.

Reaction force Q [N] $$Q = \frac{1.5 \cdot E_3}{s}$$

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

Deceleration rate a [m/s²] $$a = \frac{0.75 \cdot v_D^2}{s}$$

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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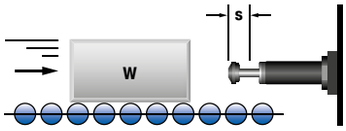
Application	Formula	Example

1 Weight without propelling force



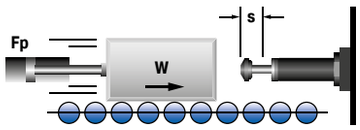
$E_1 = W \cdot v^2 \cdot 0.5$
$E_2 = 0$
$E_3 = E_1 + E_2$
$E_4 = E_3 \cdot c$
$v_D = v$
$We = W$

W = 100 kg
v = 1.5 m/s
c = 500 /hr
s = 0.050 m (chosen)

$E_1 = 100 \cdot 1.5^2 \cdot 0.5$ = **113 Nm**
$E_2 = 0$
$E_3 = 113 + 0$ = **113 Nm**
$E_4 = 113 \cdot 500$ = **56500 Nm/hr**
$We = W$ = **100 kg**

Chosen from capacity chart:
Model MC3350-2 self-compensating

2 Weight with propelling force



$E_1 = W \cdot v^2 \cdot 0.5$
$E_2 = F \cdot s$
$E_3 = E_1 + E_2$
$E_4 = E_3 \cdot c$
$v_D = v$
$We = \frac{2 \cdot E_3}{v_D^2}$

W = 36 kg
[1] v = 1.5 m/s
F = 400 N
c = 1000 /hr
s = 0.025 m (chosen)

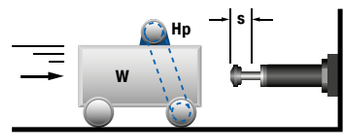
$E_1 = 36 \cdot 1.5^2 \cdot 0.5$ = **41 Nm**
$E_2 = 400 \cdot 0.025$ = **10 Nm**
$E_3 = 41 + 10$ = **51 Nm**
$E_4 = 51 \cdot 1000$ = **51000 Nm/hr**
$We = 2 \cdot 51 : 1.5^2$ = **45 kg**

Chosen from capacity chart:
Model MC600 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 → $E_2 = (F - W \cdot g) \cdot s$
2.2 for vertical motion downwards → $E_2 = (F + W \cdot g) \cdot s$

3 Weight with motor drive



$E_1 = W \cdot v^2 \cdot 0.5$
$E_2 = \frac{1000 \cdot P \cdot ST \cdot s}{v}$
$E_3 = E_1 + E_2$
$E_4 = E_3 \cdot c$
$v_D = v$
$We = \frac{2 \cdot E_3}{v_D^2}$

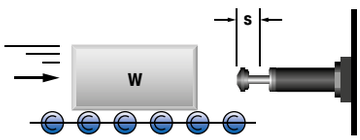
W = 800 kg
v = 1.2 m/s
ST = 2.5
P = 4 kW
c = 100 /hr
s = 0.100 m (chosen)

$E_1 = 800 \cdot 1.2^2 \cdot 0.5$ = **576 Nm**
$E_2 = 1000 \cdot 4 \cdot 2.5 \cdot 0.1 : 1.2$ = **834 Nm**
$E_3 = 576 + 834$ = **1410 Nm**
$E_4 = 1410 \cdot 100$ = **141000 Nm/hr**
$We = 2 \cdot 1410 : 1.2^2$ = **1958 kg**

Chosen from capacity chart:
Model MC64100-2 self-compensating

Note: Do not forget to include the rotational energy of motor, coupling and gearbox into calculation for E_1.

4 Weight on driven rollers



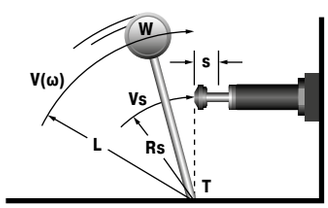
$E_1 = W \cdot v^2 \cdot 0.5$
$E_2 = W \cdot \mu \cdot g \cdot s$
$E_3 = E_1 + E_2$
$E_4 = E_3 \cdot c$
$v_D = v$
$We = \frac{2 \cdot E_3}{v_D^2}$

W = 250 kg
v = 1.5 m/s
c = 180 /hr
(Steel/Steel) μ = 0.2
s = 0.050 m (chosen)

$E_1 = 250 \cdot 1.5^2 \cdot 0.5$ = **281 Nm**
$E_2 = 250 \cdot 0.2 \cdot 9.81 \cdot 0.05$ = **25 Nm**
$E_3 = 281 + 25$ = **306 Nm**
$E_4 = 306 \cdot 180$ = **55080 Nm/hr**
$We = 2 \cdot 306 : 1.5^2$ = **272 kg**

Chosen from capacity chart:
Model MC4550-2 self-compensating

5 Swinging weight with propelling force



$E_1 = W \cdot v^2 \cdot 0.5 = 0.5 \cdot I \cdot \omega^2$
$E_2 = \frac{T \cdot s}{R}$
$E_3 = E_1 + E_2$
$E_4 = E_3 \cdot c$
$v_D = \frac{v \cdot R}{L} = \omega \cdot R$
$We = \frac{2 \cdot E_3}{v_D^2}$

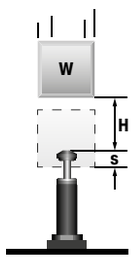
W = 20 kg
v = 1 m/s
T = 50 Nm
R = 0.5 m
L = 0.8 m
c = 1500 /hr
s = 0.012 m (chosen)

$E_1 = 20 \cdot 1^2 \cdot 0.5$ = **10 Nm**
$E_2 = 50 \cdot 0.012 : 0.5$ = **1.2 Nm**
$E_3 = 10 + 1.2$ = **11.2 Nm**
$E_4 = 306 \cdot 180$ = **16800 Nm/hr**
$v_D = 1 \cdot 0.5 : 0.8$ = **0.63 m/s**
$We = 2 \cdot 11.2 : 0.63^2$ = **56 kg**

Chosen from capacity chart:
Model MC150H 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 weight

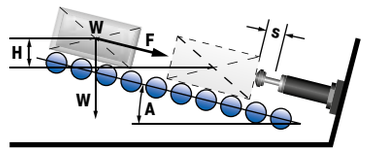
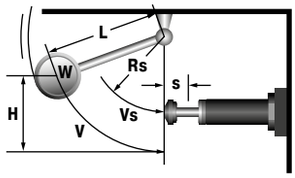
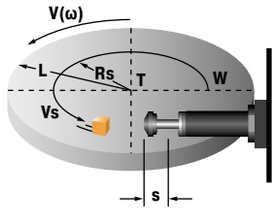
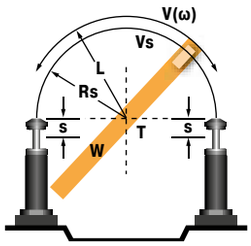
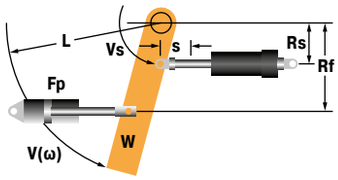
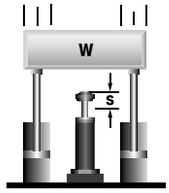


$E_1 = W \cdot g \cdot H$
$E_2 = W \cdot g \cdot s$
$E_3 = E_1 + E_2$
$E_4 = E_3 \cdot c$
$v_D = \sqrt{2 \cdot g \cdot H}$
$We = \frac{2 \cdot E_3}{v_D^2}$

W = 30 kg
H = 0.5 m
c = 400 /hr
s = 0.050 m (chosen)

$E_1 = 30 \cdot 0.5 \cdot 9.81$ = **147 Nm**
$E_2 = 30 \cdot 9.81 \cdot 0.05$ = **15 Nm**
$E_3 = 147 + 15$ = **162 Nm**
$E_4 = 162 \cdot 400$ = **64800 Nm/hr**
$v_D = \sqrt{2 \cdot 9.81 \cdot 0.5}$ = **3.13 m/s**
$We = 2 \cdot 162 : 3.13^2$ = **33 kg**

Chosen from capacity chart:
Model MC3350-1 self-compensating

Application	Formula	Example
6.1 Weight rolling/sliding down incline 	$E_1 = W \cdot g \cdot H = W \cdot v_D^2 \cdot 0.5$ $E_2 = W \cdot g \cdot \sin\beta \cdot s$ $E_3 = E_1 + E_2$ $E_4 = E_3 \cdot c$ $v_D = \sqrt{2 \cdot g \cdot H}$ $We = \frac{2 \cdot E_3}{v_D^2}$	W = 500 kg H = 0.1 m c = 200 /hr ß = 10 °C **$E_1 = 500 \cdot 9.81 \cdot 0.1$ = 490.5 Nm** **$E_2 = 50 \cdot 9.81 \cdot \sin(10) \cdot 0.075$ = 63.9 Nm** **$E_3 = 490.5 + 63.9$ = 554.4 Nm** **$E_4 = 554.4 \cdot 200$ = 11880.0 Nm/hr** Chosen from capacity chart: Model MC4575-2 self-compensating
6.1a propelling force up incline →	$E_2 = (F - W \cdot g \cdot \sin\beta) \cdot s$	
6.1b propelling force down incline →	$E_2 = (F + W \cdot g \cdot \sin\beta) \cdot s$	
6.2 Weight free falling about a pivot point  $\tan\alpha = \frac{s}{R}$	$E_1 = W \cdot g \cdot H$ $E_2 = 0$ $E_3 = E_1 + E_2$ $E_4 = E_3 \cdot c$ $v_D = \sqrt{2 \cdot g \cdot H} \cdot \frac{R}{L}$ $We = \frac{2 \cdot E_3}{v_D^2}$	W = 50 kg H = 1 m c = 50 /hr R = 300 mm L = 500 mm **$E_1 = 50 \cdot 9.81 \cdot 1$ = 490.5 Nm** **$E_2 = 0$** **$E_3 = 490.5 + 0$ = 490.5 Nm** **$E_4 = 490.5 \cdot 50$ = 24525.0 Nm/hr** Chosen from capacity chart: Model MC4550-1 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 	$E_1 = W \cdot v^2 \cdot 0.25 = 0.5 \cdot I \cdot \omega^2$ $E_2 = \frac{T \cdot s}{R}$ $E_3 = E_1 + E_2$ $E_4 = E_3 \cdot c$ $v_D = \frac{v \cdot R}{L} = \omega \cdot R$ $We = \frac{2 \cdot E_3}{v_D^2}$	W = 1000 kg v = 1.1 m/s T = 1000 Nm s = 0.050 m (chosen) L = 1.25 m R = 0.8 m c = 100 /hr **$E_1 = 1000 \cdot 1.1^2 \cdot 0.25$ = 303 Nm** **$E_2 = 300 \cdot 0.025 : 0.8$ = 63 Nm** **$E_3 = 28 + 9$ = 366 Nm** **$E_4 = 37 \cdot 1200$ = 36600 Nm/hr** **$v_D = 1.1 \cdot 0.8 : 1.25$ = 0.7 m/s** **$We = 2 \cdot 366 : 0.7^2$ = 1494 kg** Chosen from capacity chart: Model MC4550-3 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) 	$E_1 = W \cdot v^2 \cdot 0.17 = 0.5 \cdot I \cdot \omega^2$ $E_2 = \frac{T \cdot s}{R}$ $E_3 = E_1 + E_2$ $E_4 = E_3 \cdot c$ $v_D = \frac{v \cdot R}{L} = \omega \cdot R$ $We = \frac{2 \cdot E_3}{v_D^2}$	I = 56 kgm² ω = 1 rad/s T = 300 Nm s = 0.025 m (chosen) L = 1.5 m R = 0.8 m c = 1200 /hr **$E_1 = 0.5 \cdot 56 \cdot 1^2$ = 28 Nm** **$E_2 = 300 \cdot 0.025 : 0.8$ = 9 Nm** **$E_3 = 28 + 9$ = 37 Nm** **$E_4 = 37 \cdot 1200$ = 44400 Nm/hr** **$v_D = 1 \cdot 0.8$ = 0.8 m/s** **$We = 2 \cdot 37 : 0.8^2$ = 116 kg** Chosen from capacity chart: Model MC600 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) 	$E_1 = W \cdot v^2 \cdot 0.17 = 0.5 \cdot I \cdot \omega^2$ $E_2 = \frac{F \cdot r \cdot s}{R} = \frac{T \cdot s}{R}$ $E_3 = E_1 + E_2$ $E_4 = E_3 \cdot c$ $v_D = \frac{v \cdot R}{L} = \omega \cdot R$ $We = \frac{2 \cdot E_3}{v_D^2}$	W = 1000 kg v = 2 m/s F = 7000 N T = 4200 Nm s = 0.050 m (chosen) r = 0.6 m R = 0.8 m L = 1.2 m c = 900 /hr **$E_1 = 1000 \cdot 2^2 \cdot 0.17$ = 680 Nm** **$E_2 = 7000 \cdot 0.6 \cdot 0.05 : 0.8$ = 263 Nm** **$E_3 = 680 + 263$ = 943 Nm** **$E_4 = 943 \cdot 900$ = 848700 Nm/hr** **$v_D = 2 \cdot 0.8 : 1.2$ = 1.33 m/s** **$We = 2 \cdot 943 : 1.33^2$ = 1066 kg** Chosen from capacity chart: Model CA2x2-1 self-compensating
10 Weight lowered at controlled speed 	$E_1 = W \cdot v^2 \cdot 0.5$ $E_2 = W \cdot g \cdot s$ $E_3 = E_1 + E_2$ $E_4 = E_3 \cdot c$ $v_D = v$ $We = \frac{2 \cdot E_3}{v_D^2}$	W = 6000 kg v = 1.5 m/s s = 0.305 m (chosen) c = 60 /hr **$E_1 = 6000 \cdot 1.5^2 \cdot 0.5$ = 6750 Nm** **$E_2 = 6000 \cdot 9.81 \cdot 0.305$ = 17952 Nm** **$E_3 = 6750 + 17952$ = 24702 Nm** **$E_4 = 24702 \cdot 60$ = 1482120 Nm/hr** **$We = 2 \cdot 24702 : 1.5^2$ = 21957 kg** Chosen from capacity chart: Model CA3x12-2 self-compensating

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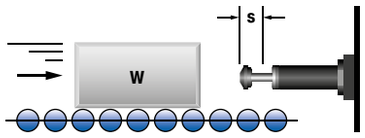
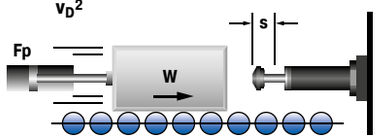
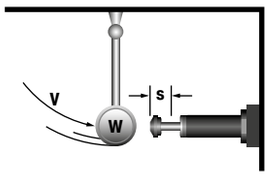
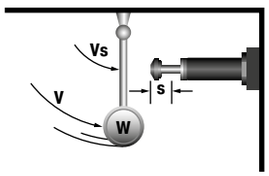
Effective Weight (We)

The effective weight (We) 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 Weight without propelling force **Formula** **We = W** 	**W = 100 kg** v_D = v = 2 m/s E_1 = E_3 = 200 Nm $We = \frac{2 \cdot 200}{4}$ = **100 kg**
B Weight with propelling force **Formula** $We = \frac{2 \cdot E_3}{v_D^2}$ 	**W = 100 kg** F = 2000 N v_D = v = 2 m/s s = 0.1 m E_1 = 200 Nm E_2 = 200 Nm E_3 = 400 Nm $We = \frac{2 \cdot 400}{4}$ = **200 kg**
C Weight without propelling force direct against shock absorber **Formula** **We = W** 	**W = 20 kg** v_D = v = 2 m/s s = 0.1 m E_1 = E_3 = 40 Nm $We = \frac{2 \cdot 40}{2^2}$ = **20 kg**
D Weight without propelling force with mechanical advantage **Formula** $We = \frac{2 \cdot E_3}{v_D^2}$ 	**W = 20 kg** v = 2 m/s v_D = 0.5 m/s s = 0.1 m E_1 = E_3 = 40 Nm $We = \frac{2 \cdot 40}{0.5^2}$ = **320 kg**

Capacity Chart

Self-Compensating Shock Absorbers

TYPES	Stroke mm	Energy capacity Nm/cycle	Effective Weight We min. kg	Effective Weight We max. kg	Page
MC5M-1-B	4.1	0.68	0.5	4.4	19
MC5M-2-B	4.1	0.68	3.8	10.8	19
MC5M-3-B	4.1	0.68	9.7	18.7	19
MC9M-2-B	5	1	0.8	4.1	19
MC9M-1-B	5	1	0.6	3.2	19
MC25	6.6	2.8	1.8	5.4	19
MC25H	6.6	2.80	4.5	13.6	19
MC25L	6.6	2.80	1.8	2.2	19
MC30M-1	8	3.50	0.4	1.9	19
MC30M-2	8	3.50	1.8	5.4	19
MC30M-3	8	3.50	5.0	15.0	19
MC75-1	10	9	0.22	1.1	19
MC75-2	10	9	0.91	6.4	19
MC75-3	10	9	2.72	36.2	19
MC75-4	10	9	25	72	19
MC150	12.5	20	0.9	10	21
MC150H	12.5	20	9	86	21
MC150H2	12.5	20	70	86	21
MC150H3	12.5	20	181	200	21
MC225	12.5	41	2.3	25	21
MC225H	12.5	41	23	230	21
MC225H2	12.5	41	180	910	21
MC225H3	12.5	41	816	2,000	21
MC600	25	136	9	136	21
MC600H	25.4	136	113	1,130	21
MC600H2	25.4	136	400	2,300	21
MC600H3	25.4	136	2,177	5,000	21
SC25M-5	8	10	1	5	31
SC25M-6	8	10	4	44	31
SC25M-7	8	10	42	500	31
SC75M-5	10	16	1	8	31
SC75M-6	10	16	7	78	31
SC75M-7	10	16	75	800	31
SC190M-5	12	31	2	16	31
SC190M-6	12	31	13	140	31
SC190M-7	12	31	136	1,550	31
SC300-5	15	73	11	45	33
SC300-6	15	73	11	136	33
SC300-7	15	73	91	181	33
SC300-8	15	73	135	680	33
SC300-9	15	73	320	1,950	33
SC650-5	23	210	23	113	33
SC650-6	23	210	90	360	33
SC650-7	23	210	320	1,090	33
SC650-8	23	210	770	2,630	33
SC650-9	23	210	1,800	6,350	33
SC25M-5-HC	4	2.25	1	5	35
SC25M-6-HC	4	2.25	4	44	35
SC25M-7-HC	4	2.25	42	500	35
SC75M-5-HC	5	8.5	1	8	35
SC75M-6-HC	5	8.5	7	78	35
SC75M-7-HC	5	8.5	75	800	35
SC190M-5-HC	8	20	2	16	35
SC190M-6-HC	8	31	13	140	35
SC190M-7-HC	8	31	136	1,550	35
SC300-5-HC	8	73	11	45	35
SC300-6-HC	8	73	11	136	35
SC300-7-HC	8	73	91	181	35
SC300-8-HC	8	73	135	680	35
SC300-9-HC	8	73	320	1,950	35
SC650-5-HC	15	136	23	113	35
SC650-6-HC	15	136	90	360	35
SC650-7-HC	15	136	320	1,090	35
SC650-8-HC	15	136	770	2,630	35
SC650-9-HC	15	210	1,800	6,350	35
MC3325-0	23.2	170	3	11	57
MC3325-1	23.2	170	9	40	57
MC3325-2	23.2	170	30	120	57
MC3325-3	23.2	170	100	420	57
MC3325-4	23.2	170	350	1,420	57
MC3350-0	48.6	330	5	22	57
MC3350-1	48.6	350	18	70	57

Self-Compensating Shock Absorbers

TYPES	Stroke mm	Energy capacity Nm/cycle	Effective Weight We min. kg	Effective Weight We max. kg	Page
MC3350-2	48.6	350	60	250	57
MC3350-3	48.6	350	210	840	57
MC3350-4	48.6	350	710	2,830	57
MC4525-0	23.1	370	7	27	58
MC4525-1	23.1	370	20	90	58
MC4525-2	23.1	370	80	310	58
MC4525-3	23.1	370	260	1,050	58
MC4525-4	23.1	370	890	3,540	58
MC4550-0	48.5	740	13	54	58
MC4550-1	48.5	740	45	180	58
MC4550-2	48.5	740	150	620	58
MC4550-3	48.5	740	520	2,090	58
MC4550-4	48.5	740	1,800	7,100	58
MC4575-0	73.9	1,130	20	80	58
MC4575-1	73.9	1,130	70	270	58
MC4575-2	73.9	1,130	230	930	58
MC4575-3	73.9	1,130	790	3,140	58
MC4575-4	73.9	1,130	2,650	10,600	58
MC6450-0	48.6	1,870	35	140	59
MC6450-1	48.6	1,870	140	540	59
MC6450-2	48.6	1,870	460	1,850	59
MC6450-3	48.6	1,870	1,600	6,300	59
MC6450-4	48.6	1,870	5,300	21,200	59
MC64100-0	99.4	3,730	70	280	59
MC64100-1	99.4	3,730	270	1,100	59
MC64100-2	99.4	3,730	930	3,700	59
MC64100-3	99.4	3,730	3,150	12,600	59
MC64100-4	99.4	3,730	10,600	42,500	59
MC64150-0	150	5,650	100	460	59
MC64150-1	150	5,650	140	1,640	59
MC64150-2	150	5,650	1,390	5,600	59
MC64150-3	150	5,650	4,700	18,800	59
MC64150-4	150	5,650	16,000	63,700	59
SC3325-5	23.2	155	1,350	2,700	73
SC3325-6	23.2	155	2,500	5,400	73
SC3325-7	23.2	155	5,000	9,000	73
SC3325-8	23.2	155	8,600	13,500	73
SC3350-5	48.6	310	2,700	5,000	73
SC3350-6	48.6	310	4,500	10,000	73
SC4525-5	23.1	340	3,400	6,800	74
SC4525-6	23.1	340	6,350	13,600	74
SC4525-7	23.1	340	12,700	22,500	74
SC4525-8	23.1	340	20,500	40,000	74
SC4550-5	48.5	680	6,800	12,000	74
SC4550-6	48.5	680	12,000	27,000	74
SC4550-7	48.5	680	26,000	44,000	74
CA2X2-1	50	3,600	700	2,200	103
CA2X2-2	50	3,600	1,800	5,400	103
CA2X2-3	50	3,600	4,500	13,600	103
CA2X2-4	50	3,600	11,300	34,000	103
CA2X4-1	102	7,200	1,400	4,400	103
CA2X4-2	102	7,200	3,600	11,000	103
CA2X4-3	102	7,200	9,100	27,200	103
CA2X4-4	102	7,200	22,600	68,000	103
CA2X6-1	152	10,800	2,200	6,500	103
CA2X6-2	152	10,800	5,400	16,300	103
CA2X6-3	152	10,800	13,600	40,800	103
CA2X6-4	152	10,800	34,000	102,000	103
CA2X8-1	203	14,500	2,900	8,700	103
CA2X8-2	203	14,500	7,200	21,700	103
CA2X8-3	203	14,500	18,100	54,400	103
CA2X8-4	203	14,500	45,300	136,000	103
CA2X10-1	254	18,000	3,600	11,000	103
CA2X10-2	254	18,000	9,100	27,200	103
CA2X10-3	254	18,000	22,600	68,000	103
CA2X10-4	254	18,000	56,600	170,000	103
CA3X5-1	127	14,125	2,900	8,700	104
CA3X5-2	127	14,125	7,250	21,700	104
CA3X5-3	127	14,125	18,100	54,350	104
CA3X5-4	127	14,125	45,300	135,900	104
CA3X8-1	203	22,600	4,650	13,900	104
CA3X8-2	203	22,600	11,600	34,800	104

Issue 04.2018 – Specifications subject to change

Self-Compensating Shock Absorbers

TYPES	Stroke mm	Energy capacity Nm/cycle	Effective Weight We min. kg	Effective Weight We max. kg	Page
CA3X8-3	203	22,600	29,000	87,000	104
CA3X8-4	203	22,600	72,500	217,000	104
CA3X12-1	305	33,900	6,950	20,900	104
CA3X12-2	305	33,900	17,400	52,200	104
CA3X12-3	305	33,900	43,500	130,450	104
CA3X12-4	305	33,900	108,700	326,000	104
CA4X6-3	152	47,500	3,500	8,600	105
CA4X6-5	152	47,500	8,600	18,600	105
CA4X6-7	152	47,500	18,600	42,700	105
CA4X8-3	203	63,300	5,000	11,400	105
CA4X8-5	203	63,300	11,400	25,000	105
CA4X8-7	203	63,300	25,000	57,000	105
CA4X16-3	406	126,500	10,000	23,000	105
CA4X16-5	406	126,500	23,000	50,000	105
CA4X16-7	406	126,500	50,000	115,000	105

Shock Absorbers Soft Contact and Self-Compensating

TYPES	Stroke mm	Energy capacity Nm/cycle	Effective Weight Soft-Contact me min. kg	Effective Weight Soft-Contact me max. kg	Effective Weight Self-Compensating me min. kg	Effective Weight Self-Compensating me max. kg	Page
SC190-0	16	25	-	-	0.7	4	29
SC190-1	16	25	2.3	6	1.4	7	29
SC190-2	16	25	5.5	16	3.6	18	29
SC190-3	16	25	14.0	41	9.0	45	29
SC190-4	16	25	34.0	91	23.0	100	29
SC300-0	19	33	-	-	0.7	2	29
SC300-1	19	33	2.3	7	1.4	8	29
SC300-2	19	33	7.0	23	4.5	27	29
SC300-3	19	33	23	70	14	80	29
SC300-4	19	33	68	180	32	200	29
SC650-0	25.4	73	-	-	2.3	14	29
SC650-1	25.4	73	11	40	7.75	45	29
SC650-2	25.4	73	34	110	22.5	136	29
SC650-3	25.4	73	110	360	68	400	29
SC650-4	25.4	73	360	1,200	200	1,200	29
SC925-0	40	110	8	25	4.5	29	29
SC925-1	40	110	22	72	14	90	29
SC925-2	40	110	59	208	40	227	29
SC925-3	40	110	181	612	113	726	29
SC925-4	40	110	544	1,952	340	2,088	29

Adjustable Shock Absorbers

TYPES	Stroke mm	Max. Energy Capacity E_3 Nm/cycle	Max. Energy Capacity E_4 Nm/h	Effective Weight We min. kg	Effective Weight We max. kg	Page
MA30M	8	3.5	5,650	0.23	15	37
MA50M	7.2	5.5	13,550	4.5	20	37
MA35	10.2	4	6,000	6	57	37
MA150	12.7	22	35,000	1	109	37
MA225	19	25	45,000	2.30	226	37
MA600	25	68	68,000	9	1,360	37
MA900	40	100	90,000	14	2,040	37
AS3/8X1	25.4	68	68,000	4.54	567	39
NA3/8x1	25.4	68	68,000	4.54	577	39
MA3325	23.2	215	75,000	9	1,700	77
ML3325	23.2	170	75,000	300	50,000	77
MA3350	48.6	425	85,000	13	2,500	77
ML3350	48.6	425	85,000	500	80,000	77
MA4525	23.1	425	107,000	40	10,000	78
ML4525	23.1	850	112,000	3,000	110,000	78
MA4550	48.5	850	112,000	70	14,500	78
ML4550	48.5	850	112,000	5,000	180,000	78
MA4575	73.9	1,300	146,000	70	15,000	78
ML6425	23.2	1,135	124,000	7,000	300,000	79
MA6450	48.6	2,275	146,000	220	50,000	79
ML6450	48.6	2,275	146,000	11,000	500,000	79
MA64100	99.4	4,520	192,000	270	52,000	79
MA64150	150	6,101	248,000	330	80,000	79
SASL11/8X1-R	23	900	142,000	318	320,000	81
SASL11/8X2-R	48.5	1,800	170,000	385.5	590,000	81
SALD½X1-P	23.2	153	85,000	4.5	1,225	83
SALD½X2-P	48.5	350	98,000	9.5	2,585	83
SALD¾X1-P	23.2	340	124,000	9	8,100	84
SALD¾X2-P	48.5	680	147,000	26	14,500	84
SALD¾X3-P	74	1,000	181,000	22.7	21,000	84
SALD11/8X2-P	48.5	1,800	170,000	54	22,700	85
SALD11/8X4-P	99	3,600	225,000	72.5	45,000	85
SALD11/8X6-P	150	5,400	280,000	91	68,000	85
SALDN¾X1-RF	25	390	107,000	45	10,000	87
SALDN¾X2-RF	50	780	113,000	72.6	14,500	87
SALDN¾X3-RF	75	1,200	147,000	115	15,000	87
SALDN¾X1-RR	25	390	107,000	43	10,000	88
SALDN¾X2-RR	50	780	113,000	72.6	14,500	88
SALDN¾X3-RR	75	1,200	147,000	115	15,000	88
A1½X2	50	2,350	362,000	195	32,000	107
A1½X3½	89	4,150	633,000	218	36,000	107
A1½X5	127	5,900	904,000	227	41,000	107
A1½X6½	165	7,700	1,180,000	308	45,000	107
A2X2	50	3,600	1,100,000	250	77,000	108
A2X4	102	9,000	1,350,000	250	82,000	108
A2X6	152	13,500	1,600,000	260	86,000	108
A2X8	203	19,200	1,900,000	260	90,000	108
A2X10	254	23,700	2,200,000	320	113,000	108
A3X5	127	15,800	2,260,000	480	154,000	109
A3X8	203	28,200	3,600,000	540	181,500	109
A3X12	305	44,000	5,400,000	610	204,000	109

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Miniature Shock Absorbers

Tuning for almost any design

Miniature shock absorbers from ACE are tried-and-tested quality products used in millions of industrial designs throughout the world. They optimize 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 design and certain models can be directly integrated in pneumatic cylinders. They reduce the load and increase the efficiency for handling devices, rotary and pivoting actuators, linear cylinders and many other industrial applications. ACE ensures a long service life with innovative sealing techniques, shock absorber and inner pressure chambers fully machined from solid high tensile alloy steel.

- Easy, inexpensive construction
- 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
Exceptionally 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 from fluids and particulate
Finishing and processing centers, Clean room areas, Pharmaceutical industry

PMCN150-V4A to PMCN600-V4A

Page 26

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

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

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

SC25-HC to SC650-HC

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Self-Compensating
Miniature self compensating shocks for high-speed applications
Linear slides, Tool machines, Handling modules, Production plants

MA30 to MA900

Page 36

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

3/8x1

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Adjustable
Miniature adjustable shock delivers convenience
Linear slides, Transport industry, Tool machines, Handling modules

Issue 04.2018 – Specifications subject to change

Products for UNF and metric thread available

MC5 to MC75

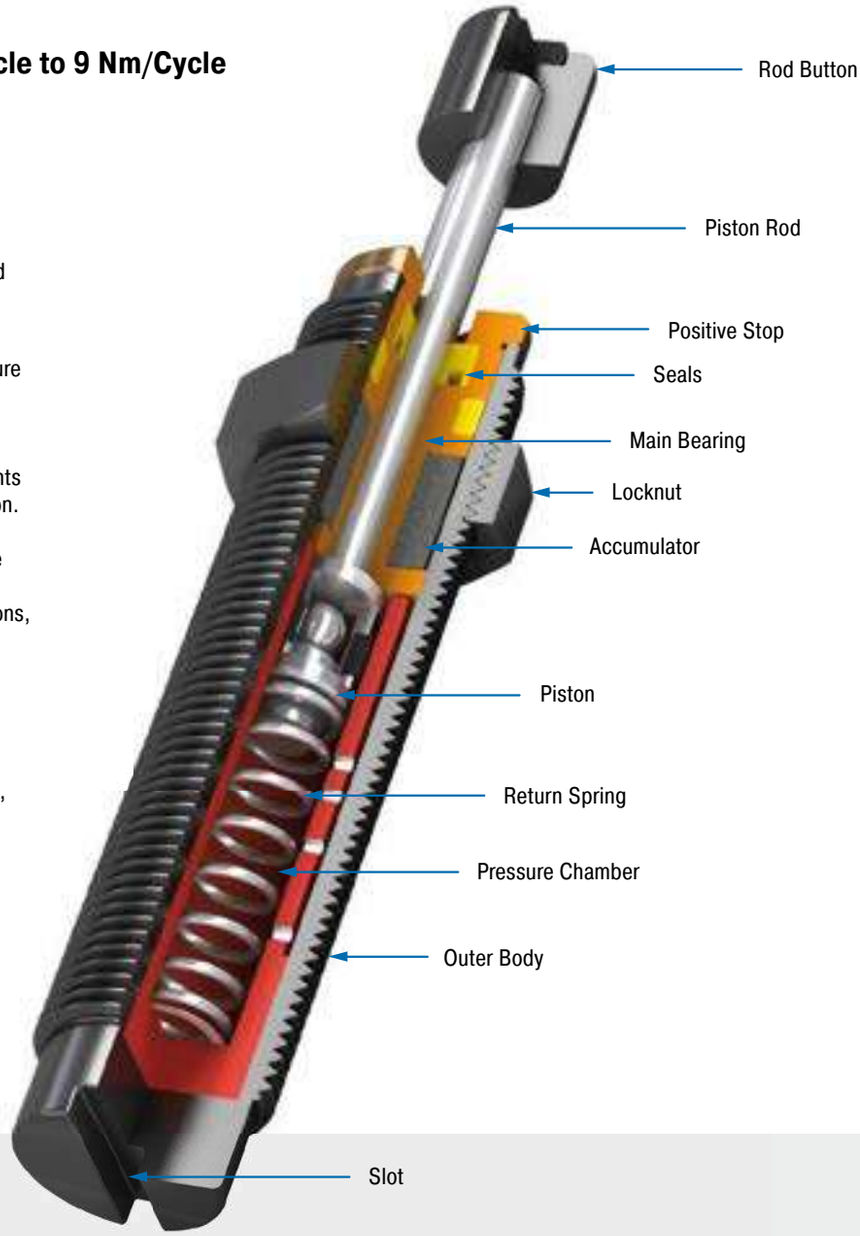
Shock absorbers in miniature format

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

Ideal for compact, efficient designs: The miniature size of the product family MC5 to MC75 delivers very short overall lengths and low return forces.

The outer body of each shock, produced from one solid piece, is filled with temperature stable oil, offers a continuous outer body thread including a supplied lock nut and also has an integrated positive stop. These maintenance-free hydraulic machine elements from ACE are ready for immediate installation. A wide range of energy absorption and effective weight are further benefits in these compact units. Self-compensating shock absorbers react to changing energy conditions, without adjustment.

These self-compensating miniature shock absorbers are perfectly suited to use in applications such as rotary actuators, automation, light industrial manufacturing, material handling and packaging equipment, medical, electronics 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

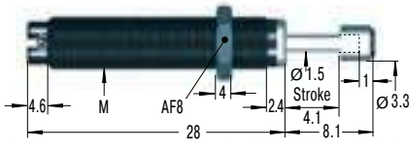
Note: If precise end position data is required consider use of a stop collar.

Safety information: 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.

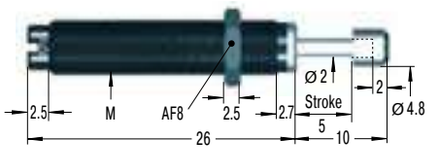
Issue 04.2018 – Specifications subject to change

MC5M



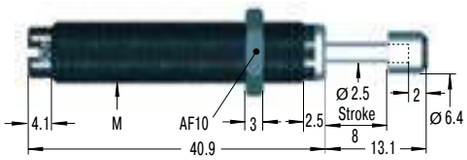
Standard version without button for MC5, MC9 and MC10

MC9M

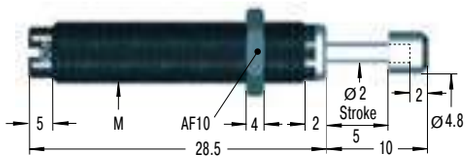


Standard version without button for MC5, MC9 and MC10

MC30M

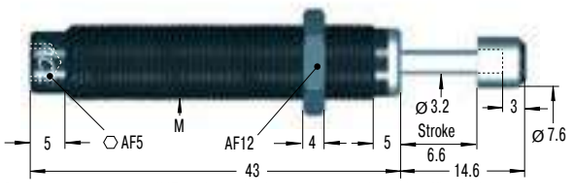


MC10M



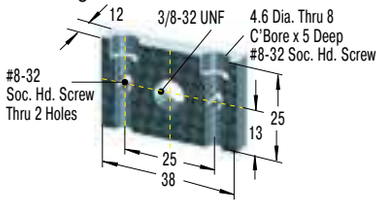
Standard version without button for MC5, MC9 and MC10
M8x0.75 also available to order

MC25

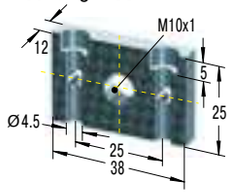


Product available for UNF and metric thread (for metric add suffix -M from part number)

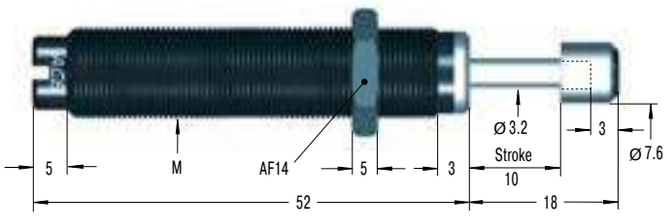
250-0306
Mounting Block



250-0307
Mounting Block

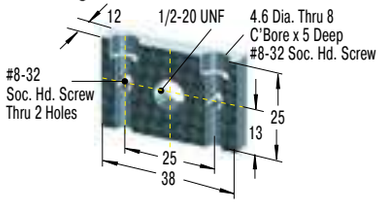


MC75

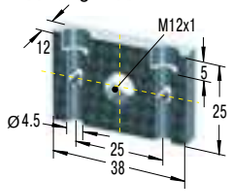


Product available for UNF and metric thread (for metric add suffix -M from part number)

250-0308
Mounting Block



250-0309
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

TYPES	Max. Energy Capacity E_3 Nm/cycle	Max. Energy Capacity E_4 Nm/h	Effective Weight We min. kg	Effective Weight We max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	M	Weight kg
MC5M-1-B	0.68	2,040	0.5	4.4	1	5	0.2	2	M5x0.5	0.003
MC5M-2-B	0.68	2,040	3.8	10.8	1	5	0.2	2	M5x0.5	0.003
MC5M-3-B	0.68	2,040	9.7	18.7	1	5	0.2	2	M5x0.5	0.003
MC9M-1-B	1.00	2,000	0.6	3.2	2	4	0.3	2	M6x0.5	0.004
MC9M-2-B	1.00	2,000	0.8	4.1	2	4	0.3	2	M6x0.5	0.004
MC10MH-B	1.25	4,000	0.7	5.0	2	4	0.3	3	M8x1	0.008
MC10ML-B	1.25	4,000	0.3	2.7	2	4	0.3	3	M8x1	0.008
MC30M-1	3.50	5,600	0.4	1.9	2	6	0.3	2	M8x1	0.010
MC30M-2	3.50	5,600	1.8	5.4	2	6	0.3	2	M8x1	0.010
MC30M-3	3.50	5,600	5.0	15.0	2	6	0.3	2	M8x1	0.010
MC25	2.80	22,600	1.8	5.4	3	6	0.3	2	3/8-32 UNF / M10x1	0.020
MC25H	2.80	22,600	4.6	13.6	3	6	0.3	2	3/8-32 UNF / M10x1	0.020
MC25L	2.80	22,600	0.7	2.2	3	6	0.3	2	3/8-32 UNF / M10x1	0.020
MC75-1	9.00	28,200	0.3	1.1	4	9	0.3	2	1/2-20 UNF / M12x1	0.040
MC75-2	9.00	28,200	0.9	4.8	4	9	0.3	2	1/2-20 UNF / M12x1	0.040
MC75-3	9.00	28,200	2.7	36.2	4	9	0.3	2	1/2-20 UNF / M12x1	0.040
MC75-4	9.00	28,200	25	72	4	9	0.3	2	1/2-20 UNF / M12x1	0.040

[1] For applications with higher side load angles consider using the side load adaptor, pages 44 to 49.

Products for UNF and metric thread available

MC150 to MC600

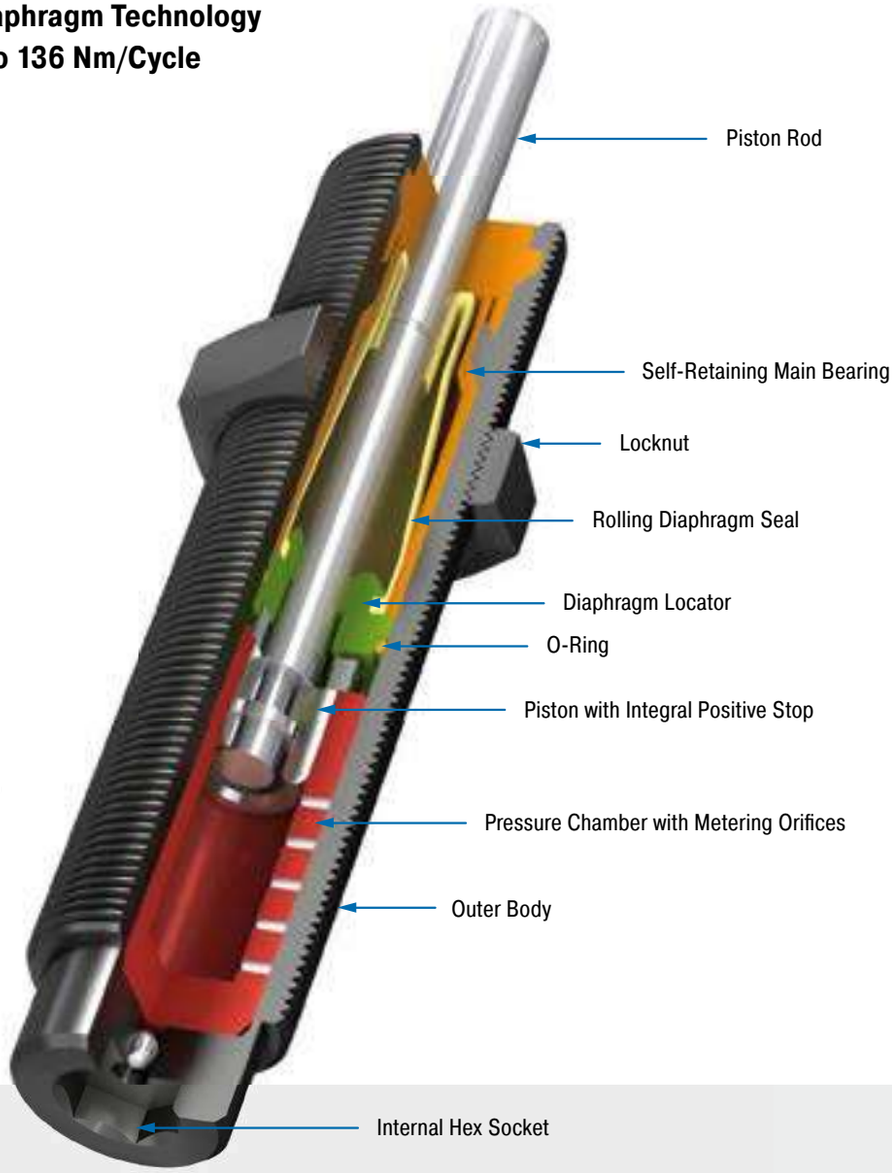
Exceptionally high endurance and with the lowest resetting force

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

Tried-and-tested and durable: With a hermetically sealed rolling diaphragm in each absorber, the MC150 to MC600 product family is suitable for an exceptionally 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 it possible for direct installation in a pressure chamber to provide end stop damping in pneumatic cylinders up to approximately 7 bar (100 psi).

The rolling diaphragm delivers very low return forces for these maintenance-free, ready-to-install absorbers. An integrated positive stop and progressive energy capacities, with a wide range of effective weight, make these miniature shock absorbers a winner. Furthermore, the use of a side load adapter allows impact angles of up to 25°. Stainless steel options are available for greater environmental compatibility. Self-compensating shock absorbers react to changing energy conditions, without adjustment.

These self compensating miniature shock absorbers are capable of universal mounting even inside a cylinder. These shocks are ideal for use in multitude of applications including material handling equipment, packaging equipment, medium robotics and machine tools.



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 centers, Measuring tables, Tool machines, Locking systems

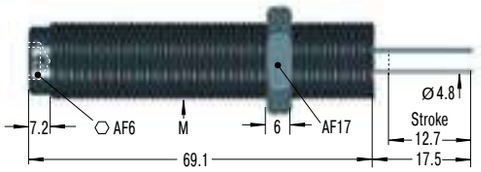
Note: If precise end position data is required consider use of a stop collar.

Safety information: 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 to7 bar.

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

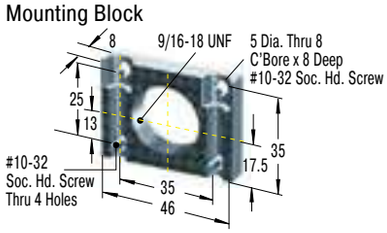
Issue 04.2018 – Specifications subject to change

MC150

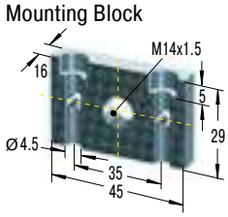


Product available for UNF and metric thread (for metric add suffix -M from part number)
M14x1 also available to special order

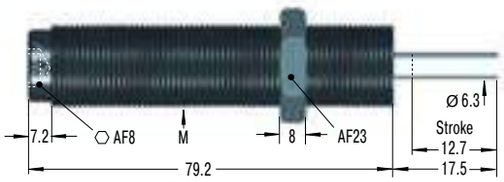
250-0318
Mounting Block



250-0352
Mounting Block

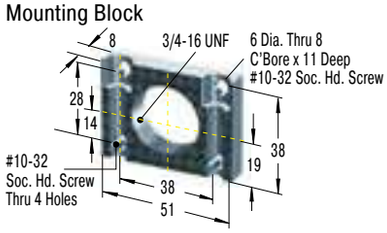


MC225

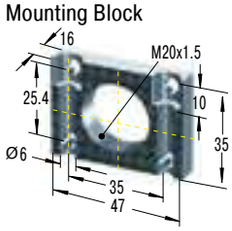


Product available for UNF and metric thread (for metric add suffix -M from part number)

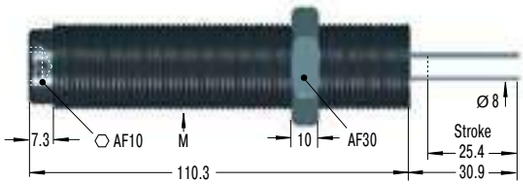
250-0401
Mounting Block



250-0353
Mounting Block

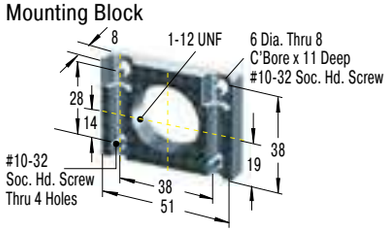


MC600

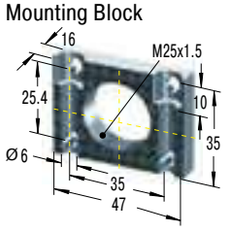


Product available for UNF and metric thread (for metric add suffix -M from part number)
M27x3 also available to special order

250-0402
Mounting Block



250-0044
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

TYPES	Max. Energy Capacity E_3 Nm/cycle	Max. Energy Capacity E_4 Nm/h	Effective Weight We min. kg	Effective Weight We max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	M	Weight kg
MC150	20	34,000	0.9	10	3	8	0.4	4	9/16-18 UNF / M14x1.5	0.054
MC150H	20	34,000	8.6	86	3	8	0.4	4	9/16-18 UNF / M14x1.5	0.054
MC150H2	20	34,000	70	200	3	8	0.4	4	9/16-18 UNF / M14x1.5	0.054
MC150H3	20	34,000	181	408	3	8	1.0	4	9/16-18 UNF / M14x1.5	0.054
MC225	41	45,000	2.3	25	4	9	0.3	4	3/4-16 UNF / M20x1.5	0.154
MC225H	41	45,000	23	230	4	9	0.3	4	3/4-16 UNF / M20x1.5	0.154
MC225H2	41	45,000	180	910	4	9	0.3	4	3/4-16 UNF / M20x1.5	0.154
MC225H3	41	45,000	816	1,814	4	9	0.3	4	3/4-16 UNF / M20x1.5	0.154
MC600	136	68,000	9	136	5	10	0.6	2	1-12 UNF / M25x1.5	0.258
MC600H	136	68,000	113	1,130	5	10	0.6	2	1-12 UNF / M25x1.5	0.258
MC600H2	136	68,000	400	2,300	5	10	0.6	2	1-12 UNF / M25x1.5	0.258
MC600H3	136	68,000	2,177	4,536	5	10	0.6	2	1-12 UNF / M25x1.5	0.258

[1] For applications with higher side load angles consider using the side load adaptor, pages 44 to 49.

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MC150-V4A to MC600-V4A

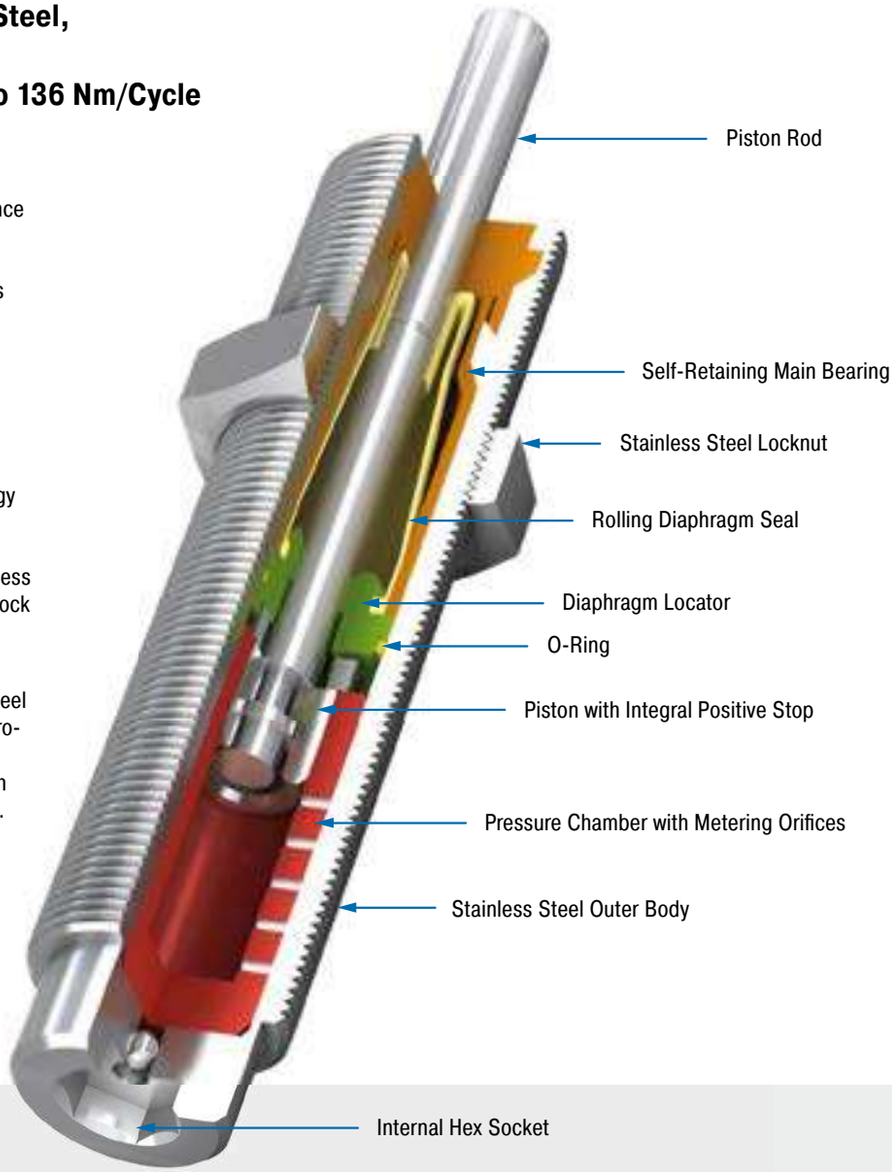
Exceptionally high endurance with stainless steel corrosion protection

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 stainless steel miniature shock absorbers 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 standard units such as the ACE rolling diaphragm technology which delivers maximum service life and direct installation in a pressure chamber with up to approx. 100 psi (7 bar).

Thanks to perfectly progressive maximum energy absorption and effective weight potential, their use is augmented even further by the stainless steel outer body and a complete range of stainless accessories (AISI 316L). Self-compensating shock absorbers react to changing energy conditions, without adjustment.

These self-compensating miniature stainless steel shock absorbers are used in medical and electro-technology, as well as marine, packaging, and chemical applications. Shocks can be filled with food-grade oil for food processing 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, 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 centers, Measuring tables

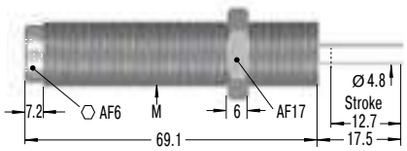
Note: If precise end position data is required consider use of a stop collar.

Safety information: 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.

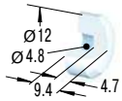
On request: Special oil with food approval. Special threads or other special options available on request.

Issue 04.2018 – Specifications subject to change

MC150M-V4A

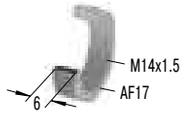


250-0753
Nylon Button

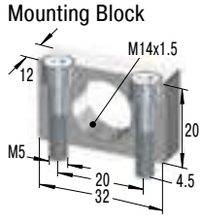


E_3max = 14 Nm

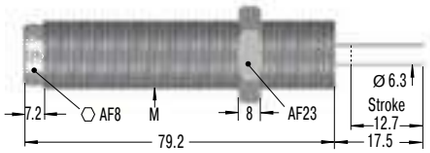
250-0441
Locknut



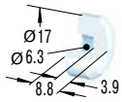
250-0255
Mounting Block



MC225M-V4A

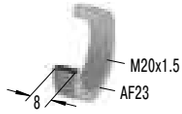


250-0754
Nylon Button



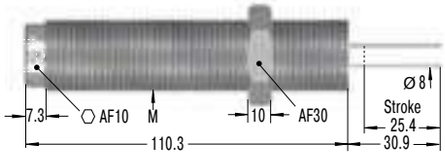
E_3 max = 33 Nm

250-0442
Locknut

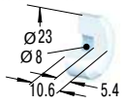


250-0434
Mounting Block

MC600M-V4A

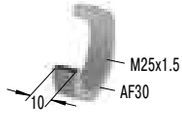


250-0755
Nylon Button

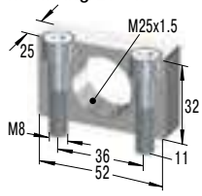


E_3 max = 68 Nm

250-0443
Locknut



250-0436
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	E_3 Nm/cycle	E_4 Nm/h	We min. kg	We max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	M	Weight kg
MC150M-V4A	20	34,000	0.9	10	3	5	0.4	4	M14x1.5	0.054
MC150MH-V4A	20	34,000	8.6	86	3	5	0.4	4	M14x1.5	0.054
MC150MH2-V4A	20	34,000	70	200	3	5	0.4	4	M14x1.5	0.054
MC150MH3-V4A	20	34,000	181	408	3	5	1.0	4	M14x1.5	0.054
MC225M-V4A	41	45,000	2.3	25	4	6	0.3	4	M20x1.5	0.154
MC225MH-V4A	41	45,000	23	230	4	6	0.3	4	M20x1.5	0.154
MC225MH2-V4A	41	45,000	180	910	4	6	0.3	4	M20x1.5	0.154
MC225MH3-V4A	41	45,000	816	1,814	4	6	0.3	4	M20x1.5	0.154
MC600M-V4A	136	68,000	9	136	5	9	0.6	2	M25x1.5	0.258
MC600MH-V4A	136	68,000	113	1,130	5	9	0.6	2	M25x1.5	0.258
MC600MH2-V4A	136	68,000	400	2,300	5	9	0.6	2	M25x1.5	0.258
MC600MH3-V4A	136	68,000	2,177	4,536	5	9	0.6	2	M25x1.5	0.258

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

PMCN150 to PMCN600

Reliable protection from fluids and particulate

Self-Compensating, Rolling Diaphragm Technology, TPU Bellow

Energy capacity 20 Nm/Cycle to 136 Nm/Cycle

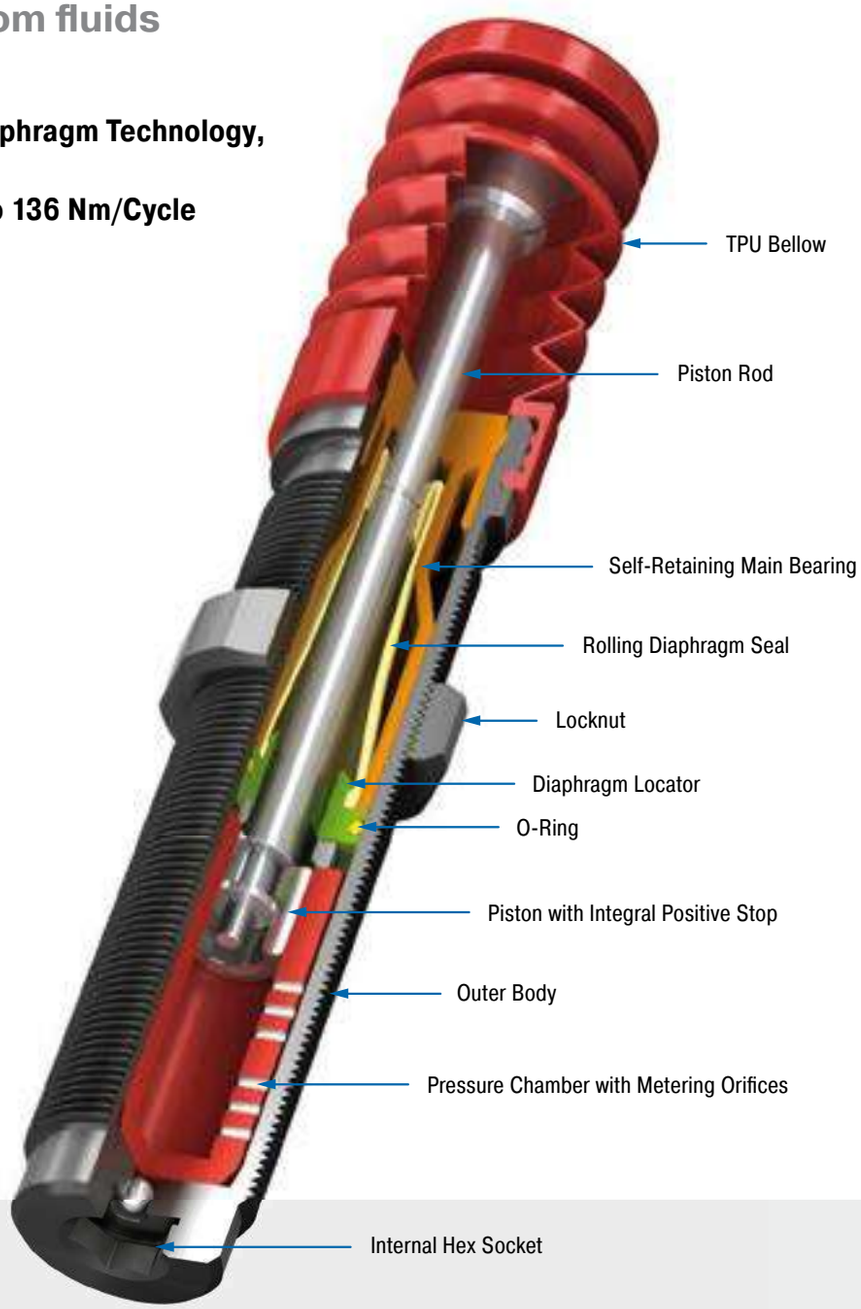
Stroke 12 mm to 25 mm

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

This protection bellows, made of TPU (thermoplastic 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 range 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 environments including fluids and abrasives, these self-compensating miniature shock absorbers are the first choice where conventional dampers wear out too quickly. Use them in harsh environments where cutting, cooling or cleaning agents can attack.



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 centers, Clean room areas, Pharmaceutical industry, Medical technology, Food industry, Linear slides, Pneumatic cylinders, Machines and plants

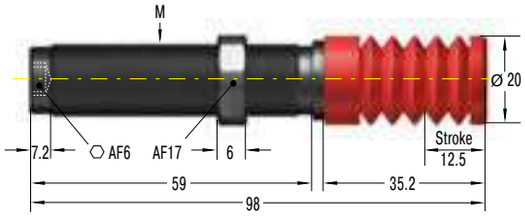
Note: Final preliminary test must be done on the application.

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

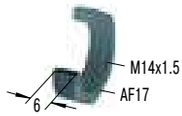
On request: Special accessories available on request.

Issue 04.2018 – Specifications subject to change

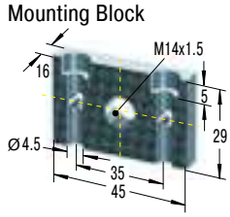
PMCN150M



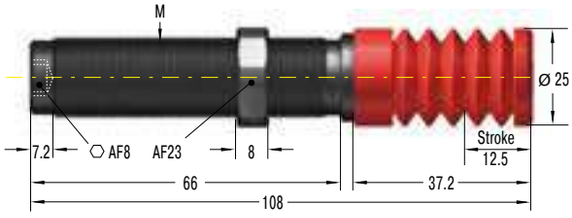
250-0233
Locknut



250-0352
Mounting Block



PMCN225M



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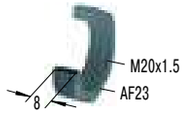

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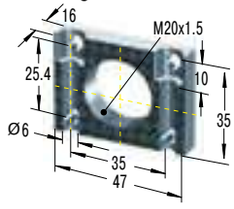
Mounting Block



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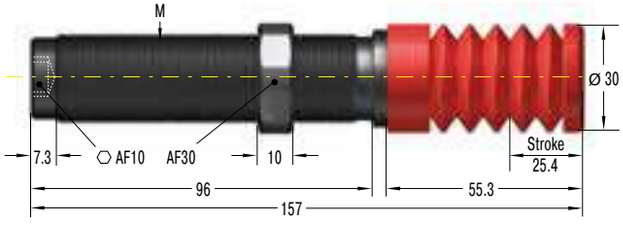

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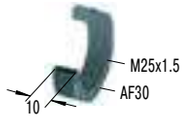
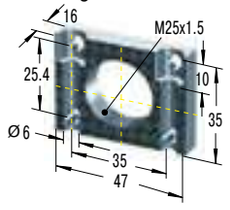


250-0044
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	E_3 Nm/cycle	E_4 Nm/h	We min. kg	We max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	M	Weight kg
PMCN150M	20	34,000	0.9	10	8	80	0.4	4	M14x1.5	0.067
PMCN150MH	20	34,000	8.6	86	8	80	0.4	4	M14x1.5	0.067
PMCN150MH2	20	34,000	70	200	8	80	0.4	4	M14x1.5	0.067
PMCN150MH3	20	34,000	181	408	8	80	1.0	4	M14x1.5	0.067
PMCN225M	41	45,000	2.3	25	8	85	0.3	4	M20x1.5	0.170
PMCN225MH	41	45,000	23	230	8	85	0.3	4	M20x1.5	0.170
PMCN225MH2	41	45,000	180	910	8	85	0.3	4	M20x1.5	0.170
PMCN225MH3	41	45,000	816	1,814	8	85	0.3	4	M20x1.5	0.170
PMCN600M	136	68,000	9	136	8	90	0.6	2	M25x1.5	0.317
PMCN600MH	136	68,000	113	1,130	8	90	0.6	2	M25x1.5	0.317
PMCN600MH2	136	68,000	400	1,043	8	90	0.6	2	M25x1.5	0.317
PMCN600MH3	136	68,000	2,177	4,536	8	90	0.6	2	M25x1.5	0.317

PMCN150-V4A to PMCN600-V4A

Optimum corrosion protection

Self-Compensating, Rolling Diaphragm Technology, TPU Bellow

Energy capacity 20 Nm/Cycle to 136 Nm/Cycle

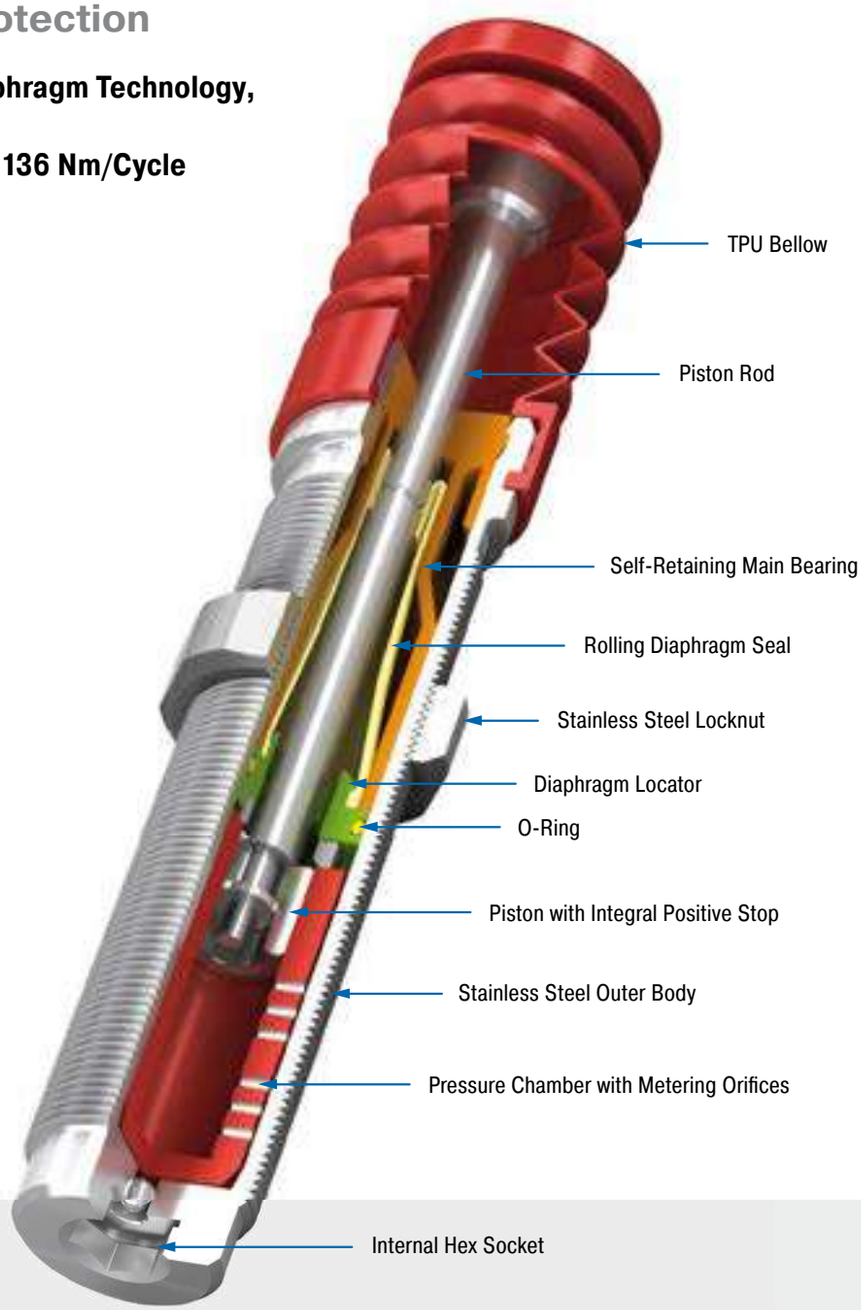
Stroke 12 mm to 25 mm

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

Their main 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 range 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 range self-compensating miniature shock absorbers, produced from stainless steel, are primarily suitable for use in the food industry, but are also wherever a high-quality appearance 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 centers, Clean room areas, Pharmaceutical industry, Medical technology, Food industry, Machines and plants

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

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

On request: Special accessories available on request.

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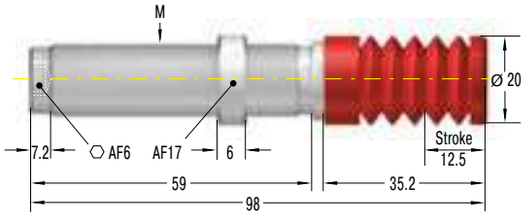
PMCN150M-V4A



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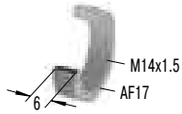
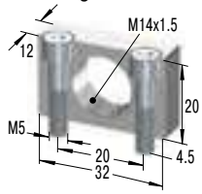
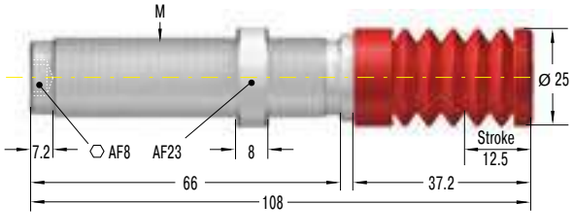


250-0255
Mounting Block



PMCN225M-V4A



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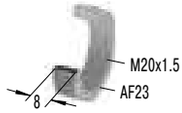
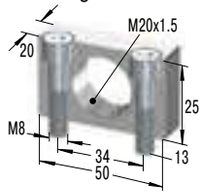
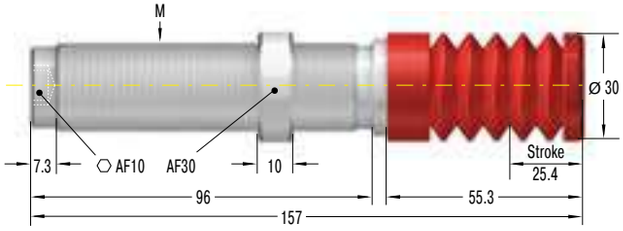
Locknut



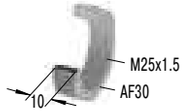
250-0434
Mounting Block



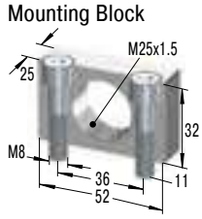
PMCN600M-V4A



250-0443
Locknut



250-0436
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	E_3 Nm/cycle	E_4 Nm/h	We min. kg	We max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	M	Weight kg
PMCN150M-V4A	20	34,000	0.9	10	8	80	0.4	4	M14x1.5	0.067
PMCN150MH-V4A	20	34,000	8.6	86	8	80	0.4	4	M14x1.5	0.067
PMCN150MH2-V4A	20	34,000	70	200	8	80	0.4	4	M14x1.5	0.067
PMCN150MH3-V4A	20	34,000	181	408	8	80	1.0	4	M14x1.5	0.067
PMCN225M-V4A	41	45,000	2.3	25	8	85	0.3	4	M20x1.5	0.170
PMCN225MH-V4A	41	45,000	23.0	230	8	85	0.3	4	M20x1.5	0.170
PMCN225MH2-V4A	41	45,000	180.0	910	8	85	0.3	4	M20x1.5	0.170
PMCN225MH3-V4A	41	45,000	816.0	1,814	8	85	0.3	4	M20x1.5	0.170
PMCN600M-V4A	136	68,000	9.0	136	8	90	0.6	2	M25x1.5	0.317
PMCN600MH-V4A	136	68,000	113.0	1,130	8	90	0.6	2	M25x1.5	0.317
PMCN600MH2-V4A	136	68,000	400	2,300	8	90	0.6	2	M25x1.5	0.317
PMCN600MH3-V4A	136	68,000	2,177.0	4,536	8	90	0.6	2	M25x1.5	0.317

SC190 to SC925

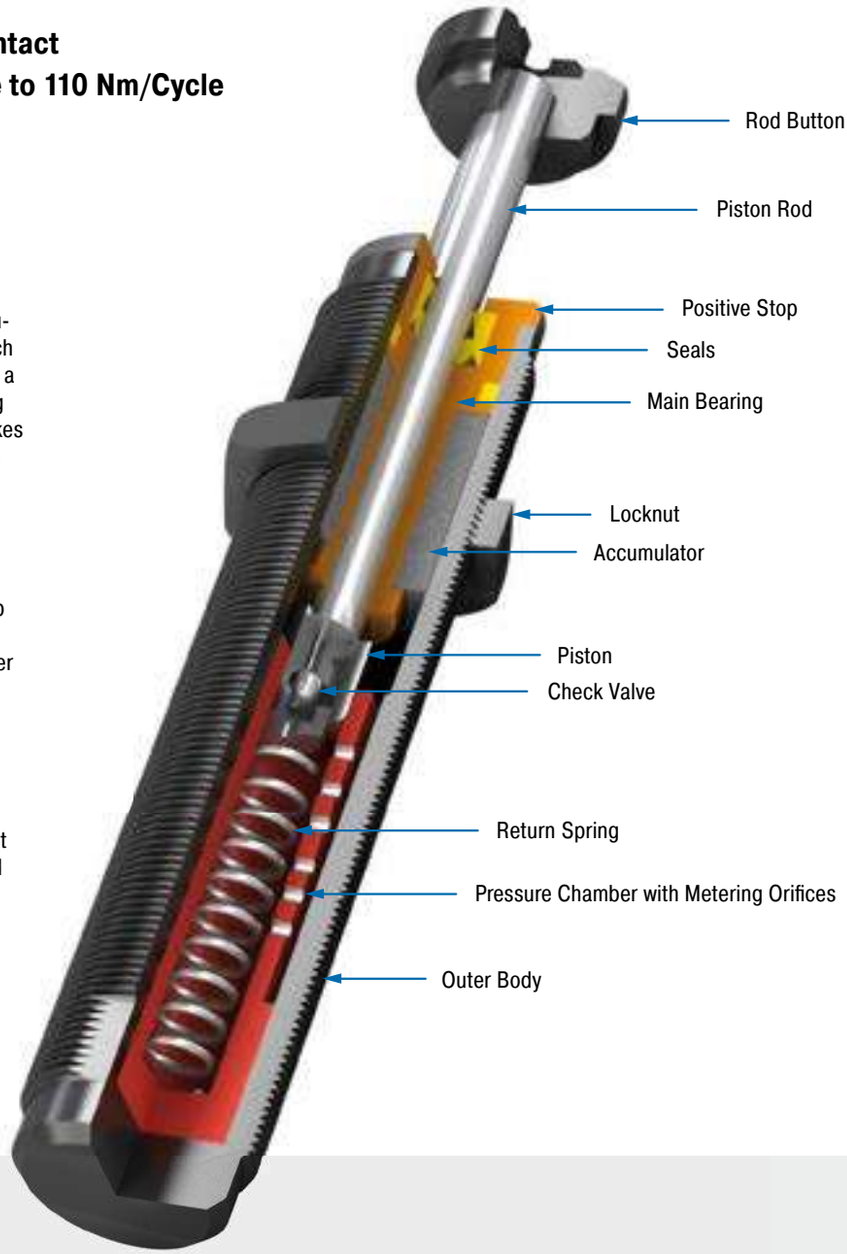
Long stroke and soft impact

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 product family SC190 to SC925 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 which produce 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 1 kg to 2,000 kg! Self-compensating shock absorbers react to changing energy conditions, without adjustment.

These miniature self-compensating shock absorbers from the SC190 to SC925 product family are used in industrial, automation and machine 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 centers, Measuring tables, Tool machines

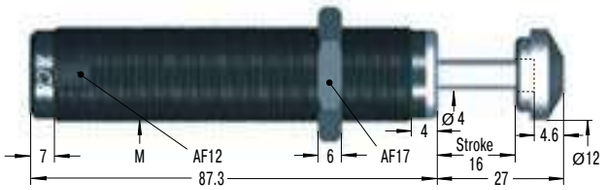
Note: If precise end position data is required consider use of a stop collar.

Safety information: 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.

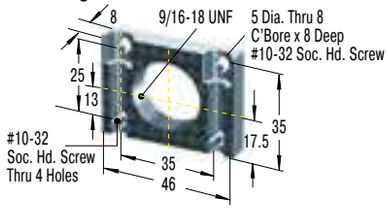
Issue 04.2018 – Specifications subject to change

SC190; 0 to 4

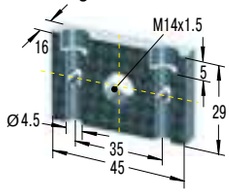


Product available for UNF and metric thread (for metric add suffix -M from part number)
M14x1 and M16x1 also available to special order

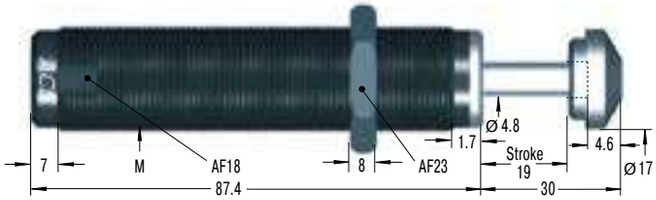
250-0318
Mounting Block



250-0352
Mounting Block

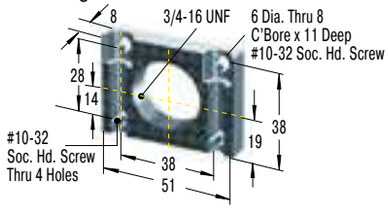


SC300; 0 to 4

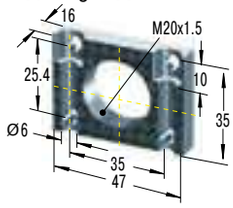


Product available for UNF and metric thread (for metric add suffix -M from part number)
M22x1.5 also available to special order

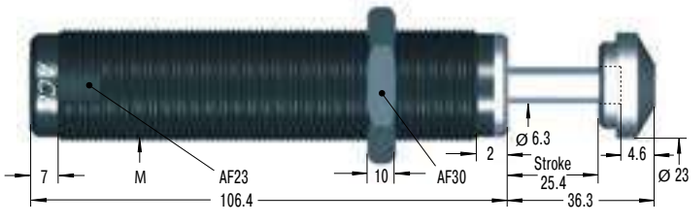
250-0401
Mounting Block



250-0353
Mounting Block

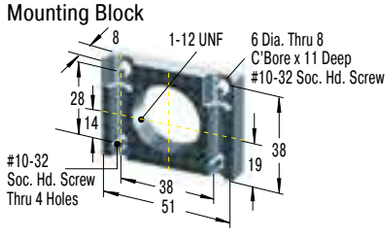


SC650; 0 to 4

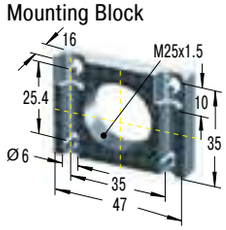


Product available for UNF and metric thread (for metric add suffix -M from part number)
M26x1.5 also available to special order

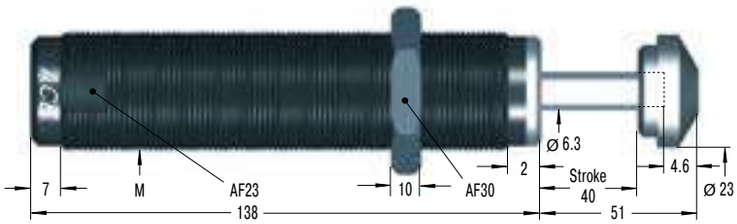
250-0402
Mounting Block



250-0044
Mounting Block

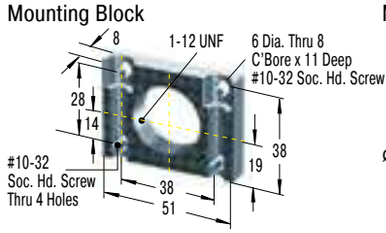


SC925; 0 to 4

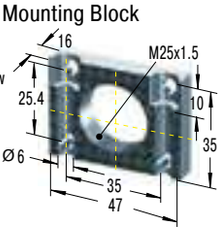


Product available for UNF and metric thread (for metric add suffix -M from part number)

250-0402
Mounting Block



250-0044
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

TYPES	E_3 Nm/cycle	E_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. °	M	Weight kg
SC190-0	25	34,000	-	-	0.7	4	-0	4	9	0.25	5	9/16-18 UNF / M14x1.5	0.080
SC190-1	25	34,000	2.3	6	1.4	7	-1	4	9	0.25	5	9/16-18 UNF / M14x1.5	0.080
SC190-2	25	34,000	5.5	16	3.6	18	-2	4	9	0.25	5	9/16-18 UNF / M14x1.5	0.080
SC190-3	25	34,000	14	41	9	45	-3	4	9	0.25	5	9/16-18 UNF / M14x1.5	0.080
SC190-4	25	34,000	34	91	23	102	-4	4	9	0.25	5	9/16-18 UNF / M14x1.5	0.080
SC300-0	33	45,000	-	-	0.7	4	-0	5	10	0.1	5	3/4-16 UNF / M20x1.5	0.175
SC300-1	33	45,000	2.3	7	1.4	8	-1	5	10	0.1	5	3/4-16 UNF / M20x1.5	0.175
SC300-2	33	45,000	7	23	4.5	27	-2	5	10	0.1	5	3/4-16 UNF / M20x1.5	0.175
SC300-3	33	45,000	23	68	14	82	-3	5	10	0.1	5	3/4-16 UNF / M20x1.5	0.175
SC300-4	33	45,000	68	181	32	204	-4	5	10	0.1	5	3/4-16 UNF / M20x1.5	0.175
SC650-0	73	68,000	-	-	2.3	14	-0	11	32	0.20	5	1-12 UNF / M25x1.5	0.335
SC650-1	73	68,000	11	36	8	45	-1	11	32	0.20	5	1-12 UNF / M25x1.5	0.335
SC650-2	73	68,000	34	113	23	136	-2	11	32	0.20	5	1-12 UNF / M25x1.5	0.335
SC650-3	73	68,000	109	363	68	408	-3	11	32	0.20	5	1-12 UNF / M25x1.5	0.335
SC650-4	73	68,000	363	1,089	204	1,180	-4	11	32	0.20	5	1-12 UNF / M25x1.5	0.335
SC925-0	110	90,000	8	25	4.5	29	-0	11	32	0.40	5	1-12 UNF / M25x1.5	0.420
SC925-1	110	90,000	22	72	14	90	-1	11	32	0.40	5	1-12 UNF / M25x1.5	0.420
SC925-2	110	90,000	59	208	40	227	-2	11	32	0.40	5	1-12 UNF / M25x1.5	0.420
SC925-3	110	90,000	181	612	113	726	-3	11	32	0.40	5	1-12 UNF / M25x1.5	0.420
SC925-4	110	90,000	544	1,952	340	2,088	-4	11	32	0.40	5	1-12 UNF / M25x1.5	0.420

[1] For applications with higher side load angles consider using the side load adaptor, pages 44 to 49.

SC²25 to SC²190

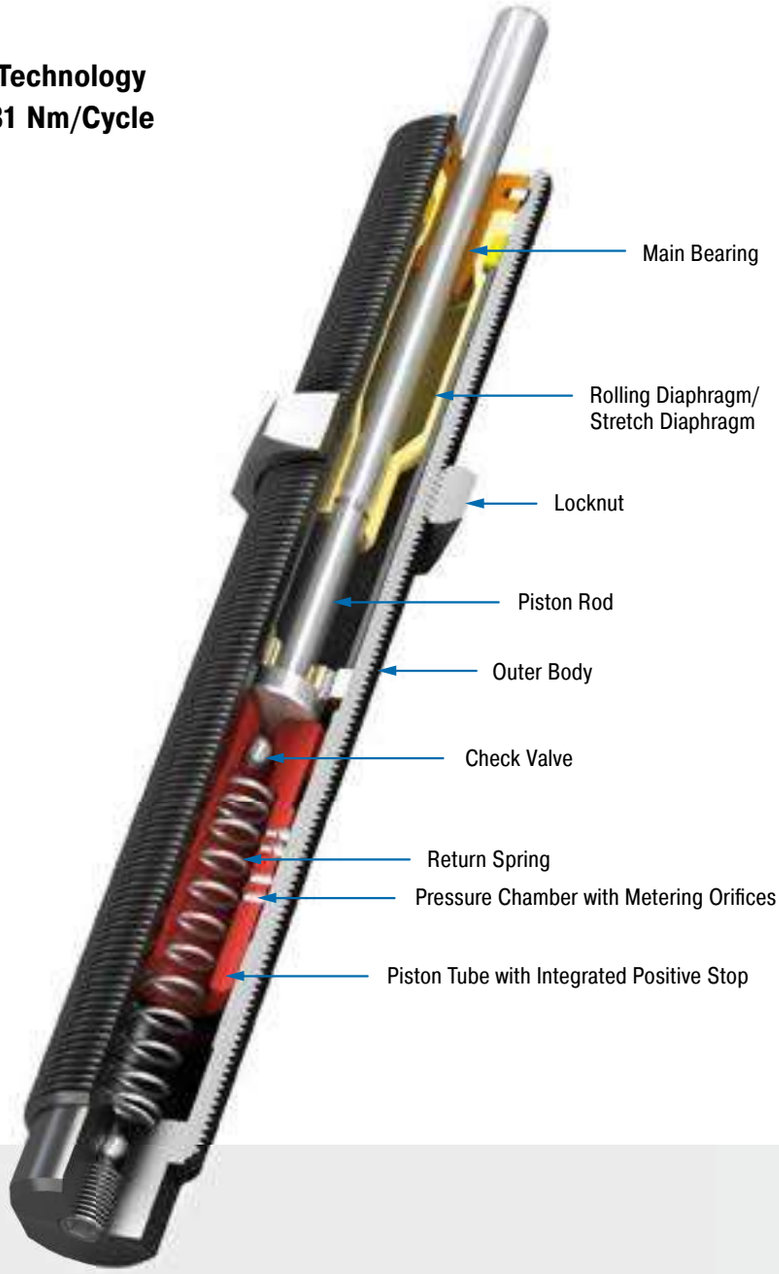
Piston tube design for maximum energy absorption

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 SC²190 extends from thread size M10 to M14 and covers effective weight ranges of 1 kg to 1,550 kg (2.2 to 3,400 lbs). 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 (72 to 102 psi) or applications where deceleration needs to take place 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°. They offer soft contact deceleration where initial impact reaction forces are very low, with the advantages of self-compensation to react to changing energy conditions, without adjustment.

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 centers, Measuring tables, Tool machines, Locking systems

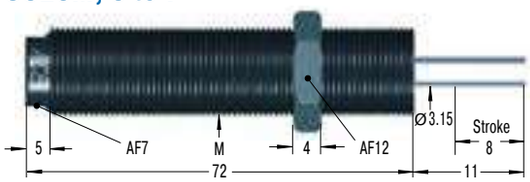
Note: If precise end position data is required consider use of a stop collar.

Safety information: 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.

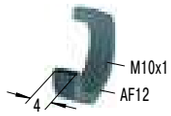
On request: Increased corrosion protection. Special finishes.

Issue 04.2018 – Specifications subject to change

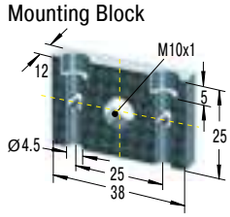
SC25M; 5 to 7



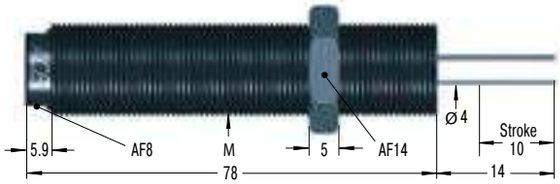
250-0315
Locknut



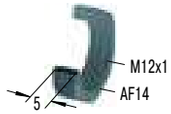
250-0307
Mounting Block



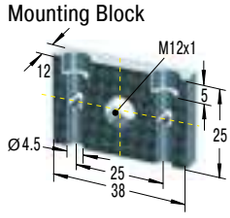
SC75M; 5 to 7



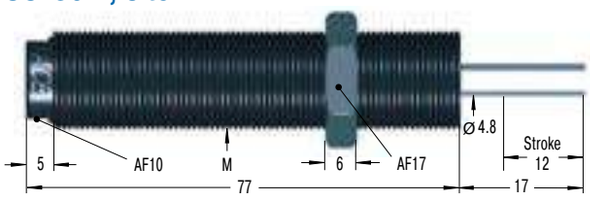
250-0317
Locknut



250-0309
Mounting Block

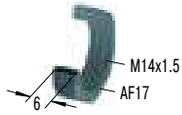


SC190M; 5 to 7

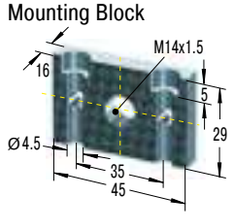


M14x1 also available to special order

250-0233
Locknut



250-0352
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

TYPES	Max. Energy Capacity E_3 Nm/cycle	Max. Energy Capacity E_4 Nm/h	Effective Weight We min. kg	Effective Weight We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	M	Weight kg
SC25M-5	10	16,000	1	5	-5	4.5	14	0.3	2	M10x1	0.029
SC25M-6	10	16,000	4	44	-6	4.5	14	0.3	2	M10x1	0.029
SC25M-7	10	16,000	42	500	-7	4.5	14	0.3	2	M10x1	0.029
SC75M-5	16	30,000	1	8	-5	6	19	0.3	2	M12x1	0.047
SC75M-6	16	30,000	7	78	-6	6	19	0.3	2	M12x1	0.047
SC75M-7	16	30,000	75	800	-7	6	19	0.3	2	M12x1	0.047
SC190M-5	31	50,000	2	16	-5	6	19	0.4	2	M14x1.5	0.059
SC190M-6	31	50,000	13	140	-6	6	19	0.4	2	M14x1.5	0.059
SC190M-7	31	50,000	136	1,550	-7	6	19	0.4	2	M14x1.5	0.059

[1] For applications with higher side load angles consider using the side load adaptor, pages 44 to 49.

Products for UNF and metric thread available

SC²300 to SC²650

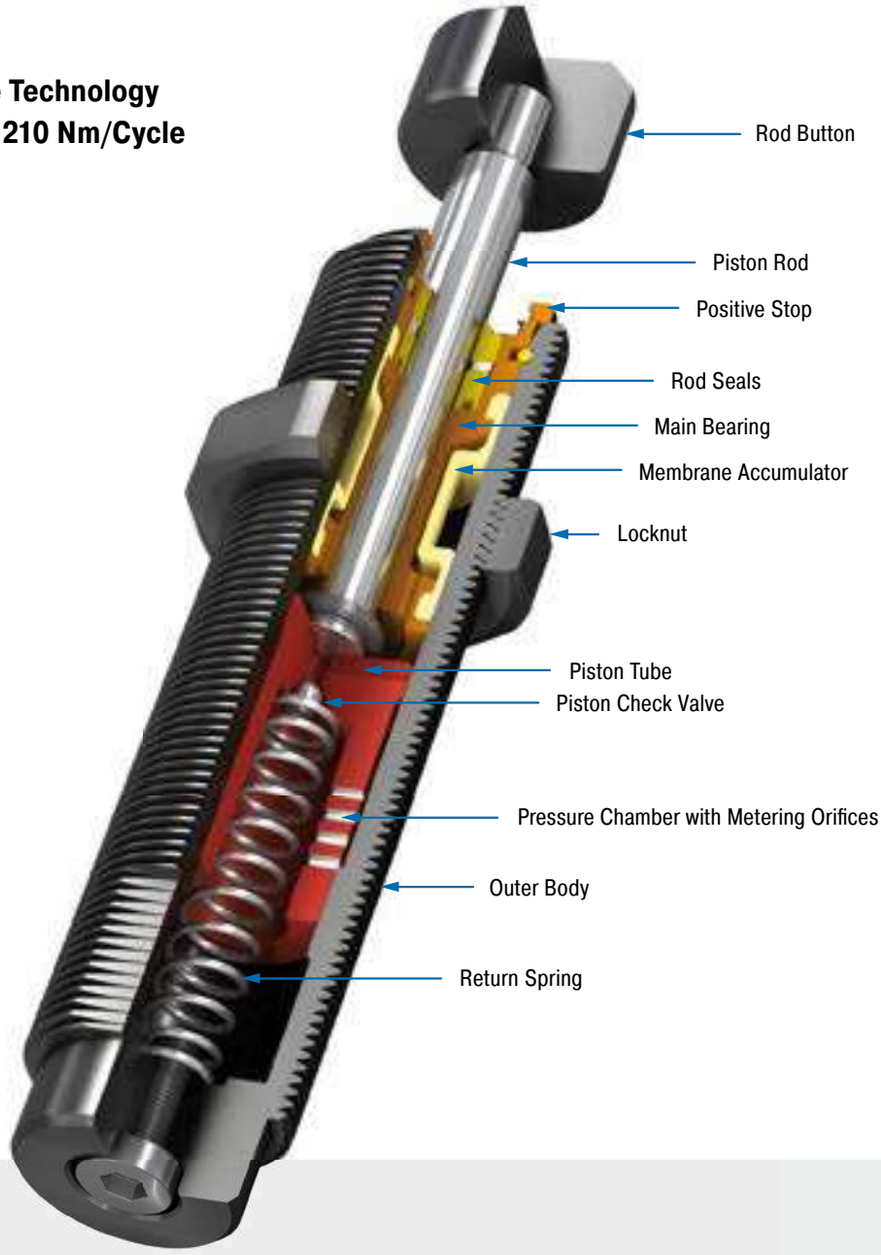
Piston tube design for maximum energy absorption

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 SC²650 are available with up to three times the energy absorption compared to similar sizes of standard shock absorbers SC190 to SC925, due to the ACE piston tube specialty. 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 shock absorbers, which are perfect for rotary actuators 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°. They offer soft contact deceleration where initial impact reaction forces are very low, with the advantages of self-compensation to react to changing energy conditions, without adjustment.

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

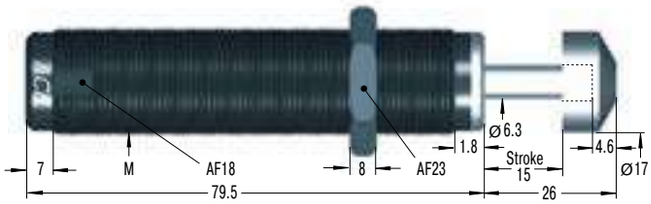
Application field: Turntables, Swivel units, Robot arms, Linear slides, Pneumatic cylinders, Handling modules, Machines and plants, Finishing and processing centers, Tool machines

Note: If precise end position data is required consider use of a stop collar.

On request: Increased corrosion protection. Special finishes.

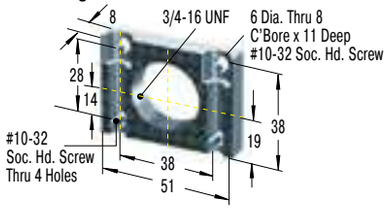
Issue 04.2018 – Specifications subject to change

SC300; 5 to 9

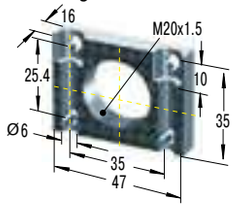


Product available for UNF and metric thread (for metric add suffix -M from part number)

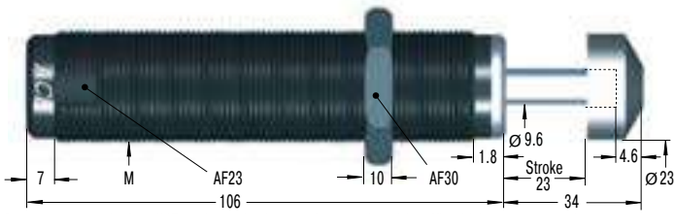
250-0401
Mounting Block



250-0353
Mounting Block

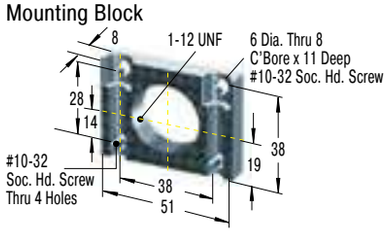


SC650; 5 to 9

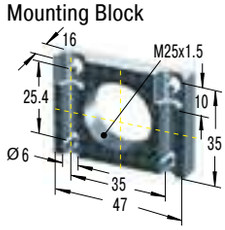


Product available for UNF and metric thread (for metric add suffix -M from part number)

250-0402
Mounting Block



250-0044
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

	Max. Energy Capacity		Effective Weight								
TYPES	E_3 Nm/cycle	E_4 Nm/h	We min. kg	We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	M	Weight kg
SC300-5	73	45,000	11	45	-5	8	18	0.2	5	3/4-16 UNF / M20x1.5	0.150
SC300-6	73	45,000	34	136	-6	8	18	0.2	5	3/4-16 UNF / M20x1.5	0.150
SC300-7	73	45,000	91	181	-7	8	18	0.2	5	3/4-16 UNF / M20x1.5	0.150
SC300-8	73	45,000	135	680	-8	8	18	0.2	5	3/4-16 UNF / M20x1.5	0.150
SC300-9	73	45,000	320	1,950	-9	8	18	0.2	5	3/4-16 UNF / M20x1.5	0.150
SC650-5	210	68,000	23	113	-5	11	33	0.3	5	1-12 UNF / M25x1.5	0.310
SC650-6	210	68,000	90	360	-6	11	33	0.3	5	1-12 UNF / M25x1.5	0.310
SC650-7	210	68,000	320	1,090	-7	11	33	0.3	5	1-12 UNF / M25x1.5	0.310
SC650-8	210	68,000	770	2,630	-8	11	33	0.3	5	1-12 UNF / M25x1.5	0.310
SC650-9	210	68,000	1,800	6,350	-9	11	33	0.3	5	1-12 UNF / M25x1.5	0.310

[1] For applications with higher side load angles consider using the side load adaptor, pages 44 to 49.

Products for UNF and metric thread available

SC25-HC to SC650-HC

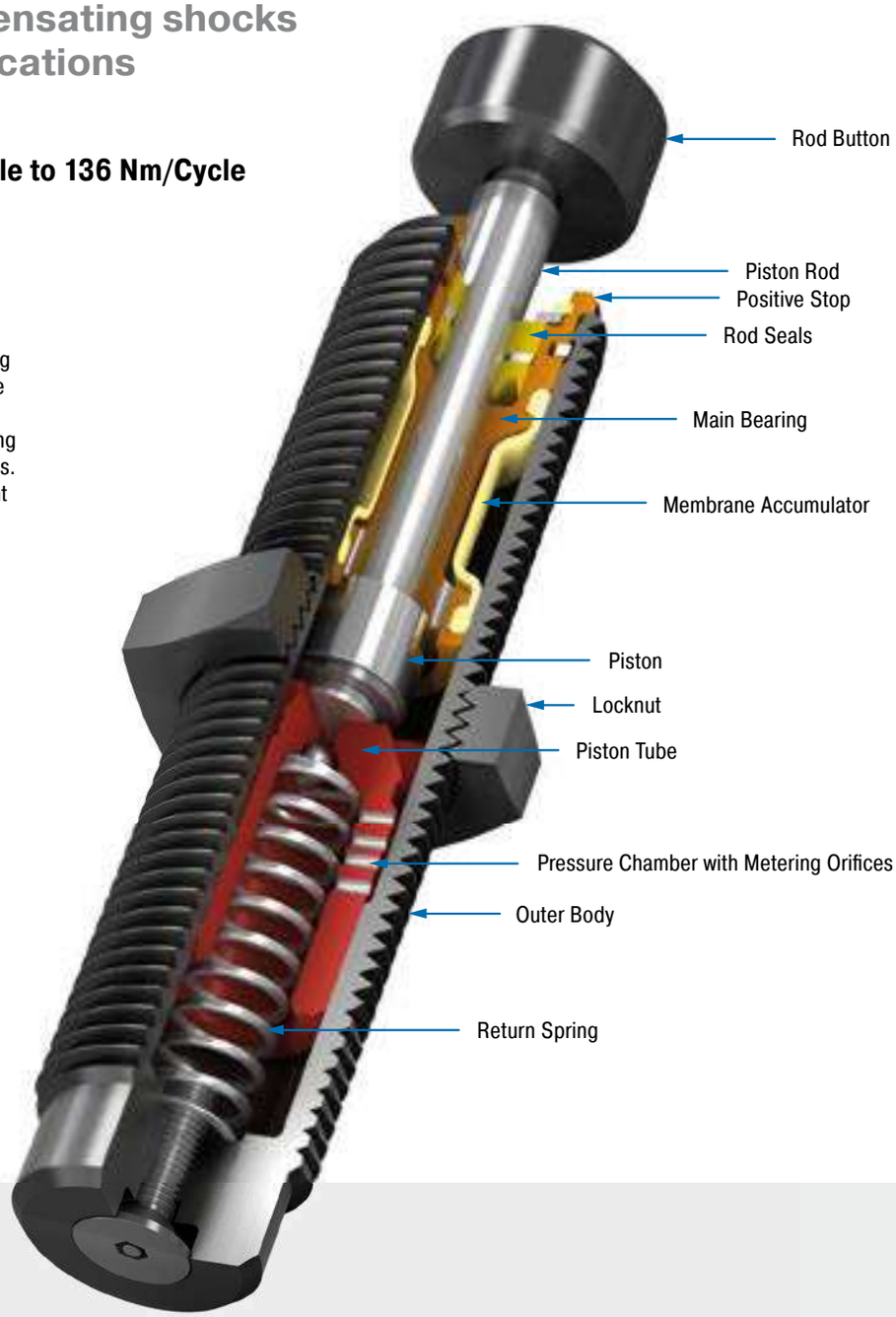
Miniature self compensating shocks for high-speed applications

Self-Compensating
Energy capacity 2.25 Nm/Cycle to 136 Nm/Cycle
Stroke 4 mm to 15 mm

ACE Controls SC25-HC to SC650-HC High-Cycle shock absorbers are engineered for high-speed equipment applications. These rugged performers are ideal for the packaging industry. They offer a short stroke, quick time through stroke and quick rod-ready time. In addition, these dependable self-compensating miniatures are capable of rapid repeat strokes. The result is faster cycling for your equipment and gains in production time for you.

Self-compensating shock absorbers react to changing energy conditions, without adjustment.

These miniature, self-compensating shock absorbers provide high-speed performance and reliability in a compact footprint. Applications include: Packaging equipment, slides, rotary actuators, small and medium robotics, machine tools, pick and place operations and more.



Technical Data

Energy capacity: 2.25 Nm/Cycle to 136 Nm/Cycle

Impact velocity range: 0.03 m/s to 4.5 m/s.

Operating temperature range: 0 °C to 66 °C

Mounting: In any position

Positive stop: Integrated

Material: Outer body: Steel corrosion-resistant coating; Main bearing: Brass; Piston rod: Steel hardened; Locknut, Accessories: Steel; Rolling diaphragm: Rubber (EPDM); Stretch diaphragm: Rubber (nitrile)

Damping medium: SF 96-500 and others

Application field: Linear slides, Tool machines, Handling modules, Production plants

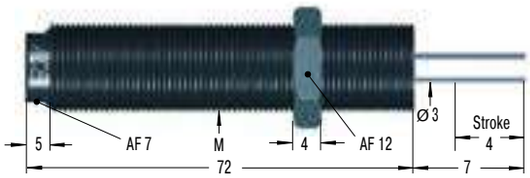
Note: If precise end position is required, consider use of the optional stop collar.

Safety information: External materials in the surrounding area can attack the accumulator and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Suitable for use in pressure chambers up to 102 psi.

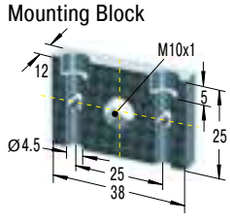
On request: Food grade oils, special threads available on request.

Issue 04.2018 – Specifications subject to change

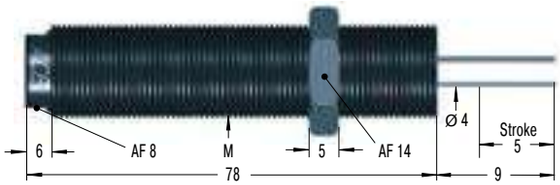
SC25M-HC



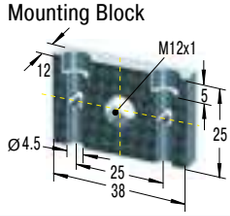
250-0307
Mounting Block



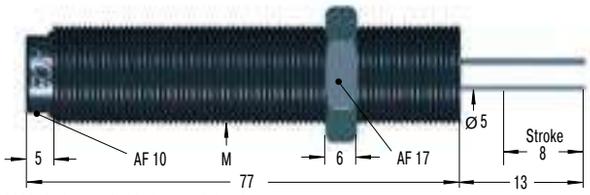
SC75M-HC



250-0309
Mounting Block

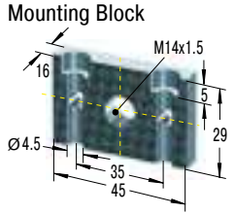


SC190M-HC

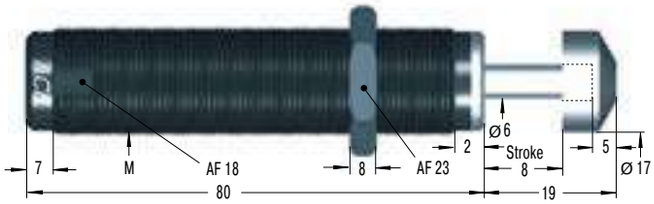


M14x1 also available to special order

250-0352
Mounting Block

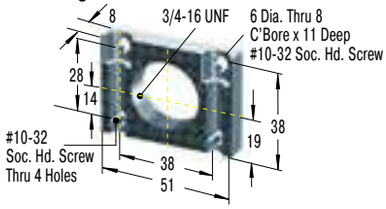


SC300-HC

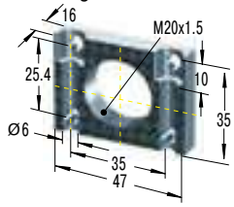


Product available for UNF and metric thread (for metric add suffix -M from part number)

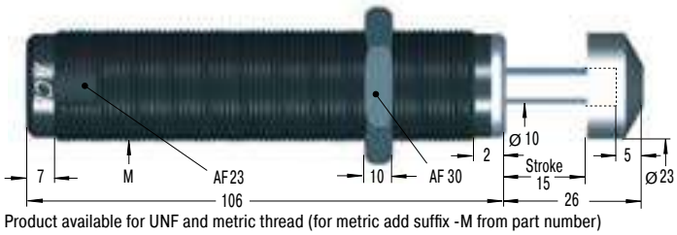
250-0401
Mounting Block



250-0353
Mounting Block

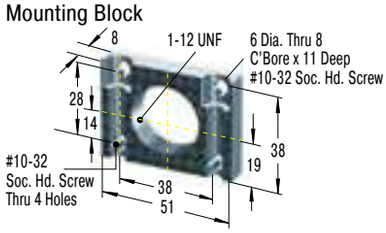


SC650-HC

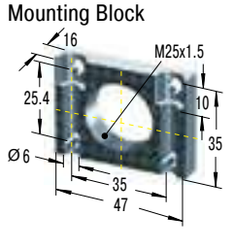


Product available for UNF and metric thread (for metric add suffix -M from part number)

250-0402
Mounting Block



250-0044
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

TYPES	Max. Energy Capacity E_3 Nm/cycle	Max. Energy Capacity Energy capacity Nm/h	Effective Weight We min. kg	Effective Weight We max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	M	Weight kg
SC25M-5-HC	2.25	16,000	1	5	9	14	0.3	2	M10x1	0.030
SC25M-6-HC	2.25	16,000	4	44	9	14	0.3	2	M10x1	0.030
SC25M-7-HC	2.25	16,000	42	500	9	14	0.3	2	M10x1	0.030
SC75M-5-HC	8.5	30,000	1	8	8.5	15	0.3	2	M12x1	0.045
SC75M-6-HC	8.5	30,000	7	124	8.5	15	0.3	2	M12x1	0.045
SC75M-7-HC	8.5	30,000	75	800	8.5	15	0.3	2	M12x1	0.045
SC190M-5-HC	20	50,000	2	16	12	25	0.4	2	M14x1.5	0.059
SC190M-6-HC	20	50,000	13	140	12	25	0.4	2	M14x1.5	0.059
SC190M-7-HC	20	50,000	136	1,540	12	25	0.4	2	M14x1.5	0.059
SC300-5-HC	73	45,000	11	45	12	17	0.2	5	3/4-16 UNF / M20x1.5	0.164
SC300-6-HC	73	45,000	34	136	12	17	0.2	5	3/4-16 UNF / M20x1.5	0.164
SC300-7-HC	73	45,000	91	181	12	17	0.2	5	3/4-16 UNF / M20x1.5	0.164
SC300-8-HC	73	45,000	135	680	12	17	0.2	5	3/4-16 UNF / M20x1.5	0.164
SC300-9-HC	73	45,000	318	885	12	17	0.2	5	3/4-16 UNF / M20x1.5	0.164
SC650-5-HC	136	68,000	23	113	22	37	0.3	5	1-12 UNF / M25x1.5	0.315
SC650-6-HC	136	68,000	91	363	22	37	0.3	5	1-12 UNF / M25x1.5	0.315
SC650-7-HC	136	68,000	318	1,090	22	37	0.3	5	1-12 UNF / M25x1.5	0.315
SC650-8-HC	136	68,000	770	2,630	22	37	0.3	5	1-12 UNF / M25x1.5	0.315
SC650-9-HC	136	68,000	1,800	6,350	22	37	0.3	5	1-12 UNF / M25x1.5	0.315

[1] For applications with higher side load angles consider using the side load adaptor, pages 44 to 49.

Products for UNF and metric thread available

MA30 to MA900

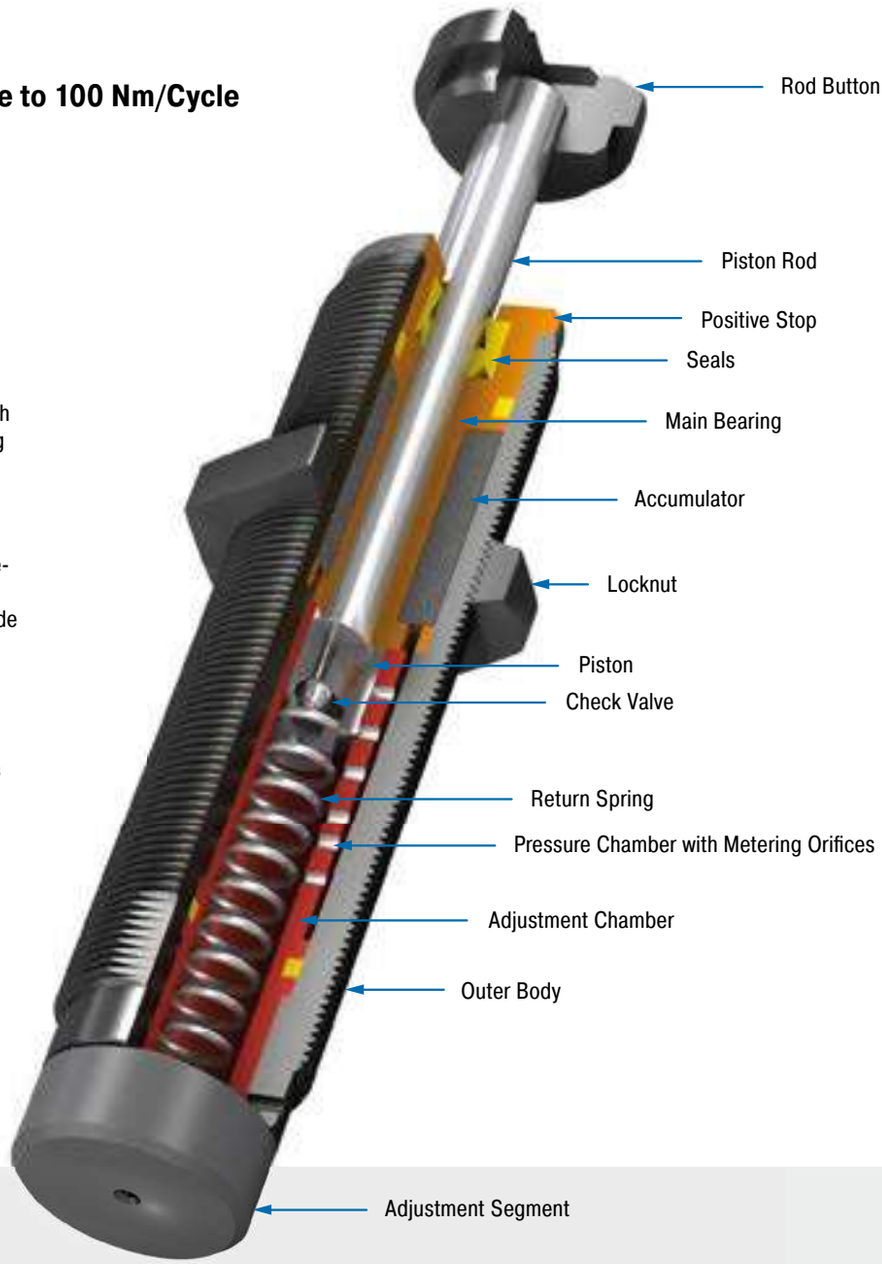
Stepless adjustment

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 product family 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.

These adjustable miniature shock absorbers from ACE can be used to precisely meet the customer's application needs and are therefore found everywhere in industrial, automation and machine 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 centers, Automatic machinery, Tool machines, Locking systems

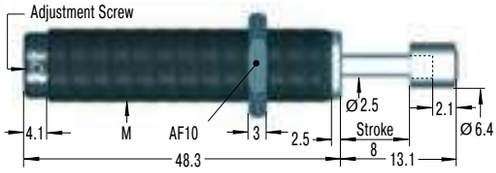
Note: If precise end position data is required consider use of a stop collar. Shock absorber is preset at delivery in a neutral position between hard and soft.

Safety information: 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.

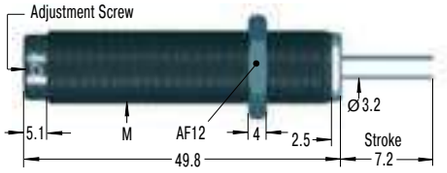
On request: Nickel-plated or other special options available to special order. Models without rod end button.

Issue 04.2018 – Specifications subject to change

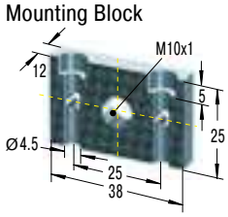
MA30M



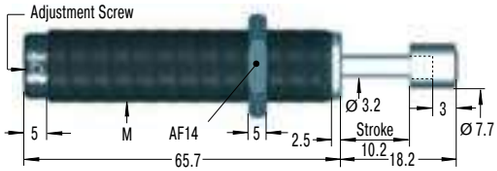
MA50M



250-0307
Mounting Block

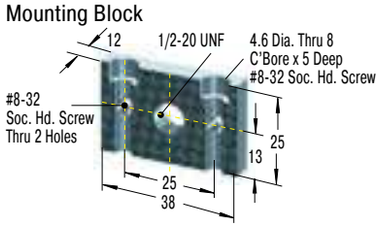


MA35

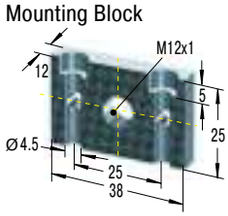


Product available for UNF and metric thread (for metric add suffix -M from part number)

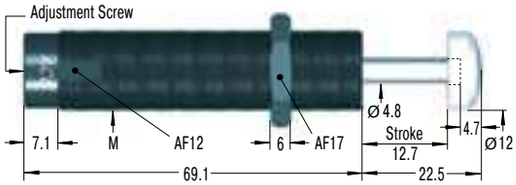
250-0308
Mounting Block



250-0309
Mounting Block

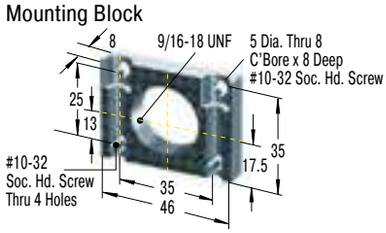


MA150

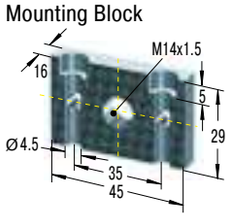


Product available for UNF and metric thread (for metric add suffix -M from part number)
M14x1 also available to special order

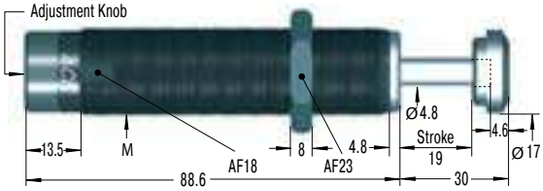
250-0318
Mounting Block



250-0352
Mounting Block

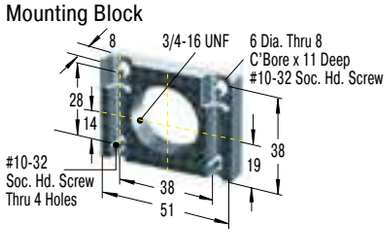


MA225

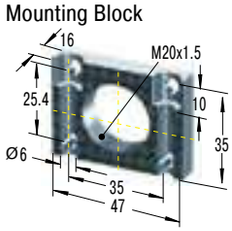


Product available for UNF and metric thread (for metric add suffix -M from part number)

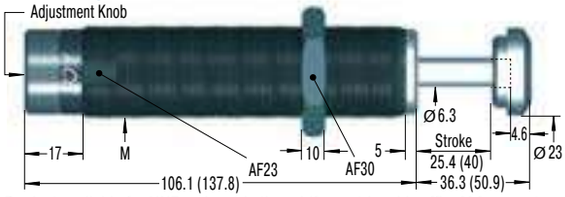
250-0401
Mounting Block



250-0353
Mounting Block

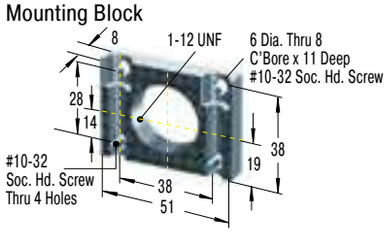


MA600 / MA900

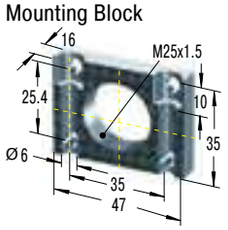


Product available for UNF and metric thread (for metric add suffix -M from part number)
Dimensions for MA900M in ( ).

250-0402
Mounting Block



250-0044
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

TYPES	Max. Energy Capacity E_3 Nm/cycle	Max. Energy Capacity E_4 Nm/h	Effective Weight We min. kg	Effective Weight We max. kg	Return Force min. N	Return Force max. N	Return Time s	[1] Side Load Angle max. °	M	Weight kg
MA30M	3.5	5,650	0.23	15	1.7	5.3	0.3	2	M8x1	0.013
MA50M	5.5	13,550	4.5	20	3	6	0.3	2	M10x1	0.025
MA35	4	6,000	6	57	5	11	0.2	2	1/2-20 UNF / M12x1	0.043
MA150	22	35,000	1	109	3	5	0.4	2	9/16-18 UNF / M14x1.5	0.061
MA225	25	45,000	2.30	226	5	10	0.4	2	3/4-16 UNF / M20x1.5	0.173
MA600	68	68,000	9	1,360	10	30	0.2	2	1-12 UNF / M25x1.5	0.352
MA900	100	90,000	14	2,040	10	35	0.4	1	1-12 UNF / M25x1.5	0.414

[1] For applications with higher side load angles consider using the side load adaptor, pages 44 to 49.

ACE Controls Inc. · 23425 Industrial Park Dr. Farmington · US-48335 Michigan · T +1 800-521-3320 · F +1 248-476-2470 · shocks@acecontrols.com · www.acecontrols.com

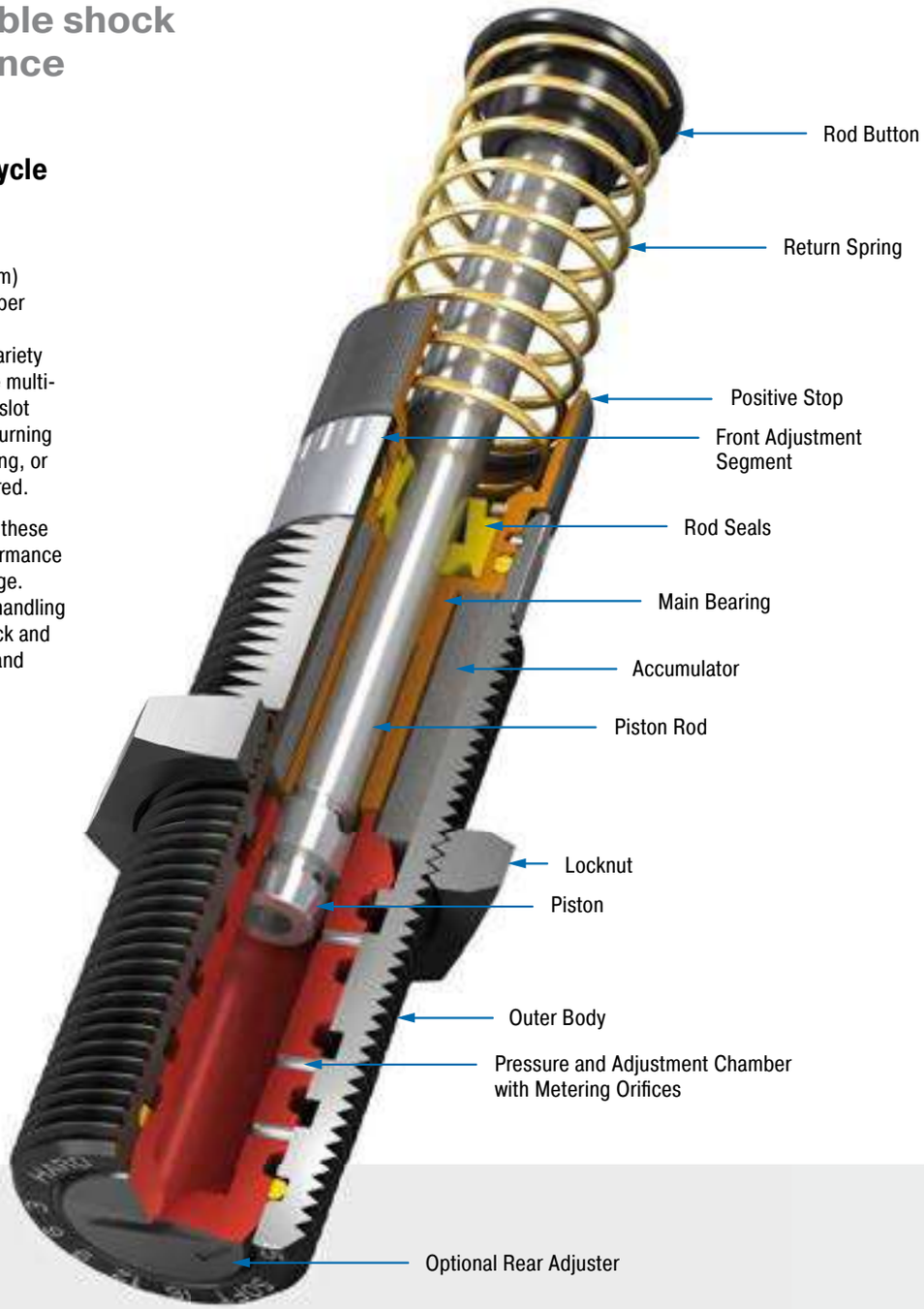
3/8x1

Miniature adjustable shock delivers convenience

Adjustable
Energy capacity 68 Nm/Cycle
Stroke 25 mm

ACE Controls 3/8x1“ (9.53 mm x 25 mm) bore adjustable miniature shock absorber offers high energy capacity and a wide effective weight range for handling a variety of applications. A unique feature of the multi-orifice 3/8x1“ bore is the optional rear slot adjuster. Adjustment can be made by turning the front adjuster to the preferred setting, or by turning the rear slot adjuster if desired.

Available with side or rear adjustment, these 1“ bore shock absorbers provide performance and convenience in one reliable package. Applications include: Slides, material handling equipment, robotics,machine tools, pick and place systems, packaging equipment and more.



Technical Data

Energy capacity: 68 Nm/Cycle

Impact velocity range: 0.5 m/s to 4.6 m/s

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

Mounting: In any position. Clevis mounting available (NA 3/8x1)

Adjustment: Adjustment can be made by turning the front adjuster to the preferred setting, or by turning the rear slot adjuster if desired.

Material: Outer body, Accessories: Steel corrosion-resistant coating; Main bearing, Rod end button: Steel hardened; Piston rod: Steel hardened and chrome plated; Return spring: Steel; Locknut: Zinc plated steel

Damping medium: American 46

Application field: Linear slides, Transport industry, Tool machines, Handling modules, Production plants

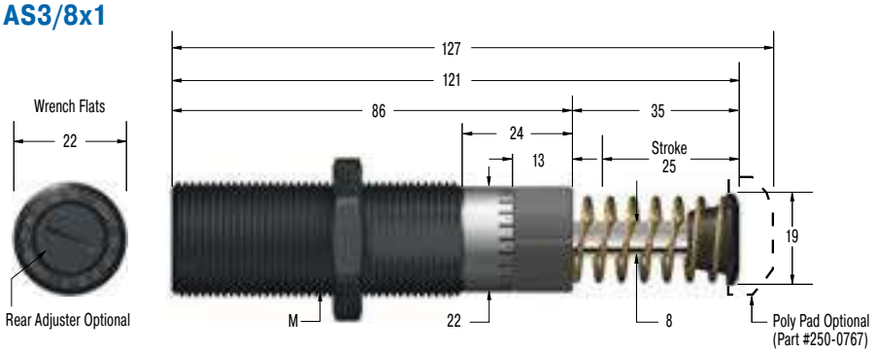
Note: Maximum side load depends on application. For additional information contact ACE Controls’ Applications Department. Lock nut included with each shock absorber.

Safety information: 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.

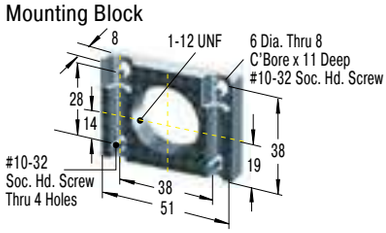
On request: Increased corrosion protection. Special finishes. Models without rod end button also available on request.

Issue 04.2018 – Specifications subject to change

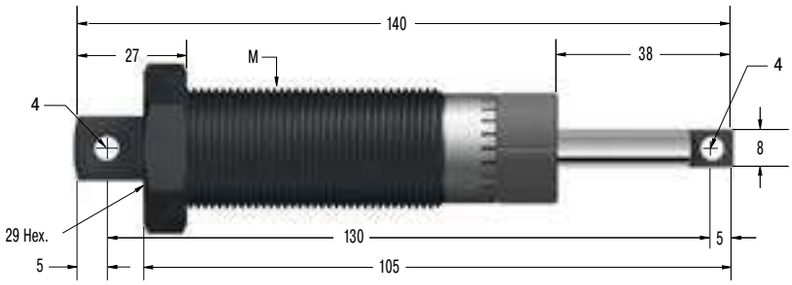
AS3/8x1



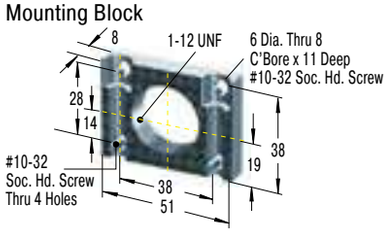
250-0402
Mounting Block



NA3/8x1



250-0402
Mounting Block



Additional acessories, mounting, installation ... starting on page 40.

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	E_3 **Nm/cycle**	Energy capacity **Nm/h**	We min. **kg**	We max. **kg**	Return Force min. **N**	Return Force max. **N**	Return Time **s**	[1] Side Load Angle max. °	M	Weight **kg**
AS3/8X1	68	68,000	4.54	567	27	49	0.03	5	1-12 UNF	0.198
NA3/8x1	68	68,000	4.54	577	30	49	0.13	5	N/A	0.198

[1] For applications with higher side load angles consider using the side load adaptor, pages 44 to 49.

Miniature Shock Absorber Accessories M5 to M25

Selection Chart




Shock Absorber Type	[1] Locknut	[2] Stop Collar	Mounting Block	[3] Side Load Adaptor
Thread M5x0.5				
MC5M	0801-001	–	–	–
Thread M6x0.5				
MC9M	250-0716	–	–	–
Thread M8x1				
MA30M	250-0482	–	–	250-0146
MC10M	250-0482	–	–	250-0141
MC30M	250-0482	–	–	250-0146
Thread M10x1				
MA50M	250-0315	250-0408	250-0307	250-0562
MC25M	250-0315	250-0408	250-0307	250-0562
SC25M; 5 to 7	250-0315	250-0408	250-0307	–
SC25M-HC	250-0315	250-0408	250-0307	–
Thread M12x1				
MA35M	250-0317	250-0409	250-0309	250-0760
MC75M	250-0317	250-0409	250-0309	250-0760
SC75M; 5 to 7	250-0317	250-0409	250-0309	250-0145
SC75M-HC	250-0317	250-0409	250-0309	–
Thread M14x1.5				
MA150M	250-0233	250-0272	250-0352	250-0558
MC150M	250-0233	250-0272	250-0352	250-0558
MC150M-V4A	250-0441	250-0243	250-0255	–
PMCN150M	250-0233	–	250-0352	–
PMCN150M-V4A	250-0441	–	250-0255	–
SC190M; 0 to 4	250-0233	250-0272	250-0352	250-0080
SC190M; 5 to 7	250-0233	250-0272	250-0352	250-0558
SC190M-HC	250-0233	250-0272	250-0352	–
Thread M20x1.5				
MA225M	250-0207	250-0410	250-0353	250-0081
MC225M	250-0207	250-0410	250-0353	250-0559
MC225M-V4A	250-0442	250-0253	250-0434	–
PMCN225M	250-0207	–	250-0353	–
PMCN225M-V4A	250-0442	–	250-0434	–
SC300M; 0 to 4	250-0207	250-0410	250-0353	250-0081
SC300M; 5 to 9	250-0207	250-0410	250-0353	–
SC300M-HC	250-0207	250-0410	250-0353	–
Thread M25x1.5				
AS3/8x1M	250-0040	250-0766	250-0044	–
MA600M	250-0040	250-0276	250-0044	250-0082
MA900M	250-0040	250-0276	250-0044	250-0082
MC600M	250-0040	250-0276	250-0044	250-0560
MC600M-V4A	250-0443	250-0254	250-0436	–
PMCN600M	250-0040	–	250-0044	–
PMCN600M-V4A	250-0443	–	250-0436	–
SC650M; 0 to 4	250-0040	250-0276	250-0044	250-0082
SC650M; 5 to 9	250-0040	250-0276	250-0044	–
SC650M-HC	250-0040	250-0276	250-0044	–
SC925M; 0 to 4	250-0040	250-0276	250-0044	–

[1] Additional special options: Locknut 250-0362 for the MC10ME (extra fine thread), locknut 250-0232 for the MA/MC150E (extra fine thread), locknut 250-0239 for the MC600ML (extra fine thread).

[2] Additional special options: Stop Collar 250-0263 for the MC600ML (extra fine thread).

[3] Only mountable on units without button. Remove the button from the shock absorber, if there's one fitted!
The following side load adaptors fit -880 model shock absorbers: 250 -0080, -0081, -0082, -0141, -0145, -0562, -0760, -0762 and -0763.

Dimensions can be found on the corresponding accessories pages.

Issue 04.2018 – Specifications subject to change




Steel Shroud	Steel Button	Steel/Urethane Button	Nylon Button	Page
Thread M5x0.5				
–	–	–	–	44
Thread M6x0.5				
–	–	–	–	44
Thread M8x1				
250-0832	–	250-0764	–	44
250-0833	–	–	–	44
250-0832	–	250-0764	–	44
Thread M10x1				
250-0834	250-0124	–	–	44
250-0834	250-0124	250-0094	–	44
250-0835	250-0175	–	–	44
250-0835	250-0175	–	–	44
Thread M12x1				
250-0836	250-0786	250-0094	–	45
250-0836	250-0786	250-0094	–	45
250-0837	250-0174	–	–	45
250-0837	250-0174	–	–	45
Thread M14x1.5				
250-0733	250-0111	250-0095	–	45
250-0733	250-0111	250-0095	250-0753	45
–	–	–	250-0753	45
–	–	–	–	45
–	–	–	–	45
250-0785	included	250-0096	–	45
250-0733	250-0111	250-0095	–	45
250-0733	250-0111	250-0095	–	45
Thread M20x1.5				
250-0734	included	250-0098	–	46
250-0170	250-0112	250-0097	250-0754	46
–	–	–	250-0754	46
–	–	–	–	46
–	–	–	–	46
250-0734	included	250-0098	–	46
250-0734	included	250-0105	–	46
250-0734	included	250-0105	–	46
Thread M25x1.5				
–	–	250-0099	–	47
250-0765	included	250-0100	–	47
250-0765	included	250-0100	–	47
250-0171	10721-000	250-0099	250-0755	47
–	–	–	250-0755	47
–	–	–	–	47
–	–	–	–	47
250-0765	included	250-0100	–	47
250-0171	included	250-0099	–	47
250-0171	included	250-0099	–	47
–	included	250-0100	–	47

Miniature Shock Absorber Accessories 3/8-32 UNF to 1-12 UNF

Selection Chart




Shock Absorber Type	Locknut	Stop Collar	Mounting Block	[1] Side Load Adaptor
Thread 3/8-32 UNF				
MC25	250-0404	250-0406	250-0306	–
Thread 1/2-20 UNF				
MA35	250-0405	250-0407	250-0308	–
MC75	250-0405	250-0407	250-0308	250-0762
Thread 9/16-18 UNF				
MA150	250-0231	250-0271	250-0318	250-0554
MC150	250-0231	250-0271	250-0318	250-0554
SC190; 0 to 4	250-0231	250-0271	250-0318	–
Thread 3/4-16 UNF				
MA225	250-0399	250-0403	250-0401	250-0561
MC225	250-0399	250-0403	250-0401	250-0561
SC300; 0 to 4	250-0399	250-0403	250-0401	–
SC300; 5 to 9	250-0399	250-0403	250-0401	–
SC300-HC	250-0399	250-0403	250-0401	–
Thread 1-12 UNF				
AS3/8x1	250-0400	250-0774	250-0402	–
MA600	250-0400	250-0275	250-0402	–
MA900	250-0400	250-0275	250-0402	–
MC600	250-0400	250-0275	250-0402	250-0763
NA3/8x1	250-0400	250-0774	250-0402	–
SC650; 0 to 4	250-0400	250-0275	250-0402	–
SC650; 5 to 9	250-0400	250-0275	250-0402	–
SC650-HC	0801-041	250-0275	250-0402	–
SC925; 0 to 4	250-0400	250-0275	250-0402	–

[1] Only mountable on units without button. Remove the button from the shock absorber, if there's one fitted!
The following side load adaptors fit -880 model shock absorbers: 250 -0080, -0081, -0082, -0141, -0145, -0562, -0760, -0762 and -0763.

Dimensions can be found on the corresponding accessories pages.

Issue 04.2018 – Specifications subject to change




Steel Shroud	Steel Button	Steel/Urethane Button	Nylon Button	Page
Thread 3/8-32 UNF				
250-0834	250-0124	250-0094	–	48
Thread 1/2-20 UNF				
–	250-0786	250-0094	–	48
250-0836	250-0786	250-0094		48
Thread 9/16-18 UNF				
250-0733	250-0111	250-0095	–	48
250-0785	250-0111	250-0095	250-0753	48
250-0733	included	250-0096	–	48
Thread 3/4-16 UNF				
250-0734	included	250-0098	–	49
250-0170	250-0112	250-0097	250-0754	49
250-0734	included	250-0098	–	49
250-0734	included	250-0105	–	49
250-0734	included	250-0105	–	49
Thread 1-12 UNF				
–	included	250-0099	–	49
250-0765	included	250-0100	–	49
–	included	250-0100	–	49
250-0171	10721-000	250-0099	250-0755	49
–	included	250-0099	–	49
250-0765	included	250-0100	–	49
250-0171	included	250-0099	–	49
250-0171	included	250-0099	–	49
–	included	250-0100	–	49

Selection Chart See Pages 40 to 41

M5x0.5

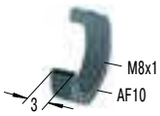
0801-001
Locknut

M6x0.5

250-0716
Locknut

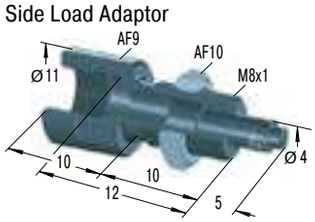
M8x1

250-0482
Locknut

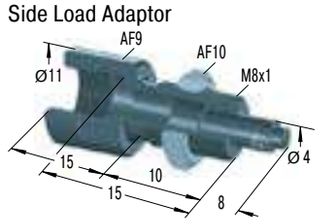


250-0362
Locknut

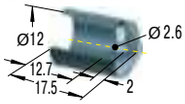
250-0141
Side Load Adaptor



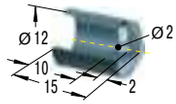
250-0146
Side Load Adaptor



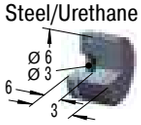
250-0832
Steel Shroud



250-0833
Steel Shroud

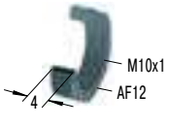


250-0764
Steel/Urethane Button

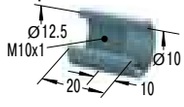


M10x1

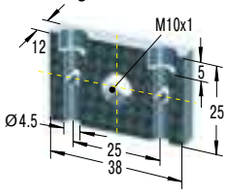
250-0315
Locknut



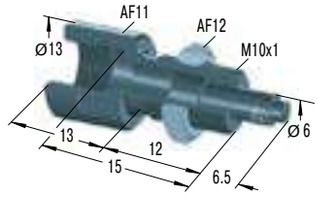
250-0408
Stop Collar



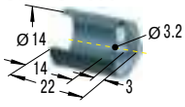
250-0307
Mounting Block



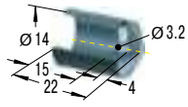
250-0562
Side Load Adaptor



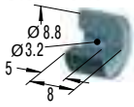
250-0834
Steel Shroud



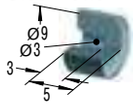
250-0835
Steel Shroud



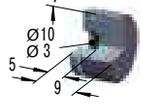
250-0124
Steel Button



250-0175
Steel Button



250-0094
Steel/Urethane Button



Mounting, installation, ... see pages 50 to 51.

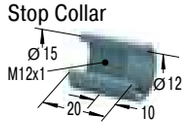
Issue 04.2018 – Specifications subject to change

Selection Chart See Pages 40 to 41

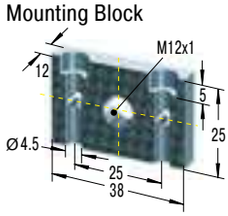
M12x1

250-0317
Locknut

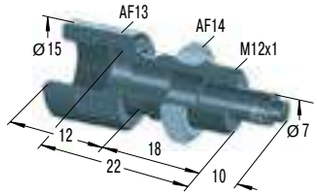
250-0409
Stop Collar



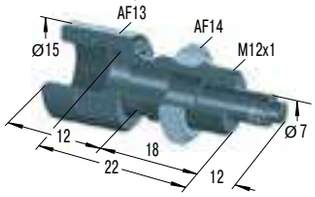
250-0309
Mounting Block



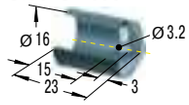
250-0145
Side Load Adaptor



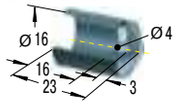
250-0760
Side Load Adaptor



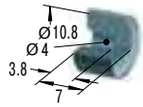
250-0836
Steel Shroud



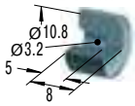
250-0837
Steel Shroud



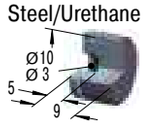
250-0174
Steel Button



250-0786
Steel Button

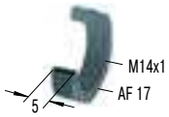


250-0094
Steel/Urethane Button



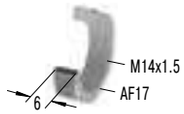
M14x1

250-0232
Locknut

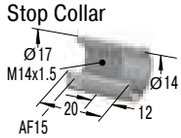


250-0233
Locknut

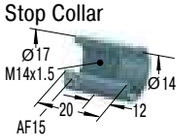
250-0441
Locknut



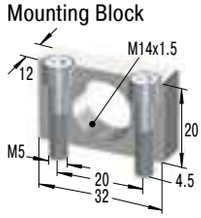
250-0243
Stop Collar



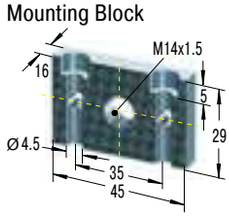
250-0272
Stop Collar



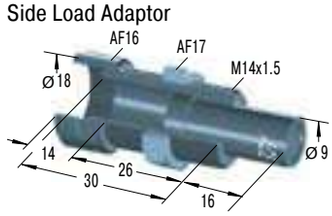
250-0255
Mounting Block



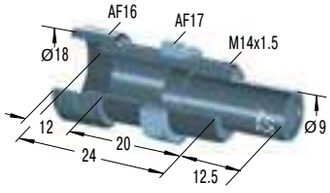
250-0352
Mounting Block



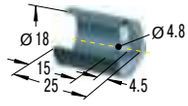
250-0080
Side Load Adaptor



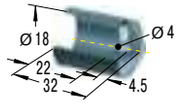
250-0558
Side Load Adaptor



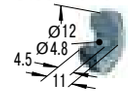
250-0733
Steel Shroud



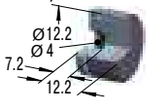
250-0785
Steel Shroud



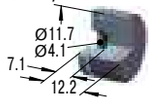
250-0111
Steel Button



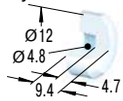
250-0095
Steel/Urethane Button



250-0096
Steel/Urethane Button



250-0753
Nylon Button



E_3max = 14 Nm

Mounting, installation, ... see pages 50 to 51.

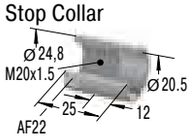
Selection Chart See Pages 40 to 41

M20x1.5

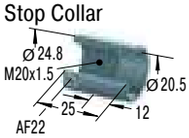
250-0207
Locknut

250-0442
Locknut

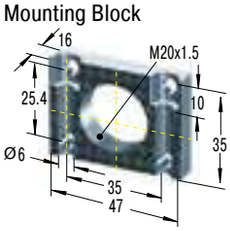
250-0253
Stop Collar



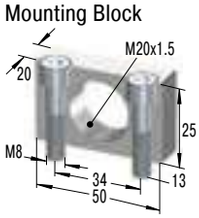
250-0410
Stop Collar



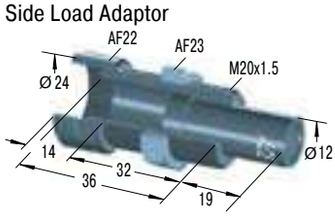
250-0353
Mounting Block



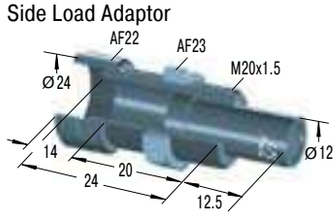
250-0434
Mounting Block



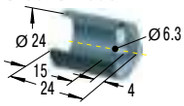
250-0081
Side Load Adaptor



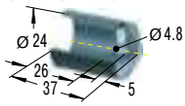
250-0559
Side Load Adaptor



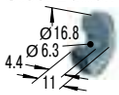
250-0170
Steel Shroud



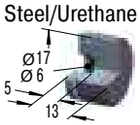
250-0734
Steel Shroud



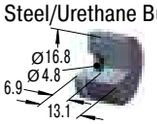
250-0112
Steel Button



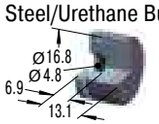
250-0097
Steel/Urethane Button



250-0098
Steel/Urethane Button



250-0105
Steel/Urethane Button



250-0754
Nylon Button

E_3 max = 33 Nm

Mounting, installation, ... see pages 50 to 51.

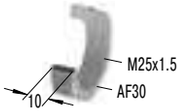
Issue 04.2018 – Specifications subject to change

Selection Chart See Pages 40 to 41

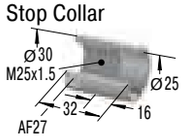
M25x1.5

250-0040
Locknut

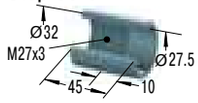
250-0443
Locknut



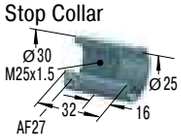
250-0254
Stop Collar



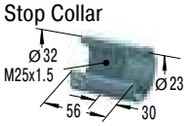
250-0263
Stop Collar



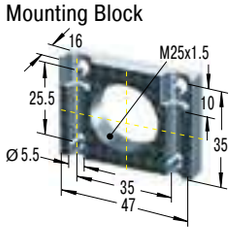
250-0276
Stop Collar



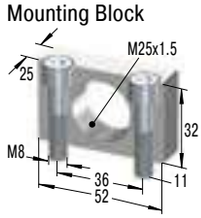
250-0766
Stop Collar



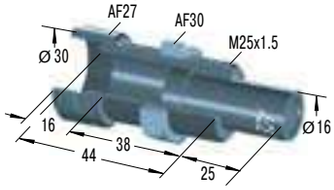
250-0044
Mounting Block



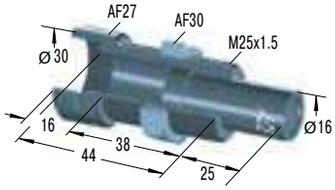
250-0436
Mounting Block



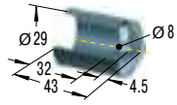
250-0082
Side Load Adaptor



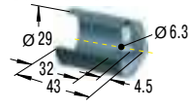
250-0560
Side Load Adaptor



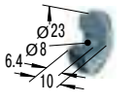
250-0171
Steel Shroud



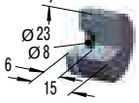
250-0765
Steel Shroud



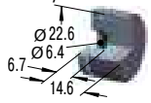
10721-000
Steel Button



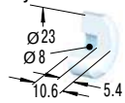
250-0099
Steel/Urethane Button



250-0100
Steel/Urethane Button



250-0755
Nylon Button



E_3 max = 68 Nm

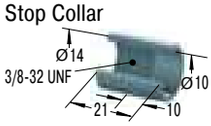
Mounting, installation, ... see pages 50 to 51.

Selection Chart See Pages 42 to 43

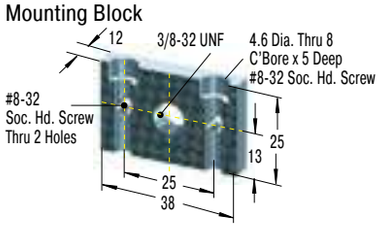
3/8-32 UNF

250-0404
Locknut

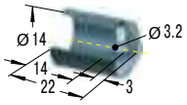
250-0406
Stop Collar



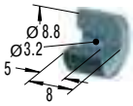
250-0306
Mounting Block



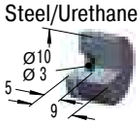
250-0834
Steel Shroud



250-0124
Steel Button



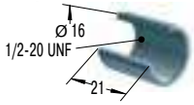
250-0094
Steel/Urethane Button



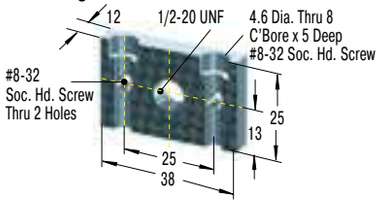
1/2-20 UNF

250-0405
Locknut

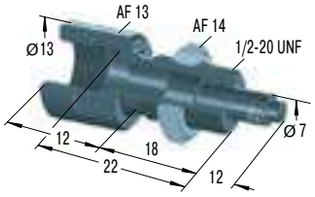
250-0407
Stop Collar



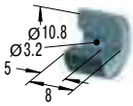
250-0308
Mounting Block



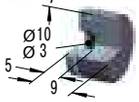
250-0762
Side Load Adaptor



250-0786
Steel Button



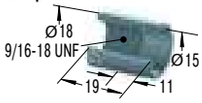
250-0094
Steel/Urethane Button



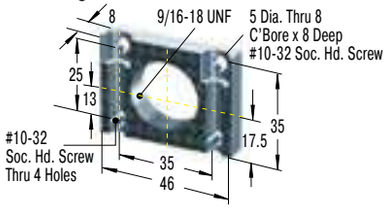
9/16-18 UNF

250-0231
Locknut

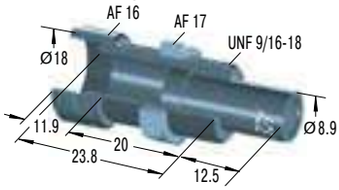
250-0271
Stop Collar



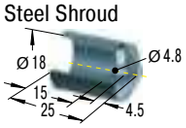
250-0318
Mounting Block



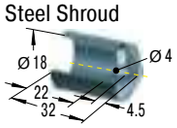
250-0554
Side Load Adaptor



250-0733
Steel Shroud

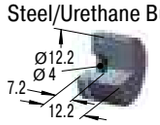


250-0785
Steel Shroud

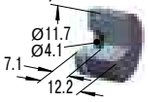


250-0111
Steel Button

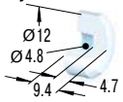
250-0095
Steel/Urethane Button



250-0096
Steel/Urethane Button



250-0753
Nylon Button



E_3max = 14 Nm

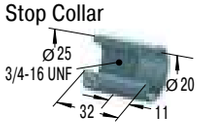
Mounting, installation, ... see pages 50 to 51.

Selection Chart See Pages 42 to 43

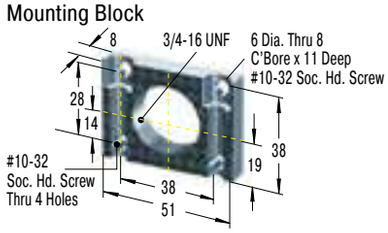
3/4-16 UNF

250-0399
Locknut

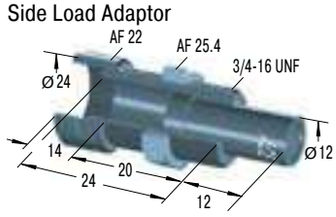
250-0403
Stop Collar



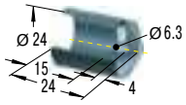
250-0401
Mounting Block



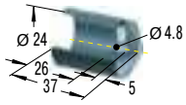
250-0561
Side Load Adaptor



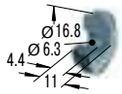
250-0170
Steel Shroud



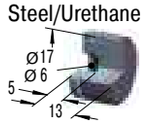
250-0734
Steel Shroud



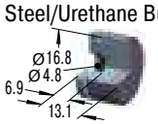
250-0112
Steel Button



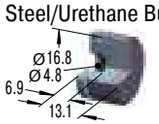
250-0097
Steel/Urethane Button



250-0098
Steel/Urethane Button



250-0105
Steel/Urethane Button

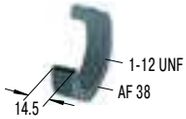


250-0754
Nylon Button

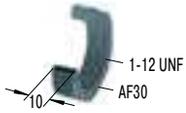
E_3 max = 33 Nm

1-12 UNF

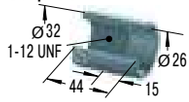
0801-041
Locknut



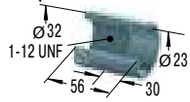
250-0400
Locknut



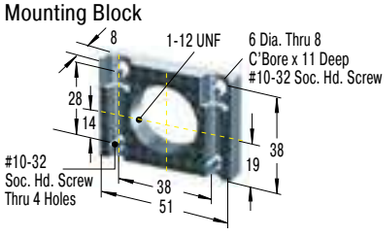
250-0275
Stop Collar



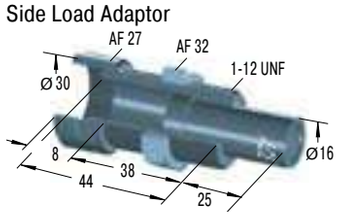
250-0774
Stop Collar



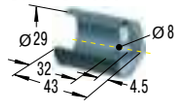
250-0402
Mounting Block



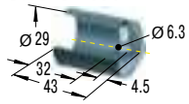
250-0763
Side Load Adaptor



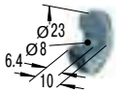
250-0171
Steel Shroud



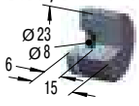
250-0765
Steel Shroud



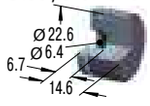
10721-000
Steel Button



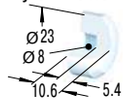
250-0099
Steel/Urethane Button



250-0100
Steel/Urethane Button



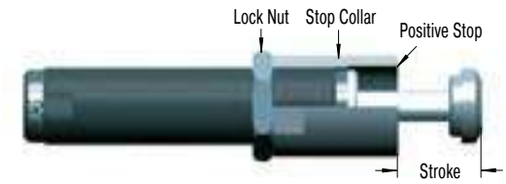
250-0755
Nylon Button



E_3 max = 68 Nm

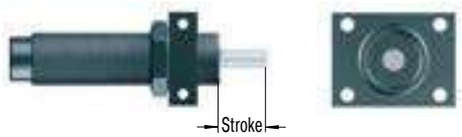
Mounting, installation, ... see pages 50 to 51.

ACE Controls Inc. · 23425 Industrial Park Dr. Farmington · US-48335 Michigan · T +1 800-521-3320 · F +1 248-476-2470 · shocks@acecontrols.com · www.acecontrols.com



Stop Collar

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

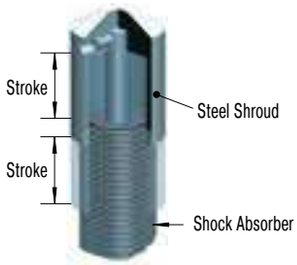


Mounting Block

This versatile block can be mounted to a horizontal or vertical surface. The shock is screwed into the center threaded hole and secured with a locknut.

Mounting information
Mounting block only. Bolts supplied separately.

Delivery
One locknut is included with each shock.



Steel Shroud

Grinding beads, sand, welding splatter, paints, 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 steel shroud can only be installed onto a shock absorber without rod end button.

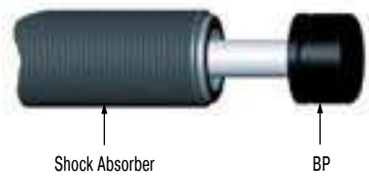
For part number MA, MC, SC please order with “-880” suffix. Part numbers MA150, MC150 to MC600 and SC25 to SC190 5-7 are supplied without a button.

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

Steel Button

The buttons are made of an oxidized steel, and offer durability beyond nylon or urethane options. They fit easily onto the piston rod of the corresponding shock absorber. Steel buttons are included on most MA and SC models. Options are available all other models that do not include the standard steel button.

Mounting information
Depending on the model, these buttons may be additionally secured with an O-Ring and LOCTITE.



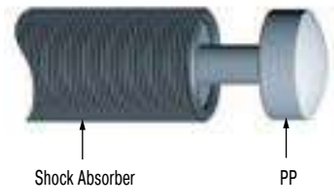
Steel/Urethane Button

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

Ordering information
New orders can indlude this button already installed by adding -BP to the part number.

Please refer to the accessories table on pages 40 to 43 to see which shock absorber types the steel urethane buttons are available for.

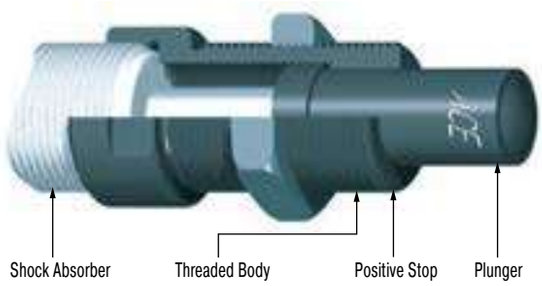
Issue 04.2018 – Specifications subject to change

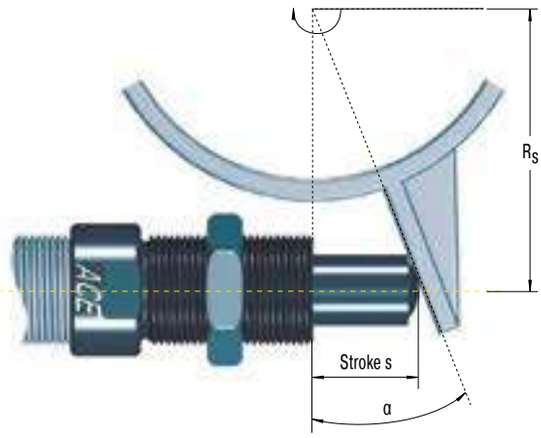


Nylon Button

While the use of industrial shock absorbers provides a considerable reduction in noise levels, adding impact buttons made of glass fiber reinforced nylon reduces noise levels even further. Additionally, use of a nylon button drastically reduces wear to the impact surface. These nylon buttons are available for the MA150 and the MC150 to MC600 shock absorber series.

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





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 side load adaptor provides long lasting solution.

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

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.

Safety information
Maximum angle:
250-0141, 250-0145, 250-0146, 250-0562, 250-0762 = 12.5°
250-0554, 250-0561, 250-0763 = 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.

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° (adapter 250-0763)

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

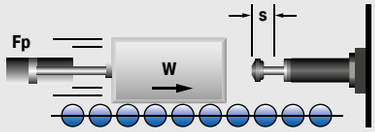
α	= side load angle °	R_s	= mounting radius m
α max	= max. angle °	$R_{s\,min}$	= min. possible mounting radius m
s	= absorber stroke m		

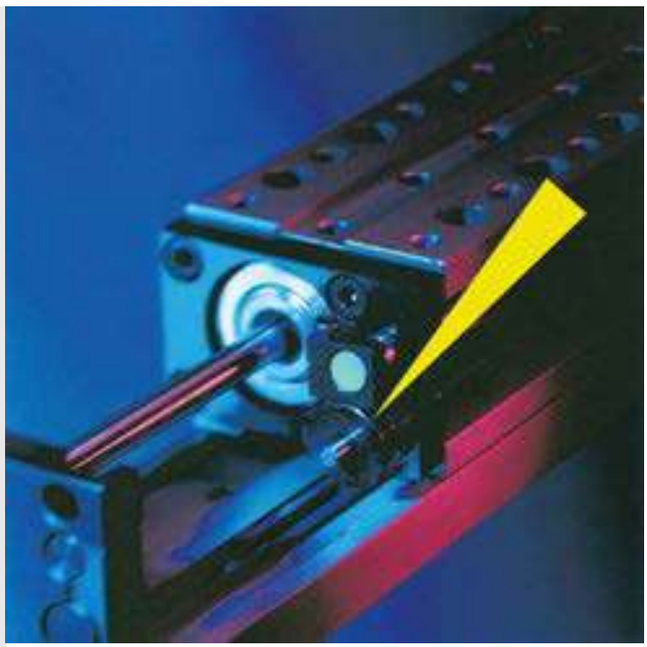
Application Examples

MC25

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 MC25H-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.





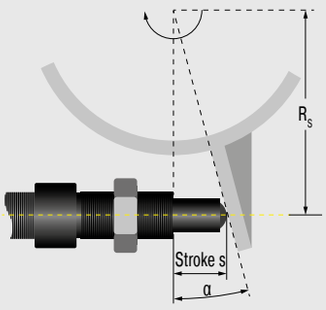
Miniature Shock Absorber in compact pneumatic module

MC225

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 MC225H2 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

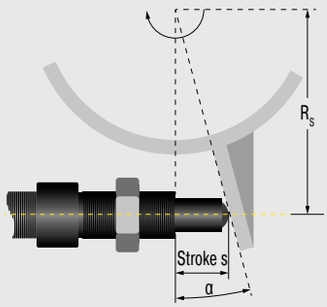


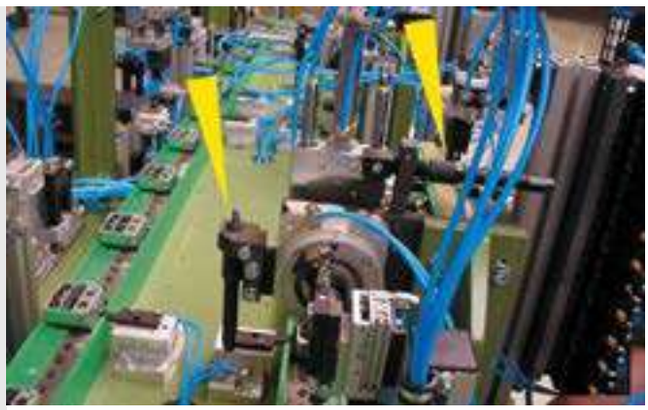
Issue 04.2018 – Specifications subject to change

SC190

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 SC190-1 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

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Industrial Shock Absorbers

Absorbers suited 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-sized damping technology.

Many innovations such as diaphragm accumulators, long life seals, hardened inner pressure chambers and make a decisive contribution towards extension of the service life. This means that the effective load range can be increased considerably, providing users with more scope with respect to the absorber size and greater utilization of the machine's output. ACE offers a wide range of matching accessories for all absorber series. This eliminates internal production of assembly parts which involves high costs and loss 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 56

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

MC33-V4A to MC64-V4A

Page 60

Self-Compensating, Stainless Steel
Optimum corrosion protection
Linear slides, Swivel units, Turntables, Food industry

MC33-HT to MC64-HT

Page 64

Self-Compensating
Extreme temperature and high cycle applications
Linear slides, Swivel units, Turntables, Machines and plants

MC33-LT to MC64-LT

Page 68

Self-Compensating
Extreme temperature and high cycle applications
Linear slides, Swivel units, Turntables, Machines and plants

SC33 to SC45

Page 72

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 76

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

SASL1 1/8

Page 80

Adjustable
Low velocity and high effective weight range
Linear slides, Pneumatic cylinders, Swivel units, Handling modules

SALD1/2 to SALD1 1/8

Page 82

Adjustable
High energy absorption and a wide effective weight range
Linear slides, Pneumatic cylinders, Swivel units, Handling modules

SALDN3/4

Page 86

Adjustable
High energy absorption and a wide effective weight range
Linear slides, Pneumatic cylinders, Swivel units, Handling modules

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MC33 to MC64

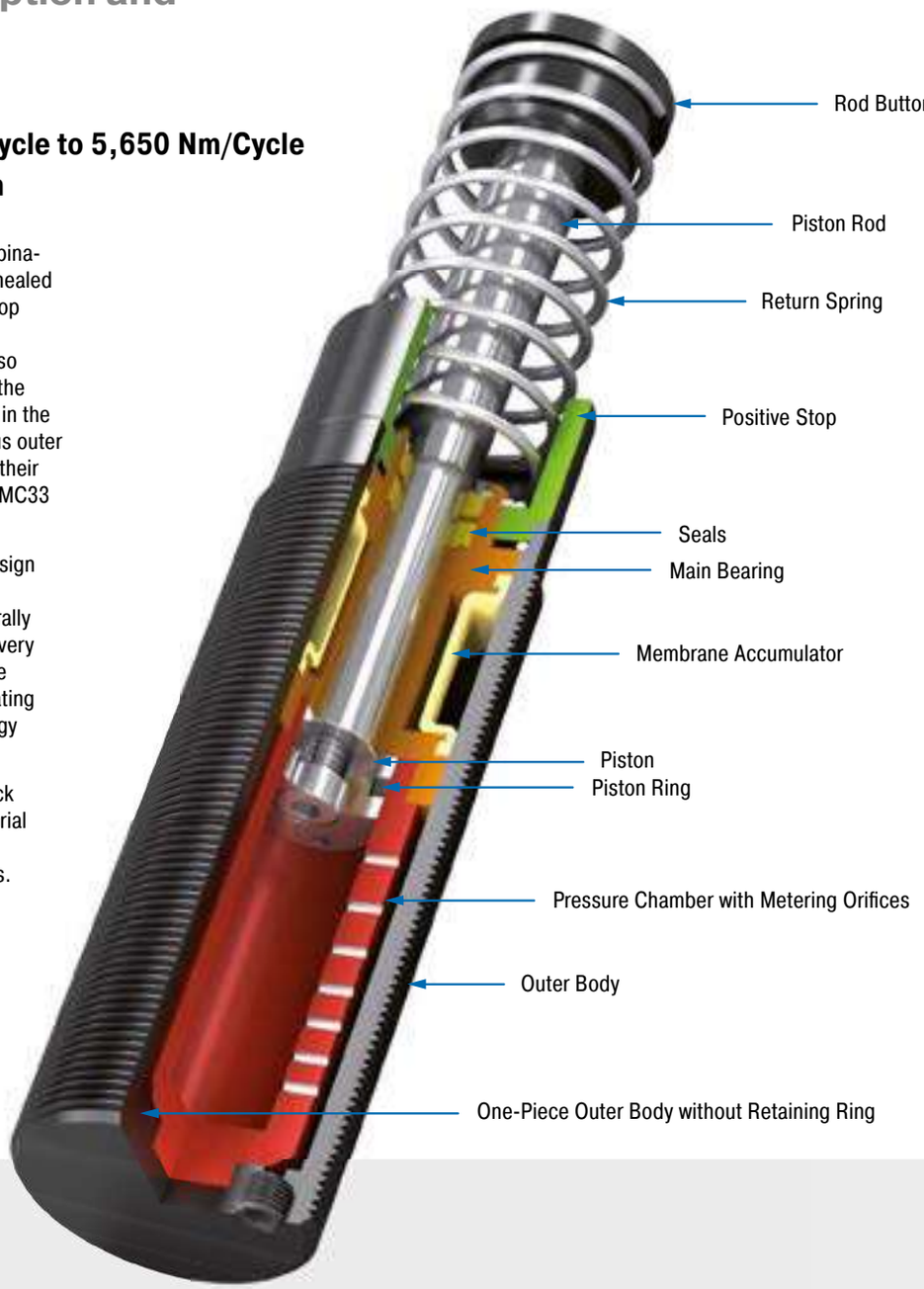
High energy absorption and robust design

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 positive 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. Self-compensating shock absorbers react to changing energy conditions, without adjustment.

These self-compensating industrial shock absorbers are used in all areas of industrial automation and machine 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 centers, Z-axes, Impact panels, Handling modules

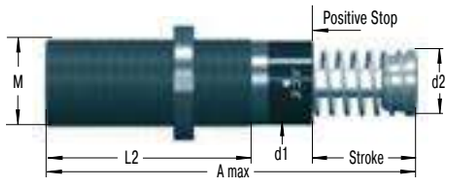
Note: A noise reduction of 3 dB to 7 dB is possible when using the special impact button. For emergency use only applications and for continous use (with additional cooling) it is sometimes possible to exceed the published max. capacity ratings. In this case, please consult ACE.

Safety information: 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.

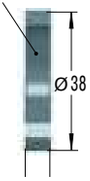
Issue 04.2018 – Specifications subject to change

MC33

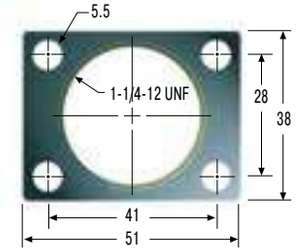


Product available for UNF and metric thread (for metric add suffix -M from part number)
M36x1.5 and M42x1.5 also available to order

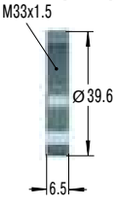
250-0038
Locking Ring
1-1/4-12 UNF



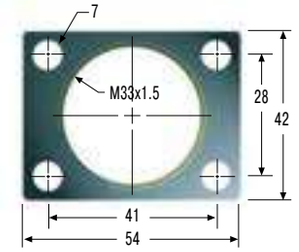
250-0016
Rectangular Flange



250-0292
Locking Ring
M33x1.5



250-0293
Rectangular 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 **MC3325M-1**

Self-Compensating
33 for 1-1/4-12 UNF or M33 threads
Stroke 0.98" (25 mm)
Metric Thread
(omitted when using thread UNF 1 1/4-12)
Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC3325	23.2	138	30	25	83	1-1/4-12 UNF / M33x1.5
MC3350	48.6	189	30	25	108	1-1/4-12 UNF / M33x1.5

Performance

	Max. Energy Capacity				Effective Weight							
TYPES	[1] E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	E_4 with Oil Recirculation Nm/h	[2] We min. kg	[2] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MC3325-0	170	75,000	124,000	169,000	3	11	-0	45	90	0.03	4	0.51
MC3325-1	170	75,000	124,000	169,000	9	40	-1	45	90	0.03	4	0.51
MC3325-2	170	75,000	124,000	169,000	30	120	-2	45	90	0.03	4	0.51
MC3325-3	170	75,000	124,000	169,000	100	420	-3	45	90	0.03	4	0.51
MC3325-4	170	75,000	124,000	169,000	350	1,420	-4	45	90	0.03	4	0.51
MC3350-0	330	85,000	135,000	180,000	5	22	-0	45	135	0.06	3	0.63
MC3350-1	330	85,000	135,000	180,000	18	70	-1	45	135	0.06	3	0.63
MC3350-2	330	85,000	135,000	180,000	60	250	-2	45	135	0.06	3	0.63
MC3350-3	330	85,000	135,000	180,000	210	840	-3	45	135	0.06	3	0.63
MC3350-4	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 please contact ACE.

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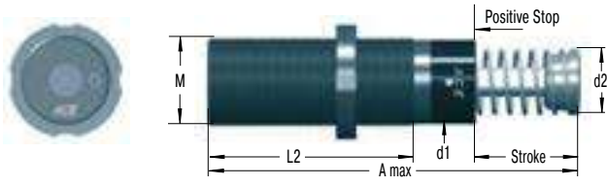
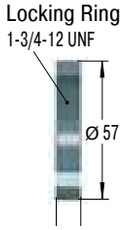
Products for UNF and metric thread available

MC45

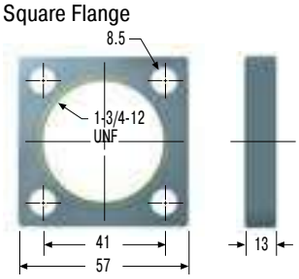


Product available for UNF and metric thread (for metric add suffix -M from part number)

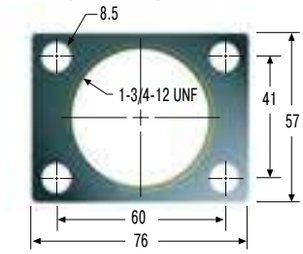
250-0041
Locking Ring



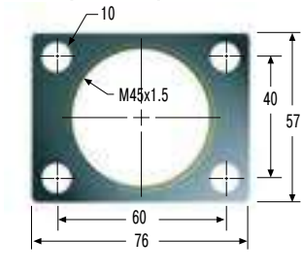
250-0023
Square Flange



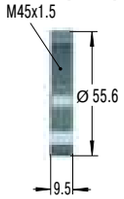
250-0024
Rectangular Flange



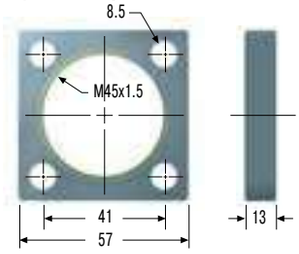
250-0299
Rectangular Flange



250-0297
Locking Ring



250-0298
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 **MC4525M-1**

Self-Compensating
45 for 1-3/4-12 UNF or M45 threads
Stroke 0.98" (25 mm)
Metric Thread
(omitted when using thread UNF 1-3/4-12)
Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC4525	23.1	145	42	35	95	1-3/4-12 UNF / M45x1.5
MC4550	48.5	195	42	35	120	1-3/4-12 UNF / M45x1.5
MC4575	73.9	246	42	35	145	1-3/4-12 UNF / M45x1.5

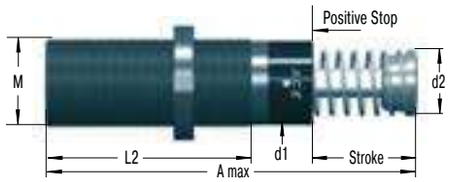
Performance

	Max. Energy Capacity				Effective Weight							
TYPES	[1] E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	E_4 with Oil Recirculation Nm/h	[2] We min. kg	[2] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MC4525-0	370	107,000	158,000	192,000	7	27	-0	70	100	0.03	4	1.13
MC4525-1	370	107,000	158,000	192,000	20	90	-1	70	100	0.03	4	1.13
MC4525-2	370	107,000	158,000	192,000	80	310	-2	70	100	0.03	4	1.13
MC4525-3	370	107,000	158,000	192,000	260	1,050	-3	70	100	0.03	4	1.13
MC4525-4	370	107,000	158,000	192,000	890	3,540	-4	70	100	0.03	4	1.13
MC4550-0	740	112,000	192,000	248,000	13	54	-0	70	145	0.08	3	1.36
MC4550-1	740	112,000	192,000	248,000	45	180	-1	70	145	0.08	3	1.36
MC4550-2	740	112,000	192,000	248,000	150	620	-2	70	145	0.08	3	1.36
MC4550-3	740	112,000	192,000	248,000	520	2,090	-3	70	145	0.08	3	1.36
MC4550-4	740	112,000	192,000	248,000	1,800	7,100	-4	70	145	0.08	3	1.36
MC4575-0	1,130	146,000	225,000	282,000	20	80	-0	50	180	0.11	2	1.59
MC4575-1	1,130	146,000	225,000	282,000	70	270	-1	50	180	0.11	2	1.59
MC4575-2	1,130	146,000	225,000	282,000	230	930	-2	50	180	0.11	2	1.59
MC4575-3	1,130	146,000	225,000	282,000	790	3,140	-3	50	180	0.11	2	1.59
MC4575-4	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 please contact ACE.

Issue 04.2018 – Specifications subject to change

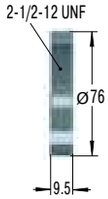
MC64



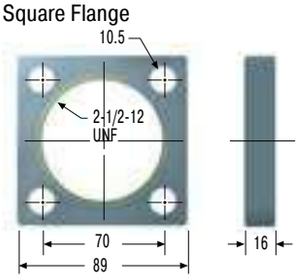
Product available for UNF and metric thread (for metric add suffix -M from part number) 150 mm stroke model does not include stop collar.

Positive stop is provided by the rod button (Ø 60 mm) and a stop block.

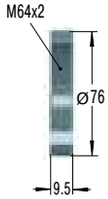
250-0042
Locking Ring



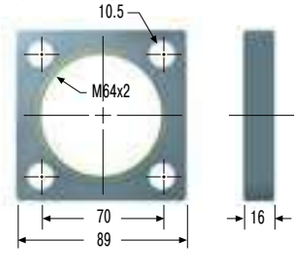
250-0028
Square Flange



250-0301
Locking Ring



250-0302
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 **MC6450M-1**

Self-Compensating
64 for 2-1/2-12 UNF or M64 threads
Stroke 0.97" (50 mm)
Metric Thread
(omitted when using thread UNF 2-1/2-12)
Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC6450	48.6	225	60	48	140	2-1/2-12 UNF / M64x2
MC64100	99.4	326	60	48	191	2-1/2-12 UNF / M64x2
MC64150	150	450	60	48	241	2-1/2-12 UNF / M64x2

Performance

	Max. Energy Capacity				Effective Weight							
TYPES	[1] E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	E_4 with Oil Recirculation Nm/h	[2] We min. kg	[2] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MC6450-0	1,870	146,000	293,000	384,000	35	140	-0	90	155	0.12	4	2.90
MC6450-1	1,870	146,000	293,000	384,000	140	540	-1	90	155	0.12	4	2.90
MC6450-2	1,870	146,000	293,000	384,000	460	1,850	-2	90	155	0.12	4	2.90
MC6450-3	1,870	146,000	293,000	384,000	1,600	6,300	-3	90	155	0.12	4	2.90
MC6450-4	1,870	146,000	293,000	384,000	5,300	21,200	-4	90	155	0.12	4	2.90
MC64100-0	3,730	192,000	384,000	497,000	70	280	-0	105	270	0.34	3	3.70
MC64100-1	3,730	192,000	384,000	497,000	270	1,100	-1	105	270	0.34	3	3.70
MC64100-2	3,730	192,000	384,000	497,000	930	3,700	-2	105	270	0.34	3	3.70
MC64100-3	3,730	192,000	384,000	497,000	3,150	12,600	-3	105	270	0.34	3	3.70
MC64100-4	3,730	192,000	384,000	497,000	10,600	42,500	-4	105	270	0.34	3	3.70
MC64150-0	5,650	248,000	497,000	644,000	100	460	-0	75	365	0.48	2	5.10
MC64150-1	5,650	248,000	497,000	644,000	140	1,640	-1	75	365	0.48	2	5.10
MC64150-2	5,650	248,000	497,000	644,000	1,390	5,600	-2	75	365	0.48	2	5.10
MC64150-3	5,650	248,000	497,000	644,000	4,700	18,800	-3	75	365	0.48	2	5.10
MC64150-4	5,650	248,000	497,000	644,000	16,000	63,700	-4	75	365	0.48	2	5.10

[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 please contact ACE.

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MC33-V4A to MC64-V4A

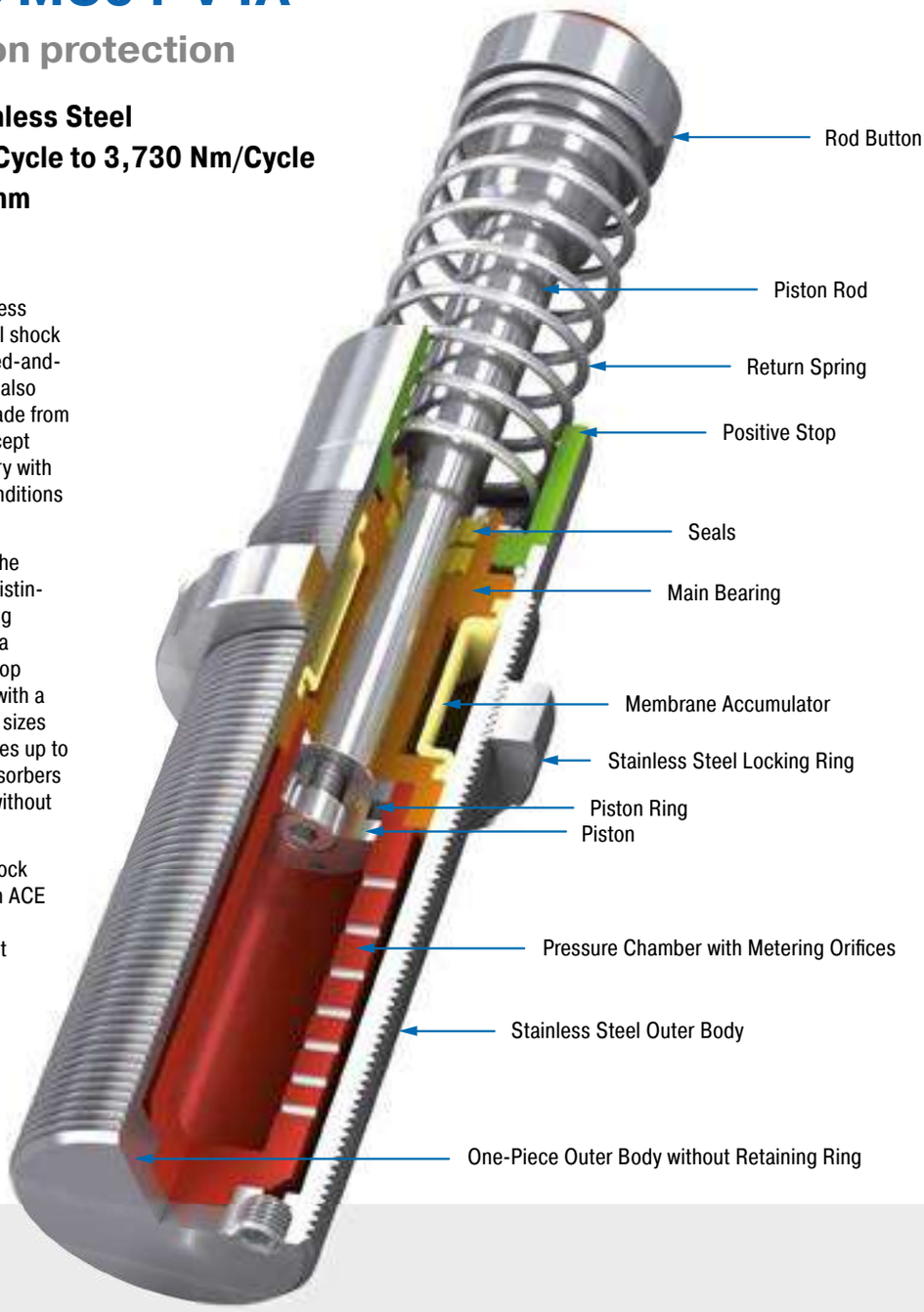
Optimum corrosion protection

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 AISI 316L (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 PUR head, they are available in thread sizes M33x1.5 to M64x2 with damping strokes up to 100 mm. Self-compensating shock absorbers react to changing energy conditions, without adjustment.

These self-compensating industrial shock absorbers made of stainless steel from ACE are mainly used in the food, medical, electronics 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 centers, Z-axes

Note: Impact button 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 information: 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 04.2018 – Specifications subject to change

MC33M-V4A

250-0048
Locking Ring

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 **MC3325M-2-V4A**

Self-Compensating
Thread Size M33
Stroke 0.98" (25 mm)
Effective Weight Range Version
Stainless Steel 1.4404/AISI 316L

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L1 mm	L2 mm	M
MC3325M-V4A	23.2	151.2	30	29.2	13.2	83	M33x1.5
MC3350M-V4A	48.6	202.2	30	29.2	13.2	108	M33x1.5

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	E_3 Nm/cycle	E_4 Nm/h	[1] We min. kg	[1] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
MC3325M-0-V4A	170	75,000	3	11	-0	45	90	0.03	4	0.51
MC3325M-1-V4A	170	75,000	9	40	-1	45	90	0.03	4	0.51
MC3325M-2-V4A	170	75,000	30	120	-2	45	90	0.03	4	0.51
MC3325M-3-V4A	170	75,000	100	420	-3	45	90	0.03	4	0.51
MC3325M-4-V4A	170	75,000	350	1,420	-4	45	90	0.03	4	0.51
MC3350M-0-V4A	330	85,000	5	22	-0	45	135	0.06	3	0.63
MC3350M-1-V4A	330	85,000	18	70	-1	45	135	0.06	3	0.63
MC3350M-2-V4A	330	85,000	60	250	-2	45	135	0.06	3	0.63
MC3350M-3-V4A	330	85,000	240	840	-3	45	135	0.06	3	0.63
MC3350M-4-V4A	330	85,000	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] For applications with higher side load angles please contact ACE.

Industrial Shock Absorbers MC45M-V4A

Self-Compensating, Stainless Steel

MC45M-V4A

250-0049
Locking Ring
M45x1.5

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 **MC4525M-2-V4A**

Self-Compensating
Thread Size M45
Stroke 0.98" (25 mm)
Effective Weight Range Version
Stainless Steel 1.4404/AISI 316L

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L1 mm	L2 mm	M
MC4525M-V4A	23.1	164.5	42	42	19.4	95	M45x1.5
MC4550M-V4A	48.5	214.4	42	42	19.4	120	M45x1.5
MC4575M-V4A	73.9	265.4	42	42	19.4	145	M45x1.5

Performance

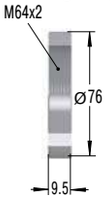
	Max. Energy Capacity		Effective Weight							
TYPES	E_3 Nm/cycle	E_4 Nm/h	[1] We min. kg	[1] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
MC4525M-0-V4A	370	107,000	7	27	-0	70	100	0.03	4	1.14
MC4525M-1-V4A	370	107,000	20	90	-1	70	100	0.03	4	1.14
MC4525M-2-V4A	370	107,000	80	310	-2	70	100	0.03	4	1.14
MC4525M-3-V4A	370	107,000	260	1,050	-3	70	100	0.03	4	1.14
MC4525M-4-V4A	370	107,000	890	3,540	-4	70	100	0.03	4	1.14
MC4550M-0-V4A	740	112,000	13	54	-0	70	145	0.08	3	1.36
MC4550M-1-V4A	740	112,000	45	180	-1	70	145	0.08	3	1.36
MC4550M-2-V4A	740	112,000	150	620	-2	70	145	0.08	3	1.36
MC4550M-3-V4A	740	112,000	520	2,090	-3	70	145	0.08	3	1.36
MC4550M-4-V4A	740	112,000	1,800	7,100	-4	70	145	0.08	3	1.36
MC4575M-0-V4A	1,130	146,000	20	80	-0	50	180	0.11	2	1.59
MC4575M-1-V4A	1,130	146,000	70	270	-1	50	180	0.11	2	1.59
MC4575M-2-V4A	1,130	146,000	230	930	-2	50	180	0.11	2	1.59
MC4575M-3-V4A	1,130	146,000	790	3,140	-3	50	180	0.11	2	1.59
MC4575M-4-V4A	1,130	146,000	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] For applications with higher side load angles please contact ACE.

Issue 04.2018 – Specifications subject to change

MC64M-V4A

250-0179
Locking Ring



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 **MC6450M-2-V4A**

Self-Compensating
Thread Size M64
Stroke 0.97" (50 mm)
Effective Weight Range Version
Stainless Steel 1.4404/AISI 316L

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L1 mm	L2 mm	M
MC6450M-V4A	48.6	244.1	60	60	19.1	140	M64x2
MC64100M-V4A	99.4	345.1	60	60	19.1	191	M64x2

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	E_3 Nm/cycle	E_4 Nm/h	[1] We min. kg	[1] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
MC6450M-0-V4A	1,870	146,000	35	140	-0	90	155	0.12	4	2.90
MC6450M-1-V4A	1,870	146,000	140	540	-1	90	155	0.12	4	2.90
MC6450M-2-V4A	1,870	146,000	460	1,850	-2	90	155	0.12	4	2.90
MC6450M-3-V4A	1,870	146,000	1,600	6,300	-3	90	155	0.12	4	2.90
MC6450M-4-V4A	1,870	146,000	5,300	21,200	-4	90	155	0.12	4	2.90
MC64100M-0-V4A	3,730	192,000	70	280	-0	105	270	0.34	3	3.70
MC64100M-1-V4A	3,730	192,000	270	1,100	-1	105	270	0.34	3	3.70
MC64100M-2-V4A	3,730	192,000	930	3,700	-2	105	270	0.34	3	3.70
MC64100M-3-V4A	3,730	192,000	3,150	12,600	-3	105	270	0.34	3	3.70
MC64100M-4-V4A	3,730	192,000	10,600	42,500	-4	105	270	0.34	3	3.70

[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 please contact ACE.

Products for UNF and metric thread available

MC33-HT to MC64-HT

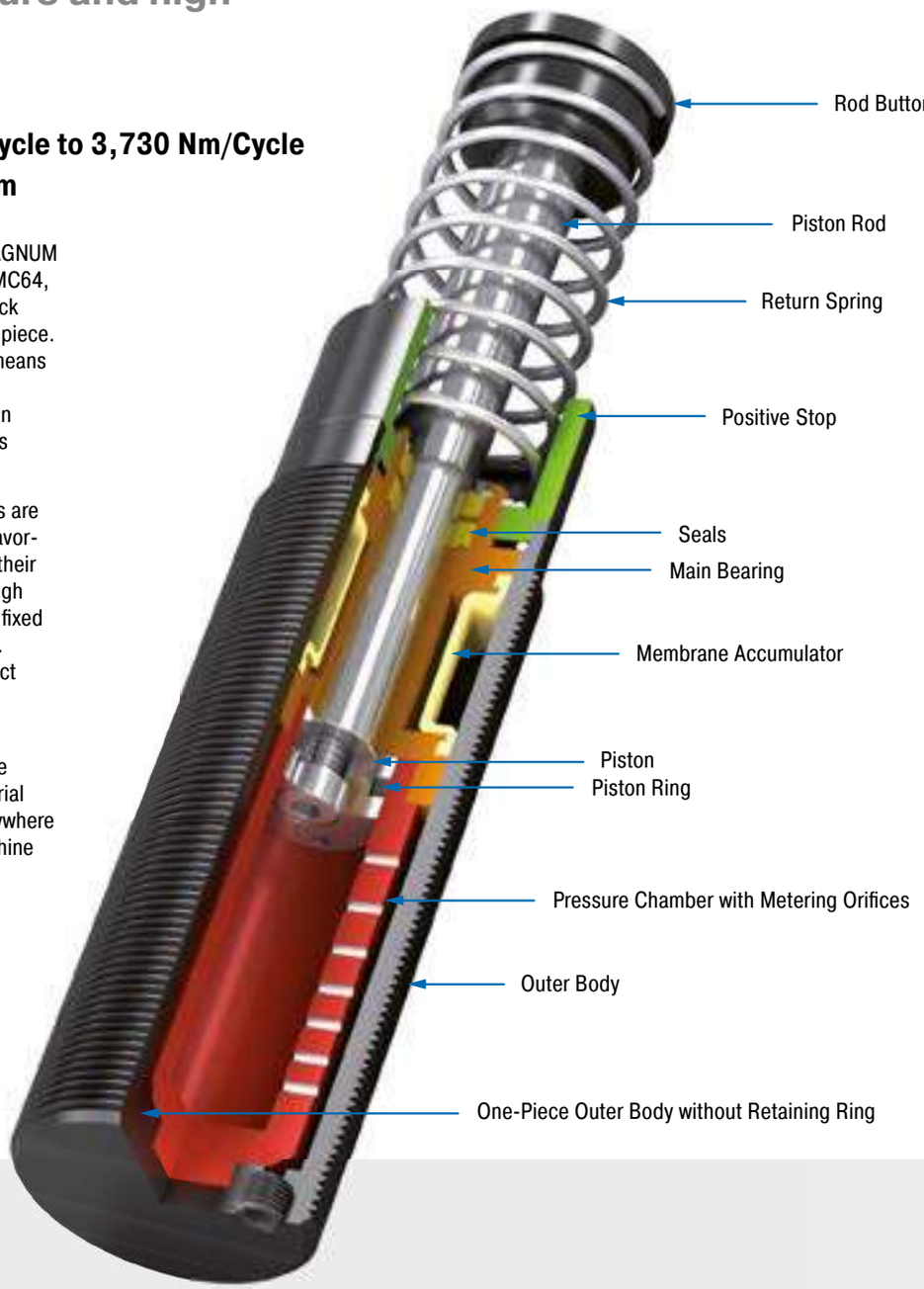
Extreme temperature and high cycle applications

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

Greater application range: 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 use 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 absorb 100 % of the kinetic energy.

These ready-to-install machine elements are recommended even under the most unfavorable conditions. Additional benefits are their robust, innovative sealing technology, high energy absorption in a compact design, fixed positive stop and a wide damping range. Self-compensating shock absorbers react to changing energy conditions, without adjustment.

Designed for use in extreme temperature ranges, these self-compensating industrial shock absorbers are suitable almost anywhere in plant, industrial, automation and machine 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 centers, Z-axes

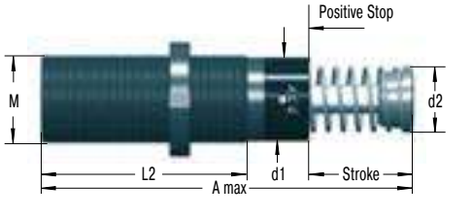
Note: A noise reduction of 3 dB to 7 dB is possible when using the special impact button.

Safety information: 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.

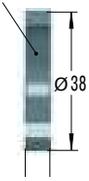
Issue 04.2018 – Specifications subject to change

MC33-HT

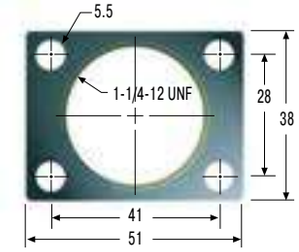


Product available for UNF and metric thread (for metric add suffix -M from part number)
M33x1.5, M36x1.5 and M42x1.5 also available to order

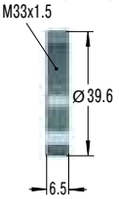
250-0038
Locking Ring
1-1/4-12 UNF



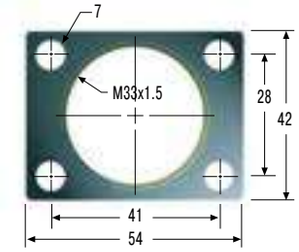
250-0016
Rectangular Flange



250-0292
Locking Ring
M33x1.5



250-0293
Rectangular Flange



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 **MC3350M-2-HT**

Self-Compensating
33 for 1-1/4-12 UNF or M33 threads
Stroke 1.97" (50 mm)
Metric Thread
(omitted when using thread UNF 1-1/4-12)
Effective Weight Range Version
HT = Version for High Temperature Use

Dimensions

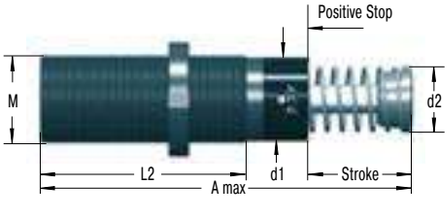
TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC3325-HT	23.2	138	30	25	83	1-1/4-12 UNF / M33x1.5
MC3350-HT	48.6	189	30	25	108	1-1/4-12 UNF / M33x1.5

Performance

	Max. Energy Capacity			Effective Weight				
TYPES	E_3 Nm/cycle	E_4 at 20 °C Nm/h	E_4 at 100 °C Nm/h	[1] We min. kg	[1] We max. kg	Hardness	[2] Side Load Angle max. °	Weight kg
MC3325-0-HT	170	215,000	82,000	3	11	-0	4	0.51
MC3325-1-HT	170	215,000	82,000	9	40	-1	4	0.51
MC3325-2-HT	170	215,000	82,000	30	120	-2	4	0.51
MC3325-3-HT	170	215,000	82,000	100	420	-3	4	0.51
MC3325-4-HT	170	215,000	82,000	350	1,420	-4	4	0.51
MC3350-0-HT	330	244,000	93,000	5	22	-0	3	0.63
MC3350-1-HT	330	244,000	93,000	18	70	-1	3	0.63
MC3350-2-HT	330	244,000	93,000	60	250	-2	3	0.63
MC3350-3-HT	330	244,000	93,000	240	840	-3	3	0.63
MC3350-4-HT	330	244,000	93,000	710	2,830	-4	3	0.63

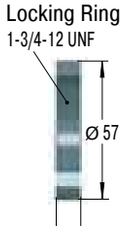
[1] The effective weight range limits can be raised or lowered to special order.
[2] For applications with higher side load angles please contact ACE.

MC45-HT

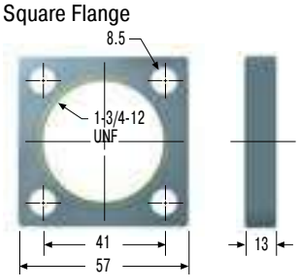


Product available for UNF and metric thread (for metric add suffix -M from part number)

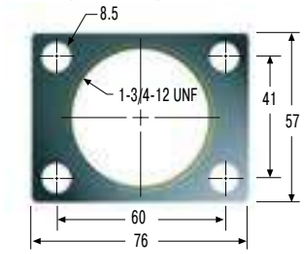
250-0041
Locking Ring



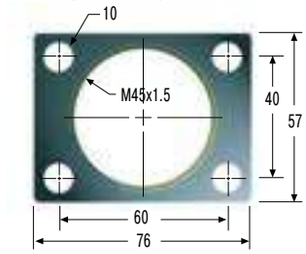
250-0023
Square Flange



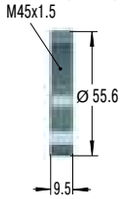
250-0024
Rectangular Flange



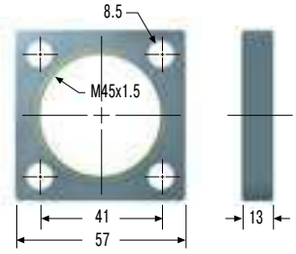
250-0299
Rectangular Flange



250-0297
Locking Ring



250-0298
Square Flange



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 **MC4525M-2-HT**

Self-Compensating
45 for 1-3/4-12 UNF or M45 threads
Stroke 0.91" (25 mm)
Metric Thread
(omitted when using thread UNF 1-3/4-12)
Effective Weight Range Version
HT = Version for High Temperature Use

Dimensions

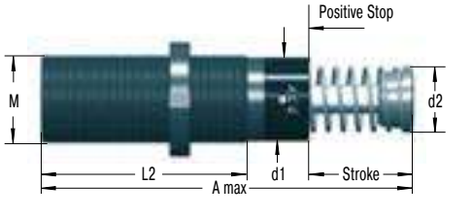
TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC4525-HT	23.1	151	42	35	95	1-3/4-12 UNF / M45x1.5
MC4550-HT	48.5	195	42	35	120	1-3/4-12 UNF / M45x1.5

Performance

	Max. Energy Capacity			Effective Weight				
TYPES	E_3 Nm/cycle	E_4 at 20 °C Nm/h	E_4 at 100 °C Nm/h	[1] We min. kg	[1] We max. kg	Hardness	[2] Side Load Angle max. °	Weight kg
MC4525-0-HT	370	307,000	117,000	7	27	-0	4	1.13
MC4525-1-HT	370	307,000	117,000	20	90	-1	4	1.13
MC4525-2-HT	370	307,000	117,000	80	310	-2	4	1.13
MC4525-3-HT	370	307,000	117,000	260	1,050	-3	4	1.13
MC4525-4-HT	370	307,000	117,000	890	3,540	-4	4	1.13
MC4550-0-HT	740	321,000	122,000	13	54	-0	3	1.36
MC4550-1-HT	740	321,000	122,000	45	180	-1	3	1.36
MC4550-2-HT	740	321,000	122,000	154	620	-2	3	1.36
MC4550-3-HT	740	321,000	122,000	522	2,090	-3	3	1.36
MC4550-4-HT	740	321,000	122,000	1,800	7,100	-4	3	1.36

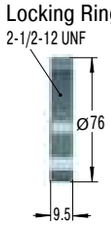
[1] The effective weight range limits can be raised or lowered to special order.
[2] For applications with higher side load angles please contact ACE.

MC64-HT

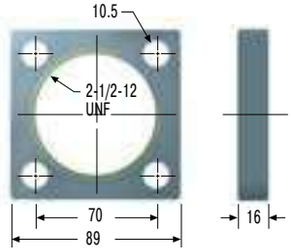


Product available for UNF and metric thread (for metric add suffix -M from part number)

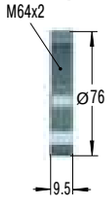
250-0042
Locking Ring



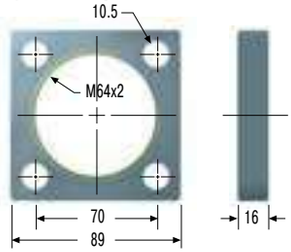
250-0028
Square Flange



250-0301
Locking Ring



250-0302
Square Flange



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 **MC6450M-2-HT**

Self-Compensating
64 for 2-1/2-12 UNF or M64 threads
Stroke 1.91" (50 mm)
Metric Thread
(omitted when using thread UNF 2-1/2-12)
Effective Weight Range Version
HT = Version for High Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC6450-HT	48.6	225	60	48	140	2-1/2-12 UNF / M64x2
MC64100-HT	99.4	326	60	48	191	2-1/2-12 UNF / M64x2

Performance

	Max. Energy Capacity			Effective Weight				
TYPES	E_3 Nm/cycle	E_4 at 20 °C Nm/h	E_4 at 100 °C Nm/h	[1] We min. kg	[1] We max. kg	Hardness	[2] Side Load Angle max. °	Weight kg
MC6450-0-HT	1,870	419,000	159,000	35	140	-0	4	2.90
MC6450-1-HT	1,870	419,000	159,000	140	540	-1	4	2.90
MC6450-2-HT	1,870	419,000	159,000	460	1,850	-2	4	2.90
MC6450-3-HT	1,870	419,000	159,000	1,600	6,300	-3	4	2.90
MC6450-4-HT	1,870	419,000	159,000	5,300	21,200	-4	4	2.90
MC64100-0-HT	3,730	550,000	200,000	70	280	-0	3	3.70
MC64100-1-HT	3,730	550,000	200,000	270	1,100	-1	3	3.70
MC64100-2-HT	3,730	550,000	200,000	930	3,700	-2	3	3.70
MC64100-3-HT	3,730	550,000	200,000	3,150	12,600	-3	3	3.70
MC64100-4-HT	3,730	550,000	200,000	10,600	42,500	-4	3	3.70

[1] The effective weight range limits can be raised or lowered to special order.
[2] For applications with higher side load angles please contact ACE.

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Products for UNF and metric thread available

MC33-LT to MC64-LT

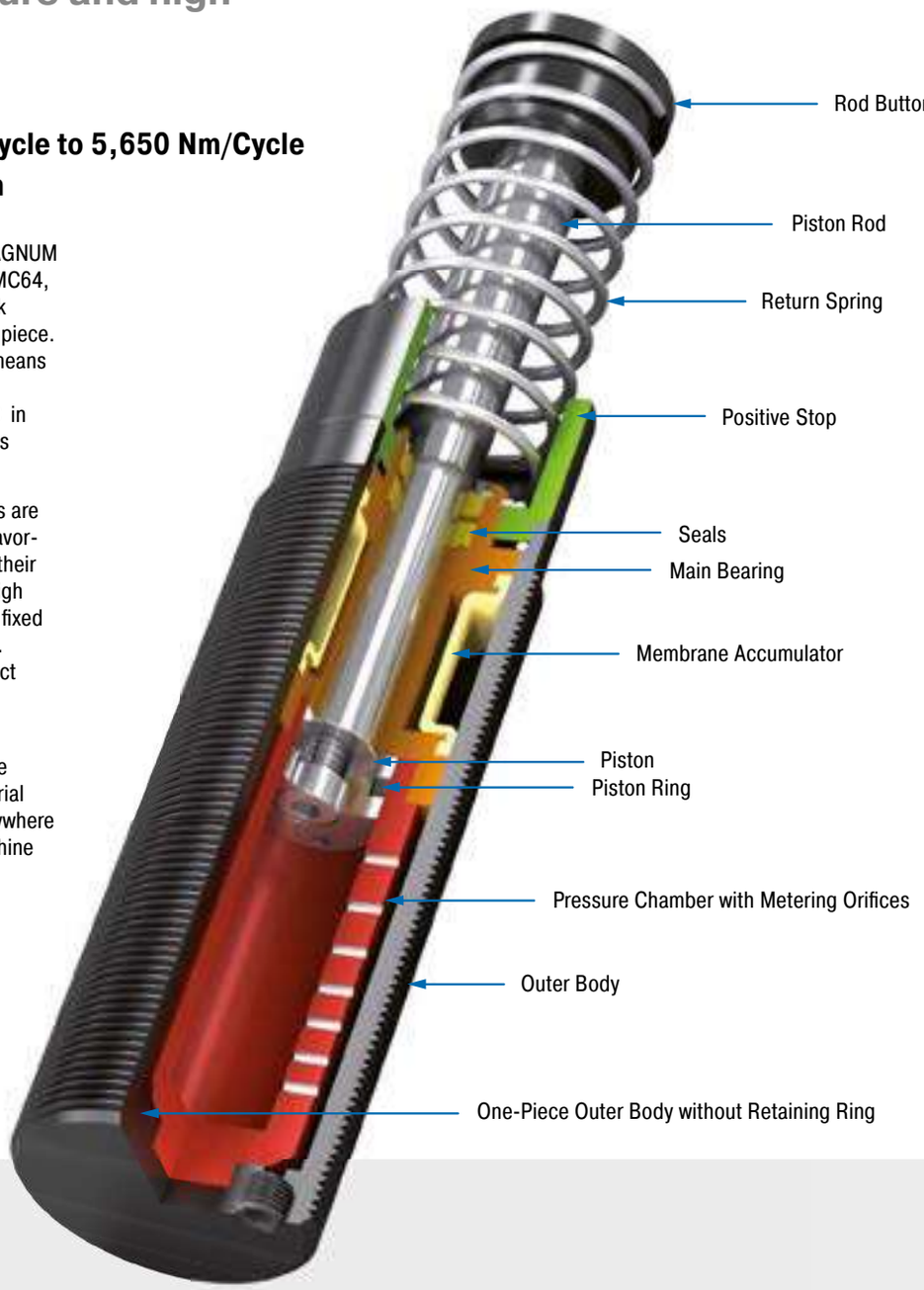
Extreme temperature and high cycle applications

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

Greater application range: 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 use 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 absorb 100 % of the kinetic energy.

These ready-to-install machine elements are recommended even under the most unfavorable conditions. Additional benefits are their robust, innovative sealing technology, high energy absorption in a compact design, fixed positive stop and a wide damping range. Self-compensating shock absorbers react to changing energy conditions, without adjustment.

Designed for use in extreme temperature ranges, these self-compensating industrial shock absorbers are suitable almost anywhere in plant, industrial, automation and machine 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 centers, Z-axes

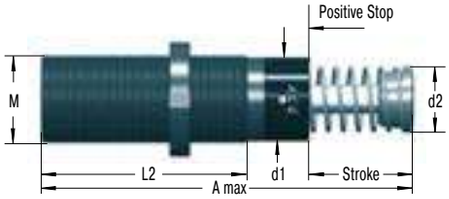
Note: A noise reduction of 3 dB to 7 dB is possible when using the special impact button.

Safety information: 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.

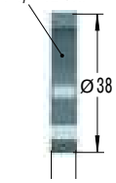
Issue 04.2018 – Specifications subject to change

MC33-LT

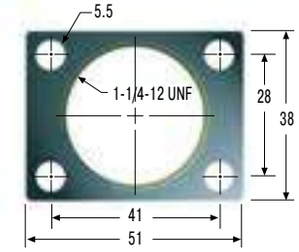


Product available for UNF and metric thread (for metric add suffix -M from part number)
M33x1.5, M36x1.5 and M42x1.5 also available to order

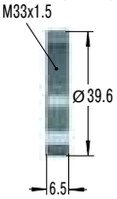
250-0038
Locking Ring
1-1/4-12 UNF



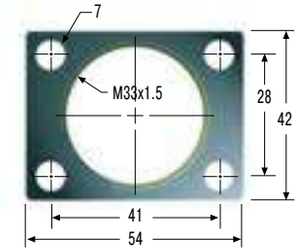
250-0016
Rectangular Flange



250-0292
Locking Ring
M33x1.5



250-0293
Rectangular Flange



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 **MC3325M-3-LT**

Self-Compensating
33 for 1-1/4-12 UNF or M33 threads
Stroke 0.91" (25 mm)
Metric Thread
(omitted when using thread UNF 1-1/4-12)
Effective Weight Range Version
LT = Version for High Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC3325-LT	23.2	138	30	25	83	1-1/4-12 UNF / M33x1.5
MC3350-LT	48.6	189	30	25	108	1-1/4-12 UNF / M33x1.5

Performance

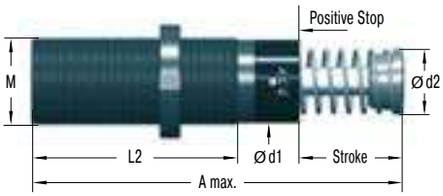
	Max. Energy Capacity		Effective Weight					
TYPES	E_3 Nm/cycle	E_4 Nm/h	[1] We min. kg	[1] We max. kg	Hardness	[2] Return Time s	[3] Side Load Angle max. °	Weight kg
MC3325-0-LT	170	75,000	3	11	-0	0.08	4	0.51
MC3325-1-LT	170	75,000	9	40	-1	0.08	4	0.51
MC3325-2-LT	170	75,000	30	120	-2	0.08	4	0.51
MC3325-3-LT	170	75,000	100	420	-3	0.08	4	0.51
MC3325-4-LT	170	75,000	350	1,420	-4	0.08	4	0.51
MC3350-0-LT	330	85,000	5	22	-0	0.16	3	0.63
MC3350-1-LT	330	85,000	18	70	-1	0.16	3	0.63
MC3350-2-LT	330	85,000	60	250	-2	0.16	3	0.63
MC3350-3-LT	330	85,000	240	840	-3	0.16	3	0.63
MC3350-4-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 please contact ACE.

Products for UNF and metric thread available

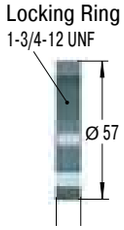
ACE

MC45-LT

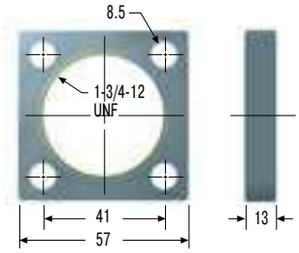


Product available for UNF and metric thread (for metric add suffix -M from part number)

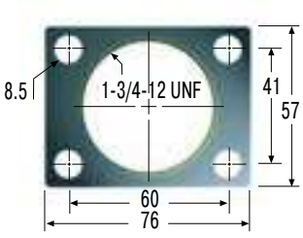
250-0041
Locking Ring



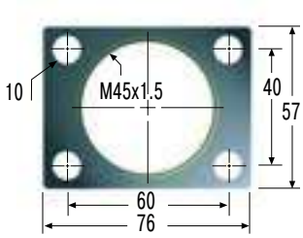
250-0023
Square Flange



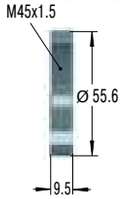
250-0024
Rectangular Flange



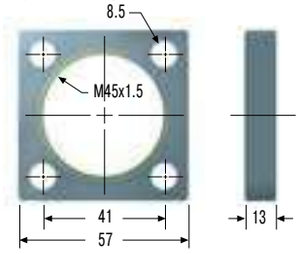
250-0299
Rectangular Flange



250-0297
Locking Ring



250-0298
Square Flange



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 **MC4525M-3-LT**

Self-Compensating
45 for 1-3/4-12 UNF or M45 threads
Stroke 0.91" (25 mm)
Metric Thread
(omitted when using thread UNF 1-3/4-12)
Effective Weight Range Version
LT = Version for High Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC4525-LT	23.1	151	42	35	95	1-3/4-12 UNF / M45x1.5
MC4550-LT	48.5	195	42	35	120	1-3/4-12 UNF / M45x1.5
MC4575-LT	73.9	246	42	35	145	1-3/4-12 UNF / M45x1.5

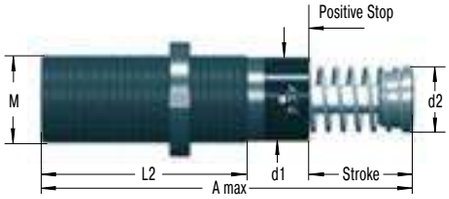
Performance

	Max. Energy Capacity		Effective Weight					
TYPES	E_3 Nm/cycle	E_4 Nm/h	[1] We min. kg	[1] We max. kg	Hardness	[2] Return Time s	[3] Side Load Angle max. °	Weight kg
MC4525-0-LT	370	107,000	7	27	-0	0.08	4	1.13
MC4525-1-LT	370	107,000	20	90	-1	0.08	4	1.13
MC4525-2-LT	370	107,000	80	310	-2	0.08	4	1.13
MC4525-3-LT	370	107,000	260	1,050	-3	0.08	4	1.13
MC4525-4-LT	370	107,000	890	3,540	-4	0.08	4	1.13
MC4550-0-LT	740	112,000	13	54	-0	0.16	3	1.36
MC4550-1-LT	740	112,000	45	180	-1	0.16	3	1.36
MC4550-2-LT	740	112,000	150	620	-2	0.16	3	1.36
MC4550-3-LT	740	112,000	520	2,090	-3	0.16	3	1.36
MC4550-4-LT	740	112,000	1,800	7,100	-4	0.16	3	1.36
MC4575-0-LT	1,130	146,000	20	80	-0	0.24	2	1.59
MC4575-1-LT	1,130	146,000	70	270	-1	0.24	2	1.59
MC4575-2-LT	1,130	146,000	230	930	-2	0.24	2	1.59
MC4575-3-LT	1,130	146,000	790	3,140	-3	0.24	2	1.59
MC4575-4-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 please contact ACE.

Issue 04.2018 – Specifications subject to change

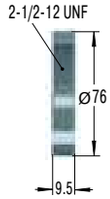
MC64-LT



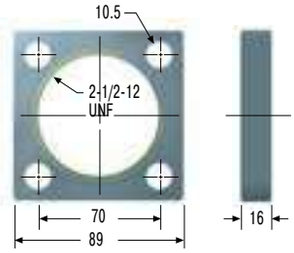
Product available for UNF and metric thread (for metric add suffix -M from part number) 150 mm stroke model does not include stop collar.

Positive stop is provided by the rod button (Ø 60 mm) and a stop block.

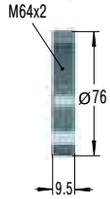
250-0042
Locking Ring



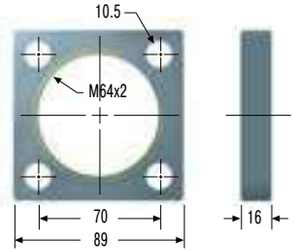
250-0028
Square Flange



250-0301
Locking Ring



250-0302
Square Flange



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 **MC6450M-3-LT**

Self-Compensating
64 for 2-1/2-12 UNF or M64 threads
Stroke 1.91" (50 mm)
Metric Thread
(omitted when using thread UNF 2-1/2-12)
Effective Weight Range Version
LT = Version for High Temperature Use

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MC6450-LT	48.6	225	60	48	140	2-1/2-12 UNF / M64x2
MC64100-LT	99.4	326	60	48	191	2-1/2-12 UNF / M64x2
MC64150-LT	150	450	60	48	241	2-1/2-12 UNF / M64x2

Performance

	Max. Energy Capacity		Effective Weight					
TYPES	E_3 Nm/cycle	E_4 Nm/h	[1] We min. kg	[1] We max. kg	Hardness	[2] Return Time s	[3] Side Load Angle max. °	Weight kg
MC6450-0-LT	1,870	146,000	35	140	-0	0.24	4	2.90
MC6450-1-LT	1,870	146,000	140	540	-1	0.24	4	2.90
MC6450-2-LT	1,870	146,000	460	1,850	-2	0.24	4	2.90
MC6450-3-LT	1,870	146,000	1,600	6,300	-3	0.24	4	2.90
MC6450-4-LT	1,870	146,000	5,300	21,200	-4	0.24	4	2.90
MC64100-0-LT	3,730	192,000	70	280	-0	0.68	3	3.70
MC64100-1-LT	3,730	192,000	270	1,100	-1	0.60	3	3.70
MC64100-2-LT	3,730	192,000	930	3,700	-2	0.68	3	3.70
MC64100-3-LT	3,730	192,000	3,150	12,600	-3	0.68	3	3.70
MC64100-4-LT	3,730	192,000	10,600	42,500	-4	0.68	3	3.70
MC64150-0-LT	5,650	248,000	100	460	-0	0.96	2	5.10
MC64150-1-LT	5,650	248,000	410	1,640	-1	0.96	2	5.10
MC64150-2-LT	5,650	248,000	1,390	5,600	-2	0.96	2	5.10
MC64150-3-LT	5,650	248,000	4,700	18,800	-3	0.96	2	5.10
MC64150-4-LT	5,650	248,000	16,000	63,700	-4	0.96	2	5.10

[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 please contact ACE.

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Products for UNF and metric thread available

SC33 to SC45

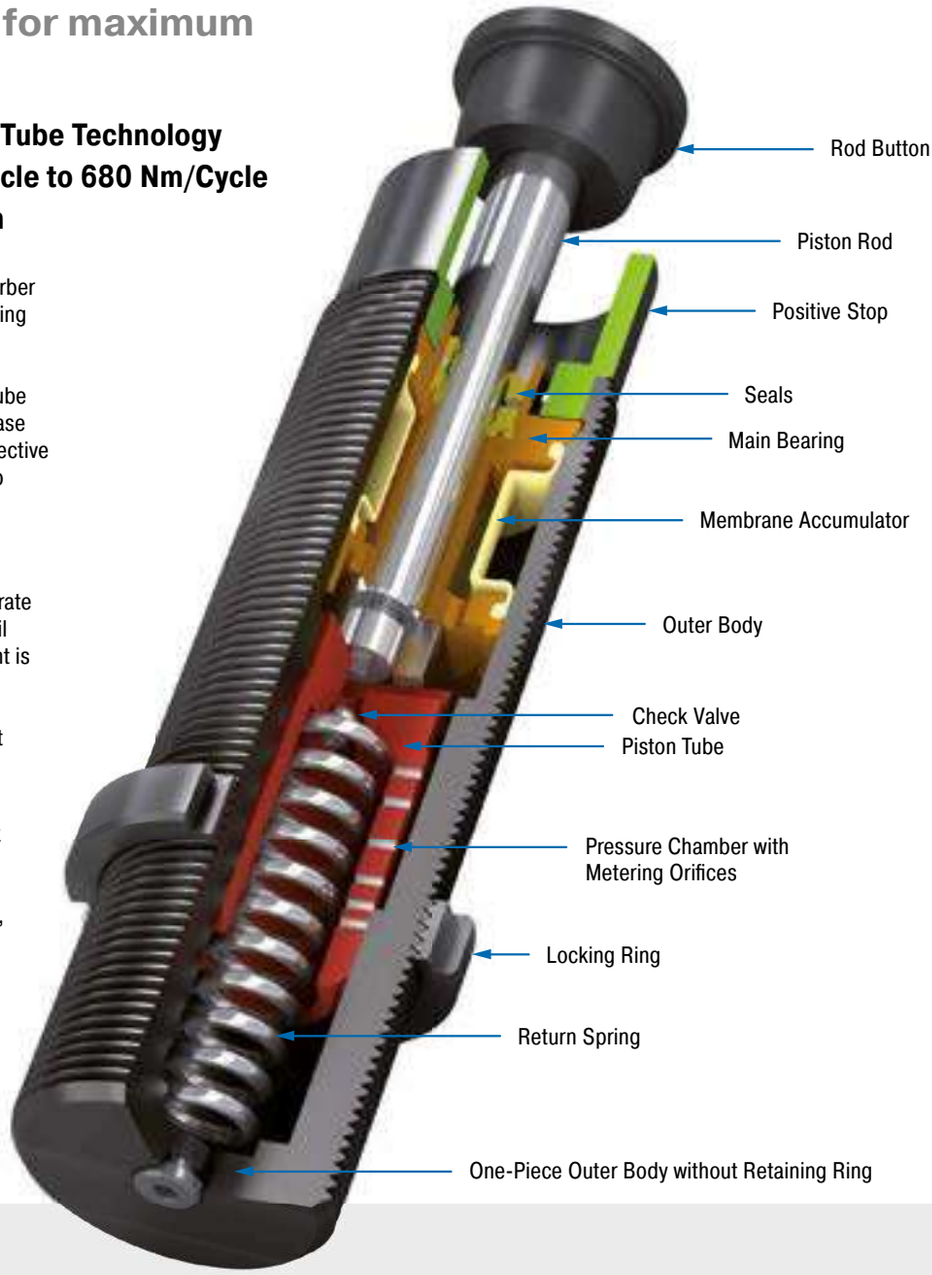
Piston tube design for maximum energy absorption

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 SC33 to SC45 absorber models are strong and durable by combining the proven sealing technology from the MAGNUM range including membrane accumulator with the well-known piston tube technology from the SC² family. We increase the oil volume to ensure the maximum effective weights. Short stroke lengths of 25 mm to 50mm (.98 in to 1.96 in) deliver shorter braking times in combination with high energy absorption.

These dampers safely and reliably decelerate rotary movements without unwanted recoil effects. Installation close to the pivot point is possible. ACE's generation of piston tube manage low impact speeds with ease. Self-compensating shock absorbers react to changing energy conditions, without adjustment.

These self-compensating industrial shock absorbers can be relied on in industrial, automation and machine engineering. They are used in pivot units, rotary tables, robot arms or integrated wherever decleration is needed.



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: Integrated

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 centers

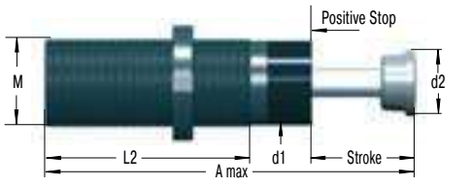
Note: A noise reduction of 3 dB to 7 dB is possible when using the special impact button.

Safety information: 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.

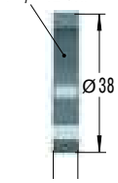
Issue 04.2018 – Specifications subject to change

SC33

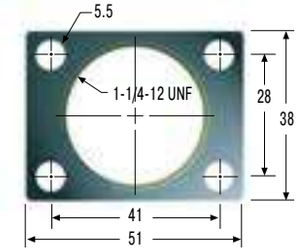


Product available for UNF and metric thread (for metric add suffix -M from part number)

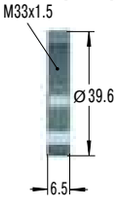
250-0038
Locking Ring
1-1/4-12 UNF



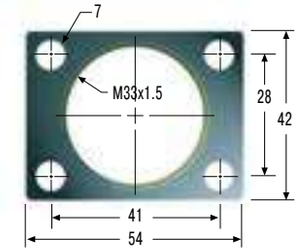
250-0016
Rectangular Flange



250-0292
Locking Ring
M33x1.5



250-0293
Rectangular Flange



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

Ordering Example **SC3325M-5**

Self-Compensating
33 for 1-1/4-12 UNF or M33 threads
Stroke 0.98" (25 mm)
Metric Thread
(omitted when using thread UNF 1 1/4-12)
Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
SC3325	23.2	178	30	25	122	1-1/4-12 UNF / M33x1.5
SC3350	48.6	254	30	25	173	1-1/4-12 UNF / M33x1.5

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	E_3 Nm/cycle	E_4 Nm/h	[1] We min. kg	[1] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
SC3325-5	155	75,000	1,360	2,721	-5	44	89	0.75	4	0.68
SC3325-6	155	75,000	2,500	5,443	-6	44	89	0.75	4	0.68
SC3325-7	155	75,000	4,989	8,935	-7	44	89	0.75	4	0.68
SC3325-8	155	75,000	8,618	13,607	-8	44	89	0.75	4	0.68
SC3350-5	310	85,000	2,721	4,990	-5	51	125	0.90	3	0.92
SC3350-6	310	85,000	4,536	9,980	-6	51	125	0.90	3	0.92

[1] The effective weight range limits can be raised or lowered to special order.
[2] For applications with higher side load angles please contact ACE.

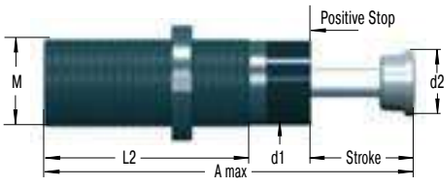
ACE Controls Inc. · 23425 Industrial Park Dr. Farmington · US-48335 Michigan · T +1 800-521-3320 · F +1 248-476-2470 · shocks@acecontrols.com · www.acecontrols.com

Industrial Shock Absorbers SC45

Self-Compensating, Piston Tube Technology

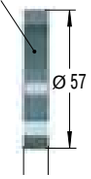
Products for UNF and metric thread available

SC45

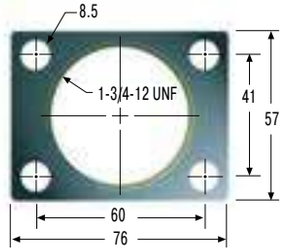


Product available for UNF and metric thread
(for metric add suffix -M from part number)

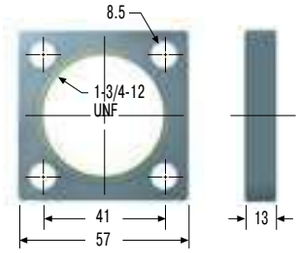
250-0041
Locking Ring
1-3/4-12 UNF



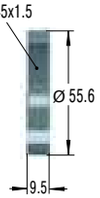
250-0024
Rectangular Flange



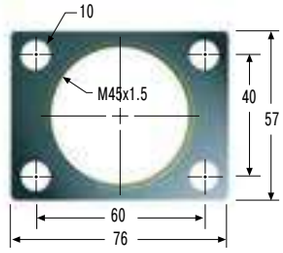
250-0023
Square Flange



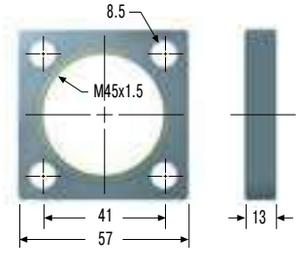
250-0297
Locking Ring
M45x1.5



250-0299
Rectangular Flange



250-0298
Square Flange



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

Ordering Example **SC4525M-5**

- Self-Compensating
- 45 for 1 3/4-12 UNF or M45 threads
- Stroke 0.98" (25 mm)
- Metric Thread
  (omitted when using thread UNF 1 3/4-12)
- Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
SC4525	23.1	189	42	35	139	1-3/4-12 UNF / M45x1.5
SC4550	48.5	265	42	35	190	1-3/4-12 UNF / M45x1.5

Performance

	Max. Energy Capacity		Effective Weight							
TYPES	E_3 Nm/cycle	E_4 Nm/h	[1] We min. kg	[1] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	[2] Side Load Angle max. °	Weight kg
SC4525-5	340	107,000	3,400	6,800	-5	67	104	0.8	4	1.43
SC4525-6	340	107,000	6,350	13,600	-6	67	104	0.8	4	1.43
SC4525-7	340	107,000	12,700	22,679	-7	67	104	0.8	4	1.43
SC4525-8	340	107,000	20,411	39,000	-8	67	104	0.8	4	1.43
SC4550-5	680	112,000	6,800	12,246	-5	47	242	1.0	3	1.90
SC4550-6	680	112,000	11,790	26,988	-6	47	242	1.0	3	1.90
SC4550-7	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 please contact ACE.

Issue 04.2018 – Specifications subject to change

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Vibration isolation

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Products for UNF and metric thread available

MA/ML33 to MA/ML64

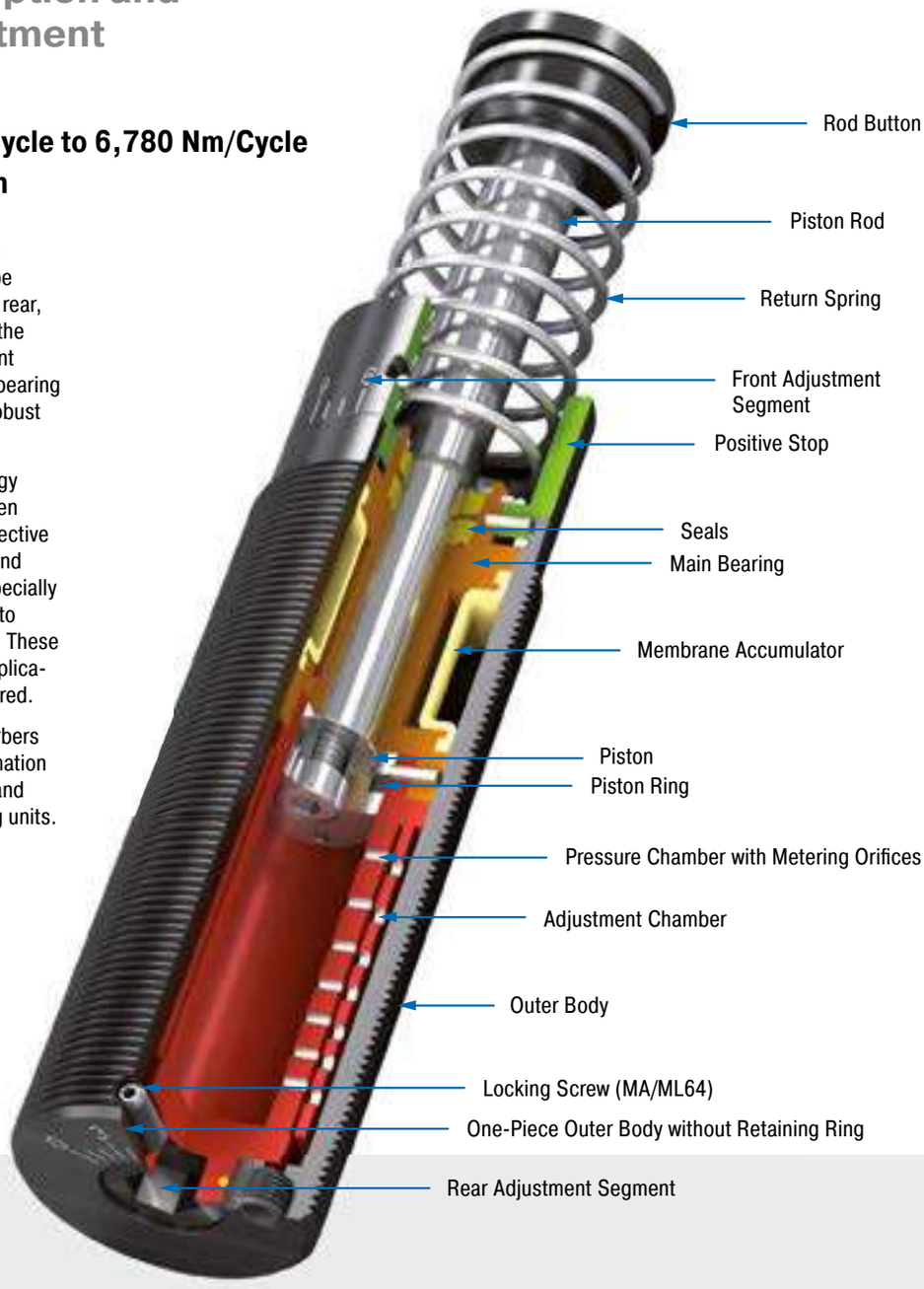
High energy absorption and progressive adjustment

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 range. 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 options in design and assembly. This makes the ML range especially suitable for effective weights of 300 kg to 500,000 kg (661 lbs. to 1,102,311 lbs.). These shocks are the best option wherever application data changes and flexibility is required.

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



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 centers, Z-axes, Impact panels, Handling modules

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

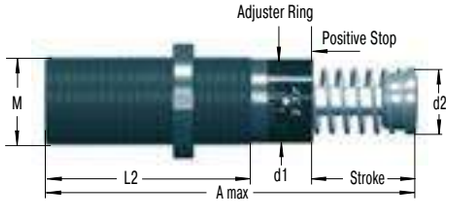
Safety information: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

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

Issue 04.2018 – Specifications subject to change

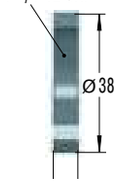
MA/ML33

Adjuster

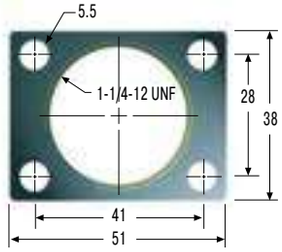


Product available for UNF and metric thread (for metric add suffix -M from part number)
M33x1.5, M36x1.5 and M42x1.5 also available to order

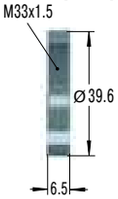
250-0038
Locking Ring
1-1/4-12 UNF



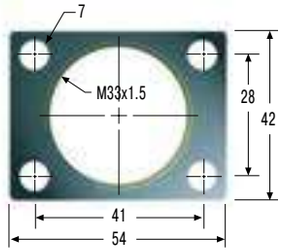
250-0016
Rectangular Flange



250-0292
Locking Ring
M33x1.5



250-0293
Rectangular Flange



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/ML3325M**

Adjustable
33 for 1-1/4-12 UNF or M33 threads
Stroke 0.98" (25 mm)
Metric Thread
(omitted when using thread UNF 1 1/4-12)

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MA3325	23.2	138	30	25	83	1-1/4-12 UNF / M33x1.5
ML3325	23.2	138	30	25	83	1-1/4-12 UNF / M33x1.5
MA3350	48.6	189	30	25	108	1-1/4-12 UNF / M33x1.5
ML3350	48.6	189	30	25	108	1-1/4-12 UNF / M33x1.5

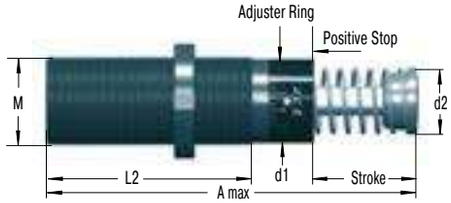
Performance

	Max. Energy Capacity				Effective Weight						
TYPES	[1] E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	E_4 with Oil Recirculation Nm/h	[2] We min. kg	[2] We max. kg	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MA3325	170	75,000	124,000	169,000	9	1,700	45	90	0.03	4	0.45
ML3325	170	75,000	124,000	169,000	300	50,000	45	90	0.03	4	0.45
MA3350	340	85,000	135,000	180,000	13	2,500	45	135	0.06	3	0.54
ML3350	340	85,000	135,000	180,000	500	80,000	45	135	0.06	3	0.54

[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 please contact ACE.

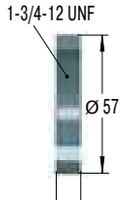
MA/ML45

Adjuster

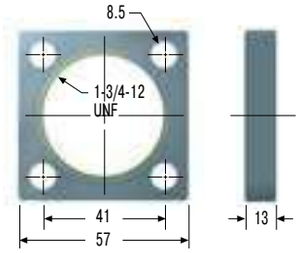


Product available for UNF and metric thread (for metric add suffix -M from part number)

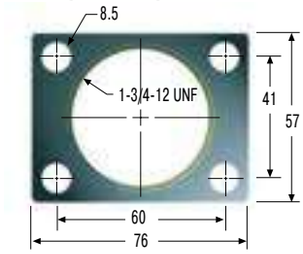
250-0041
Locking Ring



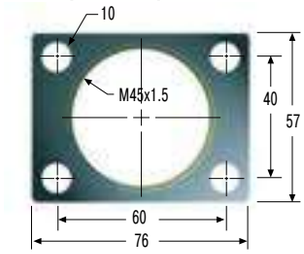
250-0023
Square Flange



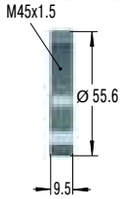
250-0024
Rectangular Flange



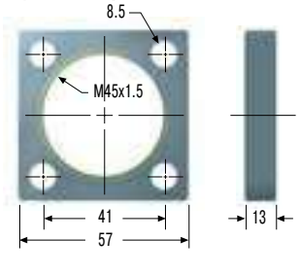
250-0299
Rectangular Flange



250-0297
Locking Ring



250-0298
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

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/ML4525M**

Adjustable
45 for 1-3/4-12 UNF or M45 threads
Stroke 0.98" (25 mm)
Metric Thread
(omitted when using thread UNF 1-3/4-12)

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
MA4525	23.1	145	42	35	95	1-3/4-12 UNF / M45x1.5
ML4525	23.1	145	42	35	95	1-3/4-12 UNF / M45x1.5
MA4550	48.5	195	42	35	120	1-3/4-12 UNF / M45x1.5
ML4550	48.5	195	42	35	120	1-3/4-12 UNF / M45x1.5
MA4575	73.9	246	42	35	145	1-3/4-12 UNF / M45x1.5

Performance

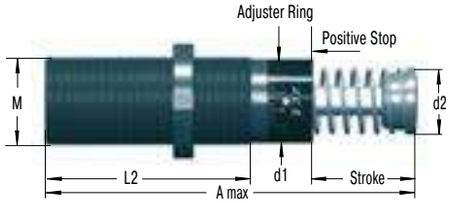
	Max. Energy Capacity				Effective Weight						
TYPES	[1] E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	E_4 with Oil Recirculation Nm/h	[2] We min. kg	[2] We max. kg	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
MA4525	425	107,000	158,000	192,000	40	10,000	70	100	0.03	4	1.13
ML4525	425	107,000	158,000	192,000	3,000	110,000	70	100	0.03	4	1.13
MA4550	850	112,000	192,000	248,000	70	14,500	70	145	0.08	3	1.36
ML4550	850	112,000	192,000	248,000	5,000	180,000	70	145	0.08	3	1.36
MA4575	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 please contact ACE.

Issue 04.2018 – Specifications subject to change

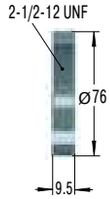
MA/ML64

Adjuster

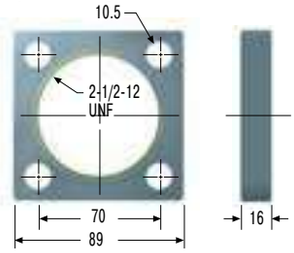


Product available for UNF and metric thread (for metric add suffix -M from part number)
150 mm stroke model does not include stop collar.
Positive stop is provided by the rod button (Ø 60 mm) and a stop block.

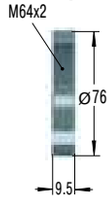
250-0042
Locking Ring



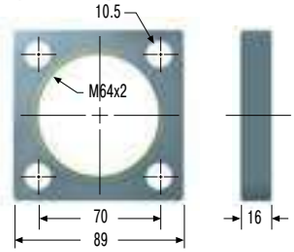
250-0028
Square Flange



250-0301
Locking Ring



250-0302
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
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/ML6450M**

Adjustable
64 for 2-1/2-12 UNF or M64 threads
Stroke 1.97" (50 mm)
Metric Thread
(omitted when using thread UNF 2-1/2-12)

Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
ML6425	23.2	174	60	48	114	2-1/2-12 UNF / M64x2
MA6450	48.6	225	60	48	140	2-1/2-12 UNF / M64x2
ML6450	48.6	225	60	48	140	2-1/2-12 UNF / M64x2
MA64100	99.4	326	60	48	191	2-1/2-12 UNF / M64x2
MA64150	150	450	60	48	241	2-1/2-12 UNF / M64x2

Performance

	Max. Energy Capacity				Effective Weight						
TYPES	[1] E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	E_4 with Oil Recirculation Nm/h	[2] We min. kg	[2] We max. kg	Return Force min. N	Return Force max. N	Return Time s	[3] Side Load Angle max. °	Weight kg
ML6425	1,135	124,000	248,000	332,000	7,000	300,000	120	155	0.06	5	2.50
MA6450	2,275	146,000	293,000	384,000	220	50,000	90	155	0.12	4	2.90
ML6450	2,275	146,000	293,000	384,000	11,000	500,000	90	155	0.12	4	2.90
MA64100	4,520	192,000	384,000	497,000	270	52,000	105	270	0.34	3	3.70
MA64150	6,780	248,000	497,000	644,000	330	80,000	75	365	0.48	2	5.10

[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 please contact ACE.

SASL1 1/8

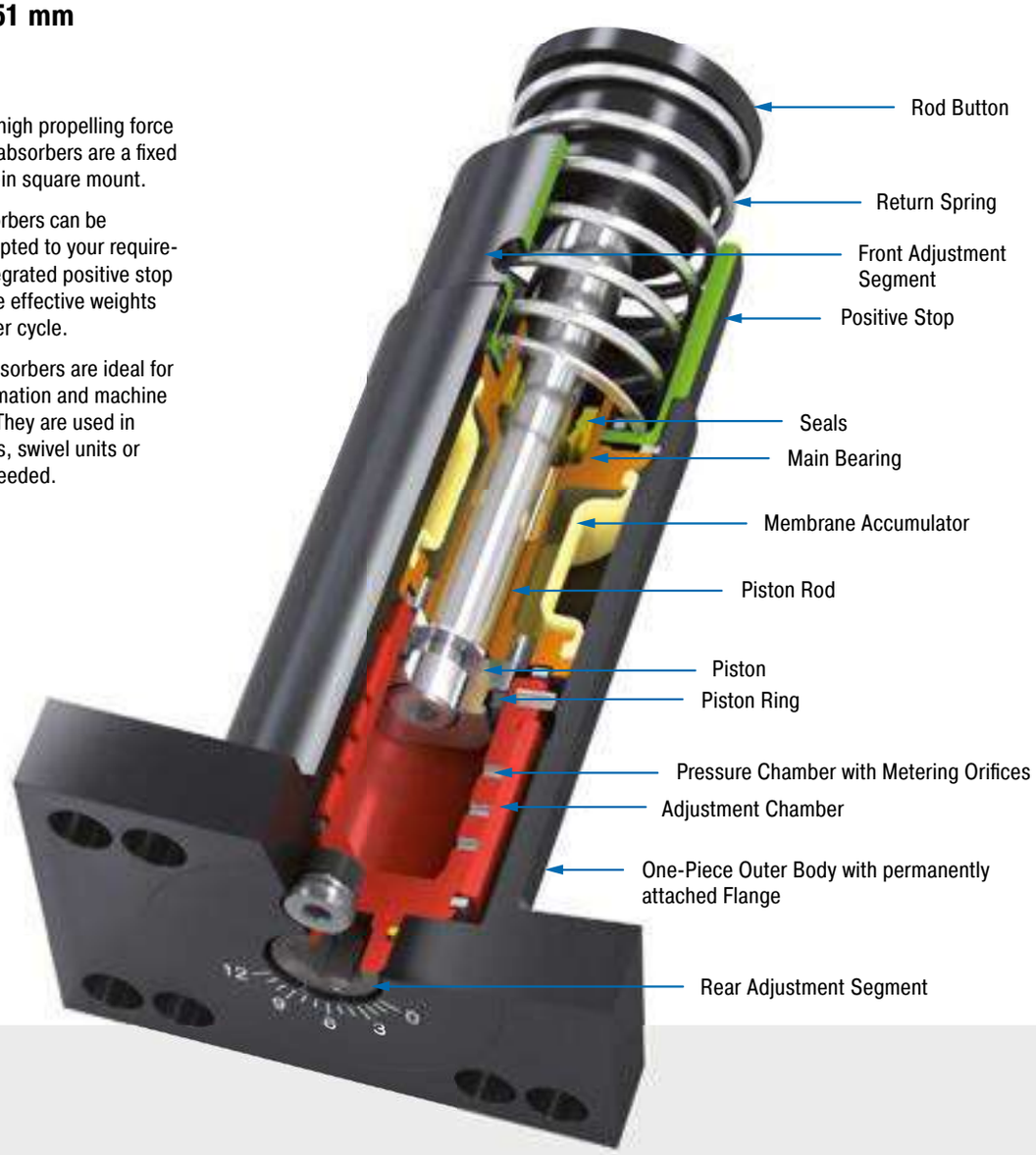
Low velocity and high effective weight range

Adjustable
Energy capacity 900 Nm/Cycle to 1,800 Nm/Cycle
Stroke 25 mm to 51 mm

Designed for low velocity, high propelling force applications, SASL shock absorbers are a fixed flange product with a built-in square mount.

SASL industrial shock absorbers can be adjusted and precisely adapted to your requirements; they feature an integrated positive stop and are designed to handle effective weights from 1,800 to 5,400 Nm per cycle.

These adjustable shock absorbers are ideal for all areas of industrial automation and machine engineering applications. They are used in linear slides, tool machines, swivel units or wherever deceleration is needed.



Technical Data

Energy capacity: 900 Nm/Cycle to 1,800 Nm/Cycle

Impact velocity range: 0.08 m/s to 0.61 m/s

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

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

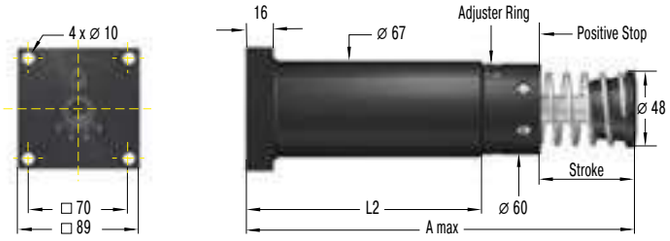
Damping medium: Automatic Transmission Fluid (ATF)

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

Safety information: 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.

Issue 04.2018 – Specifications subject to change

SASL 1 1/8-R Rear Flange



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

Model Type Prefix

SASL: Internal accumulator, spring return
ASLA: Internal accumulator, mechanical return
ASLS: External accumulator, spring return
ASL: External accumulator, air or mechanical return

Ordering Example **SASL11/8x1-R**

Adjustable
Bore 1 1/8" (28.5 mm)
Stroke 1" (25 mm)
Rear Flange

Dimensions

TYPES	Stroke **mm**	A max. **mm**	L2 **mm**
SASL11/8X1-R	23	175	100
SASL11/8X2-R	48.5	225	124

Performance

	Max. Energy Capacity			Effective Weight		
TYPES	E_3 **Nm/cycle**	E_4 **Nm/h**	E_4 with Air/Oil Tank **Nm/h**	[1] We min. **kg**	[1] We max. **kg**	Weight **kg**
SASL11/8X1-R	900	142,000	282,000	318	320,000	3.67
SASL11/8X2-R	1,800	170,000	340,000	385.5	590,000	4.17

[1] The effective weight range limits can be raised or lowered to special order.

SALD1/2 to SALD1 1/8

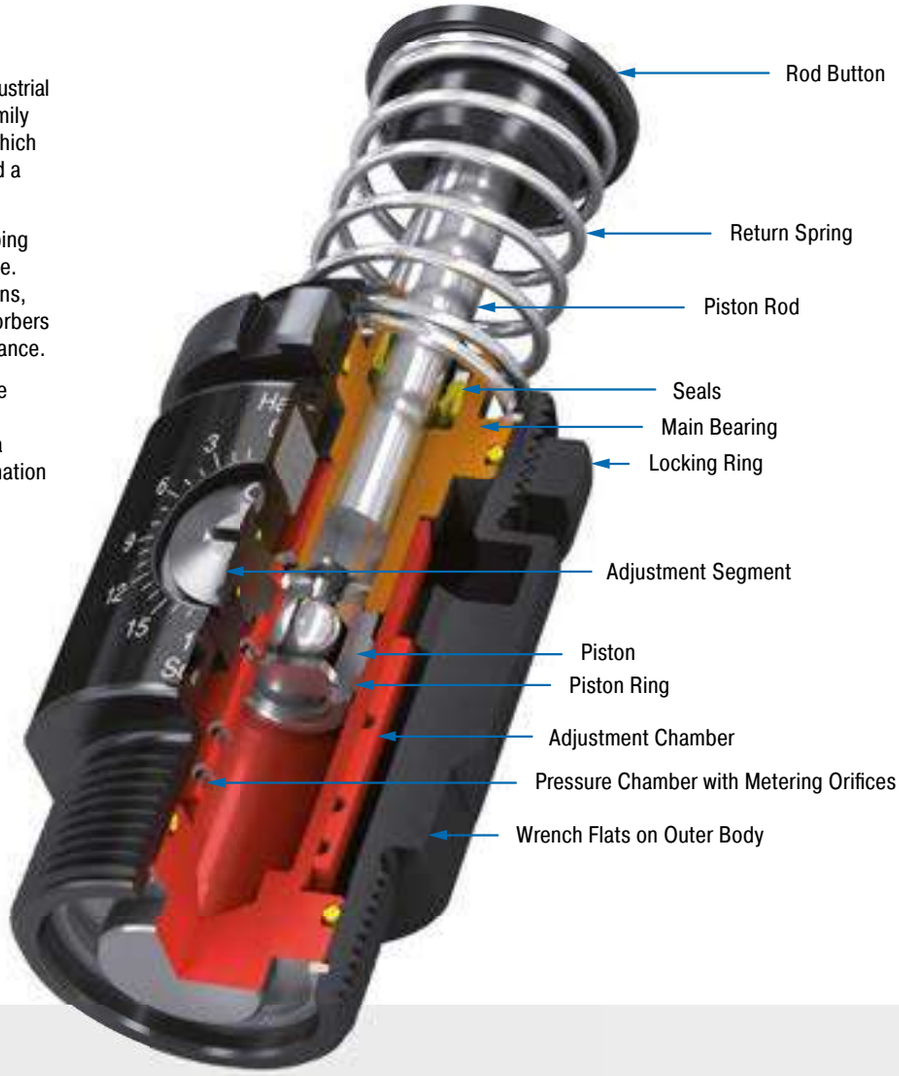
High energy absorption and a wide effective weight range

Adjustable
Energy capacity 153 Nm/Cycle to 5,400 Nm/Cycle
Stroke 25 mm to 152 mm

Ideal for high-speed moving machines,industrial shock absorbers of the SALD product family feature a built-in external positive stop which prevents damage from bottoming out and a positive work-positioning point.

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

These adjustable shock absorbers can be adjusted and precisely adapted to your requirements, making them suitable for a variety of applications in industrial automation and machine engineering applications, especially in automation and gantries.



Technical Data

Energy capacity: 153 Nm/Cycle to 5,400 Nm/Cycle

Impact velocity range: 0.3 m/s to 4.6 m/s

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

Mounting: In any position

Positive stop: External

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

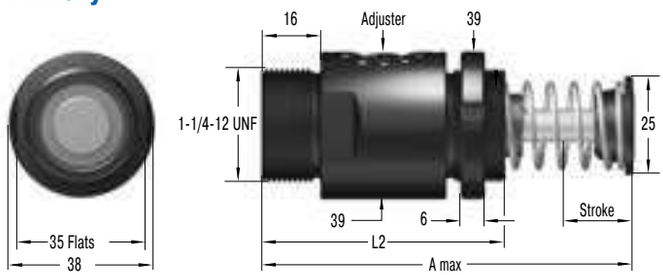
Damping medium: Automatic Transmission Fluid (ATF)

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

Safety information: 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.

Issue 04.2018 – Specifications subject to change

SALD1/2-P Primary



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

Model Type Prefix

SALD: Internal accumulator, spring return
ALDA: Internal accumulator, mechanical return
ALDS: External accumulator, spring return
ALD: External accumulator, air or mechanical return

Ordering Example **SALD1/2x1-P**

Adjustable
Bore 1/2" (12.7 mm)
Stroke 1" (25 mm)
Primary

Dimensions

TYPES	Stroke mm	A max. mm	L2 mm
SALD1/2X1-P	23.2	138	82
SALD1/2X2-P	48.5	189	102

Performance

	Max. Energy Capacity			Effective Weight		
TYPES	E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	[1] We min. kg	[1] We max. kg	Weight kg
SALD1/2X1-P	153	85,000	147,000	4.5	1,225	0.68
SALD1/2X2-P	305	98,000	158,000	9.5	2,585	0.83

[1] The effective weight range limits can be raised or lowered to special order.

SALD3/4-P Primary

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

Model Type Prefix

SALD: Internal accumulator, spring return
ALDA: Internal accumulator, mechanical return
ALDS: External accumulator, spring return
ALD: External accumulator, air or mechanical return

Ordering Example **SALD3/4x1-P**

Adjustable
Bore 3/4" (19 mm)
Stroke 1" (25 mm)
Primary

Dimensions

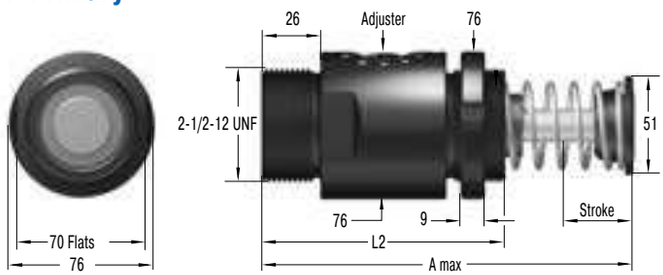
TYPES	Stroke **mm**	A max. **mm**	L2 **mm**
SALD3/4X1-P	23.2	151	101
SALD3/4X2-P	48.5	202	126
SALD3/4X3-P	74	252	152

Performance

	Max. Energy Capacity			Effective Weight		
TYPES	E_3 **Nm/cycle**	E_4 **Nm/h**	E_4 with Air/Oil Tank **Nm/h**	[1] We min. **kg**	[1] We max. **kg**	Weight **kg**
SALD3/4X1-P	340	124,000	181,000	9	8,100	1.47
SALD3/4X2-P	680	147,000	225,000	15.9	14,500	1.81
SALD3/4X3-P	1,000	181,000	2,700,000	22.7	21,000	2.24

[1] The effective weight range limits can be raised or lowered to special order.

SALD1 1/8-P Primary



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

Model Type Prefix

SALD: Internal accumulator, spring return
ALDA: Internal accumulator, mechanical return
ALDS: External accumulator, spring return
ALD: External accumulator, air or mechanical return

Ordering Example **SALD3/4x1-P**

Adjustable
Bore 1 1/8" (28.5 mm)
Stroke 1" (25 mm)
Primary

Dimensions

TYPES	Stroke **mm**	A max. **mm**	L2 **mm**
SALD11/8X2-P	48.5	226	140
SALD11/8X4-P	99	327	190
SALD11/8X6-P	150	451	241

Performance

	Max. Energy Capacity			Effective Weight		
TYPES	E_3 **Nm/cycle**	E_4 **Nm/h**	E_4 with Air/Oil Tank **Nm/h**	[1] We min. **kg**	[1] We max. **kg**	Weight **kg**
SALD11/8X2-P	1,800	170,000	340,000	54	22,700	3.97
SALD11/8X4-P	3,600	225,000	452,000	72.5	45,000	5.22
SALD11/8X6-P	5,400	280,000	565,000	91	68,000	7.04

[1] The effective weight range limits can be raised or lowered to special order.

SALDN3/4

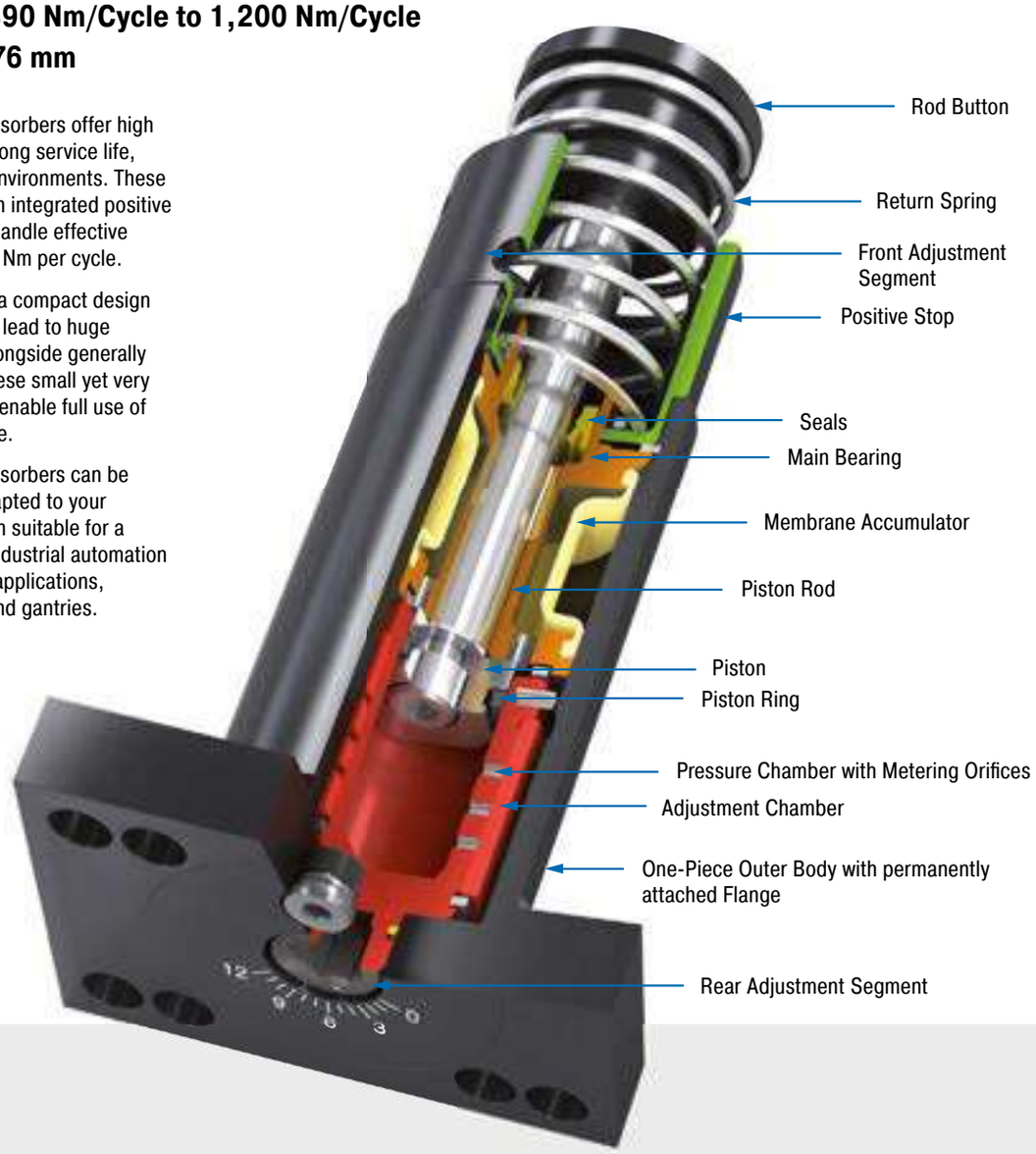
High energy absorption and a wide effective weight range

Adjustable
Energy capacity 390 Nm/Cycle to 1,200 Nm/Cycle
Stroke 25 mm to 76 mm

SALDN industrial shock absorbers offer high performance levels and a long service life, even in the most difficult environments. These shock absorbers feature an integrated positive stop and are designed to handle effective weights from 390 to 1,200 Nm per cycle.

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 shock absorbers enable full use of the machine's performance.

These adjustable shock absorbers can be adjusted and precisely adapted to your requirements, making them suitable for a variety of applications in industrial automation and machine engineering applications, especially in automation and gantries.



Technical Data

Energy capacity: 390 Nm/Cycle to 1,200 Nm/Cycle

Impact velocity range: 0.1 m/s to 5 m/s

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

Mounting: In any position

Positive stop: Integrated

Adjustment: Rear of shock

Damping medium: Automatic Transmission Fluid (ATF)

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

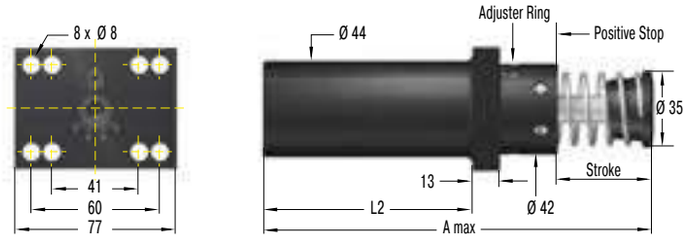
Note: ACE recommends selecting a model with 20 % more capacity than your calculations indicate necessary. This extra capacity allows for changes in weight, velocity or cycle rates increase in the future.

Safety information: 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, additional impact velocity ranges or other special options are available on request.

Issue 04.2018 – Specifications subject to change

SALDN3/4-RF Front Flange



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

Model Type Prefix

SALDN: Internal accumulator, spring return
ALDAN: Internal accumulator, mechanical return
ALDSN: External accumulator, spring return
ALDN: External accumulator, air or mechanical return

Ordering Example **SALDN3/4x1-RF**

Adjustable
Bore 3/4" (19 mm)
Stroke 1" (25 mm)
Series (RF = Front Flange)

Dimensions

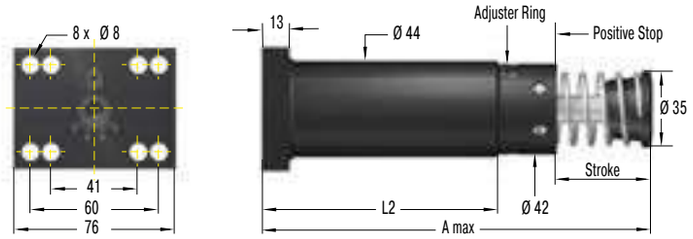
TYPES	Stroke mm	A max. mm	L2 mm
SALDN3/4X1-RF	25	145	82
SALDN3/4X2-RF	50	195	107
SALDN3/4X3-RF	75	246	133

Performance

	Max. Energy Capacity			Effective Weight						
TYPES	E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	[1] We min. kg	[1] We max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
SALDN3/4X1-RF	390	107,000	158,000	45	10,000	7	10	0.03	4	1.13
SALDN3/4X2-RF	780	113,000	190,000	72.6	14,500	7	14.5	0.08	3	1.37
SALDN3/4X3-RF	1,200	147,000	226,000	115	15,000	5	18.25	0.11	2	1.59

[1] The effective weight range limits can be raised or lowered to special order.

SALDN3/4-RR Rear Flange



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

Model Type Prefix

SALDN: Internal accumulator, spring return
ALDAN: Internal accumulator, mechanical return
ALDSN: External accumulator, spring return
ALDN: External accumulator, air or mechanical return

Ordering Example **SALDN3/4x1-RR**

Adjustable
Bore 3/4" (19 mm)
Stroke 1" (25 mm)
Series (RR = Rear Flange)

Dimensions

TYPES	Stroke mm	A max. mm	L2 mm
SALDN3/4X1-RR	25	145	82
SALDN3/4X2-RR	50	195	107
SALDN3/4X3-RR	75	246	133

Performance

	Max. Energy Capacity			Effective Weight						
TYPES	E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	[1] We min. kg	[1] We max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
SALDN3/4X1-RR	390	107,000	158,000	43	10,000	7	10	0.03	4	1.13
SALDN3/4X2-RR	780	113,000	190,000	72.6	14,500	7	14.5	0.08	3	1.37
SALDN3/4X3-RR	1,200	147,000	226,000	115	15,000	5	18.25	0.11	2	1.59

[1] The effective weight range limits can be raised or lowered to special order.

High Performance

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=

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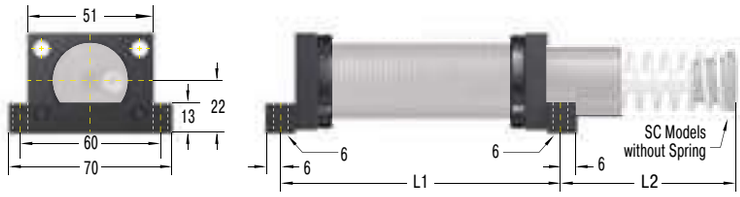
M33x1.5

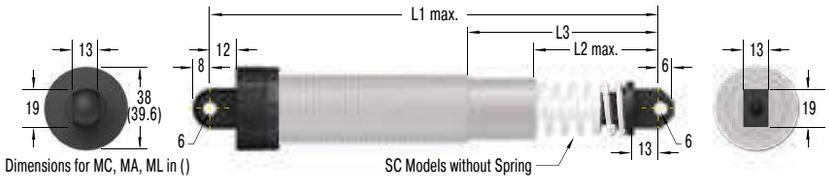
250-0294
Side Foot Mounting Kit



Dimensions		
TYPES	L1 mm	L2 mm
MC, MA, ML3325	95.3	49.3
MC, MA, ML3350	120.7	74.7
SC3325	134.9	49.3
SC3350	185.7	74.7
SCS33-25	95.3	49.3
SCS33-50	120.7	74.7

250-0294 = 1 locknut, 2 flanges, 2 bars, 4 screws M6x40, DIN 912
Torque max.: 11 Nm
Clamping torque: 90 Nm
Bolts to mount assembled shock & mount not included.

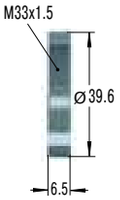
250-0323
Clevis Mount Assembly



Dimensions			
TYPES	L1 max. mm	L2 max. mm	L3 mm
MC, MA, ML3325	167.13	34.54	67.05
MC, MA, ML3350	217.93	59.94	92.46
SC3325	206.76	34.67	67.31
SC3350	282.96	60.20	92.71

Use positive stop at both ends of travel.

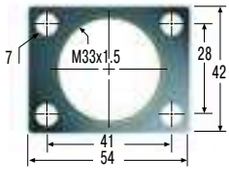
250-0292
Locking Ring



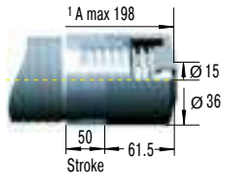
250-0091
Poly Button

Supplied ready mounted onto the shock absorber.

250-0293
Rectangular Flange

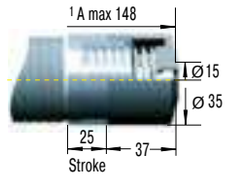


250-0130
Steel Shroud



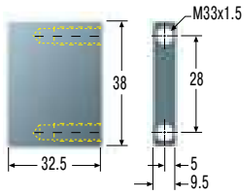
[1] Total installation length of the shock absorber inc. steel shroud

250-0730
Steel Shroud

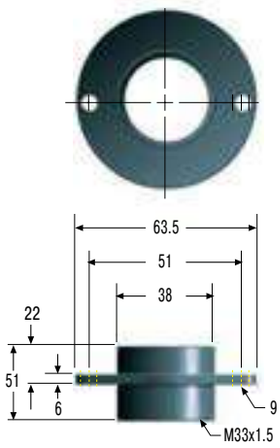


[1] Total installation length of the shock absorber inc. steel shroud

250-0427
Stop Bar



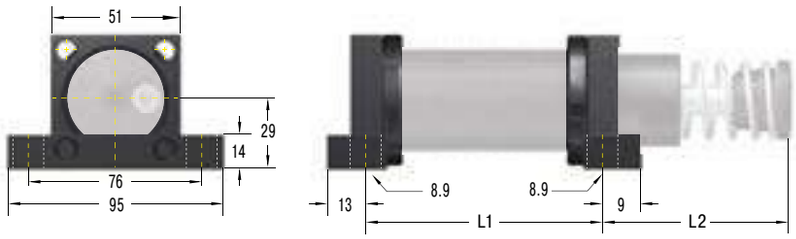
250-0071
Flanged Stop Collar



Mounting, installation, ... see page 96.

M45x1.5

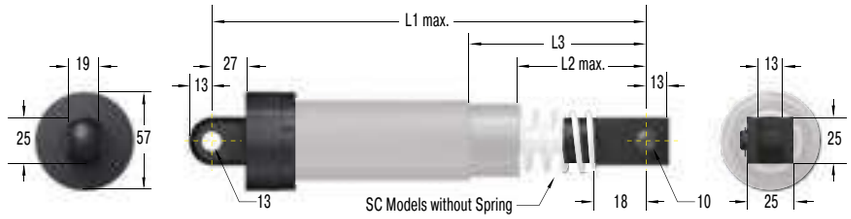
250-0300
Side Foot Mounting Kit



Dimensions	L1	L2
TYPES	mm	mm
MC, MA, ML4525	88.9	49.3
MC, MA, ML4550	111.8	77.7
MC, MA4575	136.6	103.1
SC4525	129.5	53.9
SC4550	180.3	78.5
SCS45-25	88.9	49.3
SCS45-50	111.8	77.7
SCS45-75	136.6	103.1

250-0300 = 1 locknut, 2 flanges, 2 bars, 4 screws M8x50, DIN 912
Torque max.: 27 Nm
Clamping torque: 350 Nm
Bolts to mount assembled shock & mount not included.

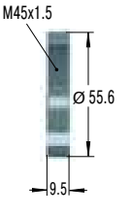
250-0325
Clevis Mount Assembly



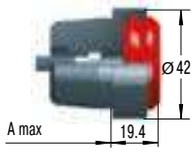
Dimensions	L1 max.	L2 max.	L3
TYPES	mm	mm	mm
MC, MA, ML4525	199.39	38.35	65.27
MC, MA, ML4550	250.19	63.75	90.67
MC, MA4575	300.99	89.15	116.07
SC4525	243.84	38.35	65.28
SC4550	320.04	63.75	90.68

Use positive stop at both ends of travel.

250-0297
Locking Ring



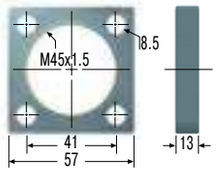
250-0092
Poly Button



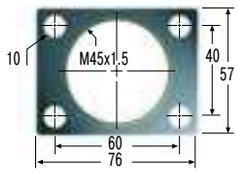
see shock absorber dims.

Supplied ready mounted onto the shock absorber.

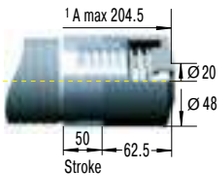
250-0298
Square Flange



250-0299
Rectangular Flange

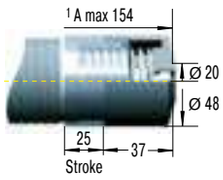


250-0778
Steel Shroud



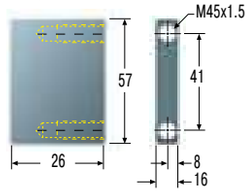
[1] Total installation length of the shock absorber inc. steel shroud

250-0731
Steel Shroud

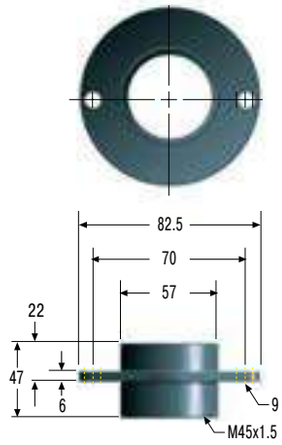


[1] Total installation length of the shock absorber inc. steel shroud

250-0639
Stop Bar



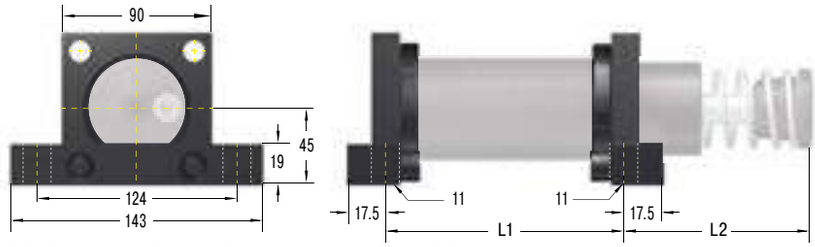
250-0073
Flanged Stop Collar



Mounting, installation, ... see page 96.

M64x2

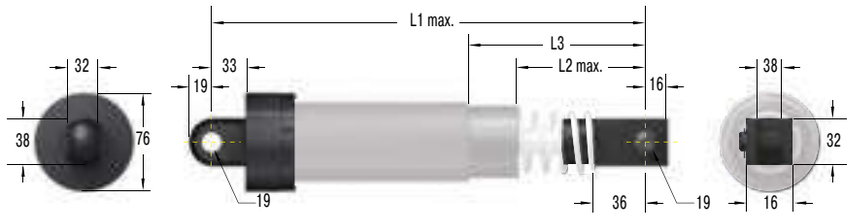
250-0304
Side Foot Mounting Kit



Dimensions	L1	L2
TYPES	mm	mm
ML6425	101.6	64.5
MC, MA, ML6450	127.0	89.9
MC, MA64100	177.8	140.7
MC, MA64150	228.6	213.9
SCS64-50	127.0	89.9
SCS64-100	177.8	140.7
SCS64-150	228.6	213.9

250-0304 = 1 locknut, 2 flanges, 2 bars, 4 screws M10x80, DIN 912
Torque max.: 50 Nm
Clamping torque: 350 Nm
Bolts to mount assembled shock & mount not included.

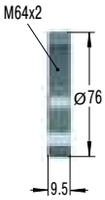
250-0626
Clevis Mount Assembly



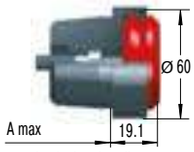
Dimensions	L1 max.	L2 max.	L3
TYPES	mm	mm	mm
ML6425	257.10	58.70	95.50
MC, MA, ML6450	307.90	84.10	120.70
MC, MA64100	409.50	134.90	171.50
MC, MA64150	530.10	204.70	241.30

Use positive stop at both ends of travel.

250-0301
Locking Ring

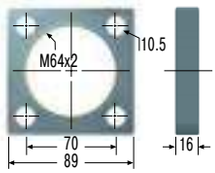


250-0093
Poly Button

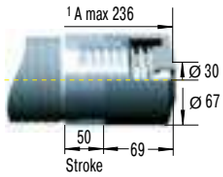


see shock absorber dims.
Supplied ready mounted onto the shock absorber.

250-0302
Square Flange

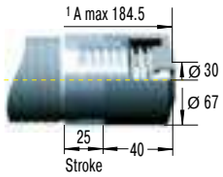


250-0787
Steel Shroud



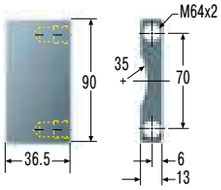
[1] Total installation length of the shock absorber inc. steel shroud

250-0839
Steel Shroud



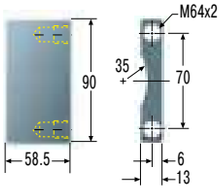
[1] Total installation length of the shock absorber inc. steel shroud

250-0640
Stop Bar



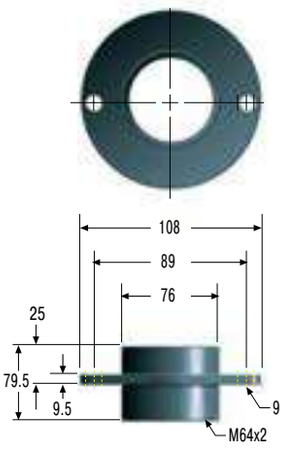
For MC/MA/ML6425M to 64100M models

250-0641
Stop Bar



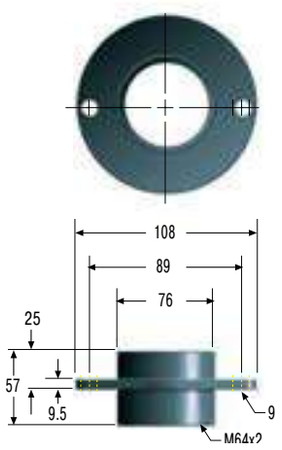
For MC/MA/ML64150M model

250-0077
Flanged Stop Collar



For MC/MA/ML64150M model

250-0075
Flanged Stop Collar

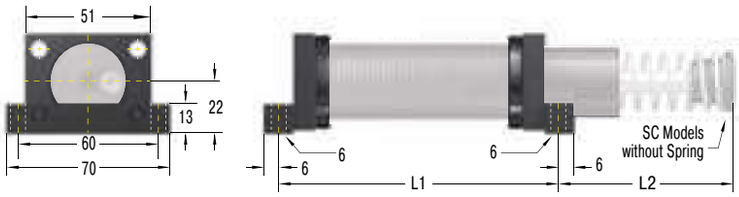


For MC/MA/ML6425M to 64100M models

Mounting, installation, ... see page 96.

1-1/4-12 UNF

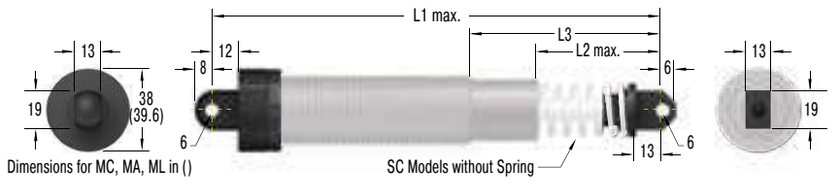
250-0015
Side Foot Mounting Kit



Dimensions	L1	L2
TYPES	mm	mm
MC, MA, ML3325	95.3	49.3
MC, MA, ML3350	120.7	74.7
SC3325	134.9	49.3
SC3350	185.7	74.7
SCS33-25	95.3	49.3
SCS33-50	120.7	74.7

250-0015 = 1 locknut, 2 flanges, 2 bars, 4 screws 1-1/4-12 UNF, DIN 912
Torque max.: 11 Nm
Clamping torque: 90 Nm
Bolts to mount assembled shock & mount not included.

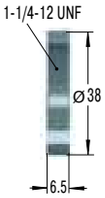
250-0225
Clevis Mount Assembly



Dimensions	L1 max.	L2 max.	L3
TYPES	mm	mm	mm
MC, MA, ML3325	167.13	34.54	67.05
MC, MA, ML3350	217.93	59.94	92.46
SC3325	206.76	34.67	67.31
SC3350	282.96	60.20	92.71

Use positive stop at both ends of travel.

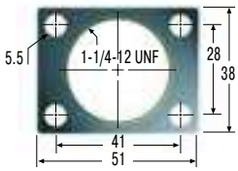
250-0038
Locking Ring



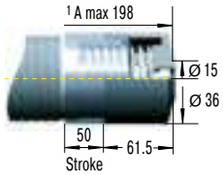
250-0091
Poly Button

Supplied ready mounted onto the shock absorber.

250-0016
Rectangular Flange

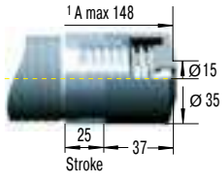


250-0130
Steel Shroud



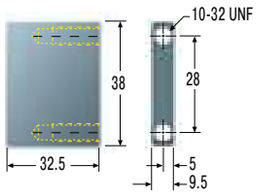
[1] Total installation length of the shock absorber inc. steel shroud

250-0730
Steel Shroud

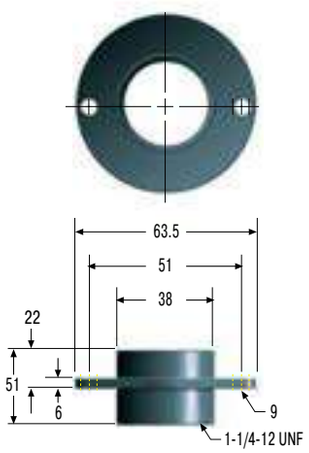


[1] Total installation length of the shock absorber inc. steel shroud

250-0426
Stop Bar



250-0070
Flanged Stop Collar

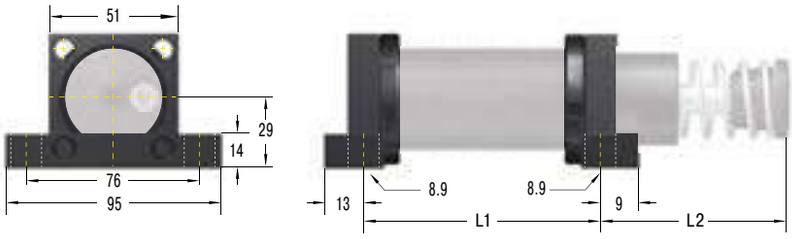


Mounting, installation, ... see page 96.

ACE Controls Inc. · 23425 Industrial Park Dr. Farmington · US-48335 Michigan · T +1 800-521-3320 · F +1 248-476-2470 · shocks@acecontrols.com · www.acecontrols.com

1-3/4-12 UNF

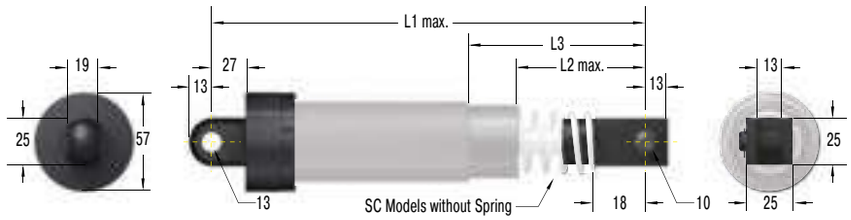
250-0025
Side Foot Mounting Kit



Dimensions	L1	L2
TYPES	mm	mm
MC, MA, ML4525	88.9	49.3
MC, MA, ML4550	111.8	77.7
MC, MA4575	136.6	103.1
SC4525	129.5	53.9
SC4550	180.3	78.5
SCS45-25	88.9	49.3
SCS45-50	111.8	77.7
SCS45-75	136.6	103.1

250-0025 = 1 locknut, 2 flanges, 2 bars, 4 screws 1-3/4-12 UNF, DIN 912
Torque max.: 27 Nm
Clamping torque: 350 Nm
Bolts to mount assembled shock & mount not included.

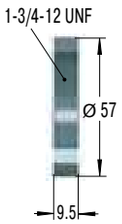
250-0324
Clevis Mount Assembly



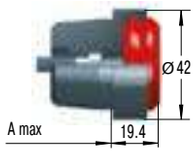
Dimensions	L1 max.	L2 max.	L3
TYPES	mm	mm	mm
MC, MA, ML4525	199.39	38.35	65.27
MC, MA, ML4550	250.19	63.75	90.67
MC, MA4575	300.99	89.15	116.07
SC4525	243.84	38.35	65.28
SC4550	320.04	63.75	90.68

Use positive stop at both ends of travel.

250-0041
Locking Ring



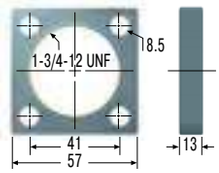
250-0092
Poly Button



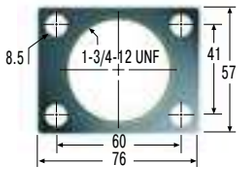
see shock absorber dims.

Supplied ready mounted onto the shock absorber.

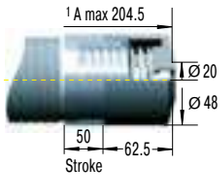
250-0023
Square Flange



250-0024
Rectangular Flange

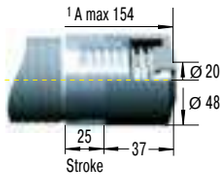


250-0778
Steel Shroud



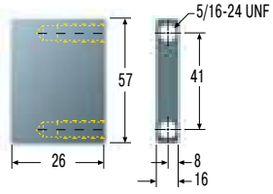
[1] Total installation length of the shock absorber inc. steel shroud

250-0731
Steel Shroud

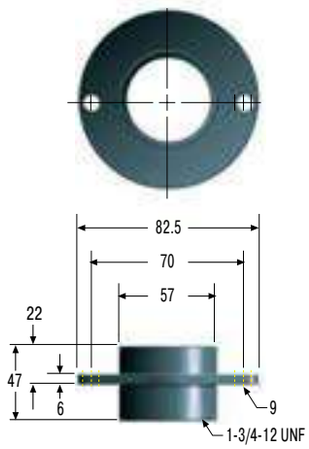


[1] Total installation length of the shock absorber inc. steel shroud

250-0428
Stop Bar



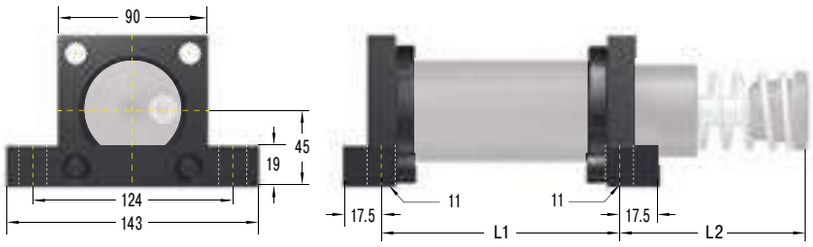
250-0072
Flanged Stop Collar



Mounting, installation, ... see page 96.

2-1/2-12 UNF

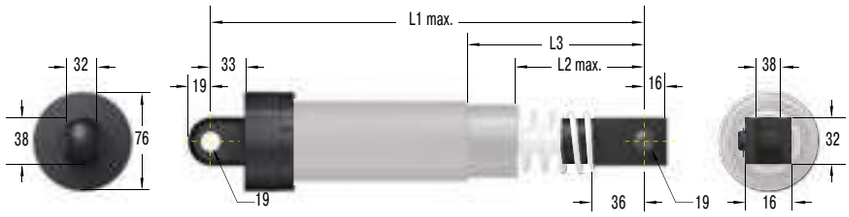
250-0030
Side Foot Mounting Kit



Dimensions	L1	L2
TYPES	mm	mm
ML6425	101.6	64.5
MC, MA, ML6450	127.0	89.9
MC, MA64100	177.8	140.7
MC, MA64150	228.6	213.9
SCS64-50	127.0	89.9
SCS64-100	177.8	140.7
SCS64-150	228.6	213.9

250-0030 = 1 locknut, 2 flanges, 2 bars, 4 screws 2-1/2-12 UNF, DIN 912
Torque max.: 50 Nm
Clamping torque: 50 Nm
Bolts to mount assembled shock & mount not included.

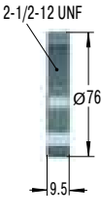
250-0625
Clevis Mount Assembly



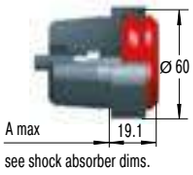
Dimensions	L1 max.	L2 max.	L3
TYPES	mm	mm	mm
ML6425	257.10	58.70	95.50
MC, MA, ML6450	307.90	84.10	120.70
MC, MA64100	409.50	134.90	171.50
MC, MA64150	530.10	204.70	241.30

Use positive stop at both ends of travel.

250-0042
Locking Ring

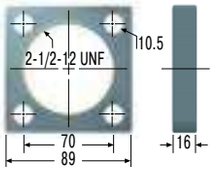


250-0093
Poly Button

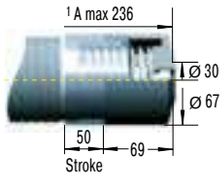


see shock absorber dims.
Supplied ready mounted onto the shock absorber.

250-0028
Square Flange

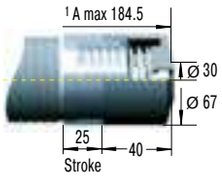


250-0787
Steel Shroud



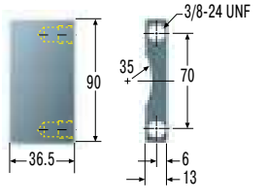
[1] Total installation length of the shock absorber inc. steel shroud

250-0839
Steel Shroud



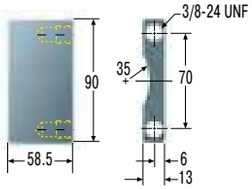
[1] Total installation length of the shock absorber inc. steel shroud

250-0430
Stop Bar



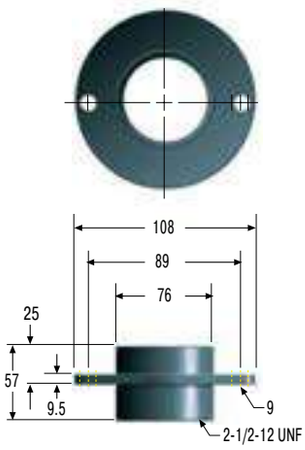
For MC/MA/ML6425 to 64100 models

250-0432
Stop Bar



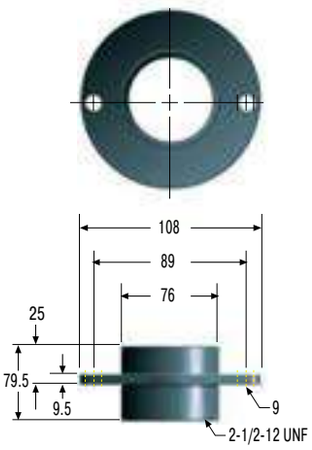
For MC/MA/ML64150 models

250-0074
Flanged Stop Collar



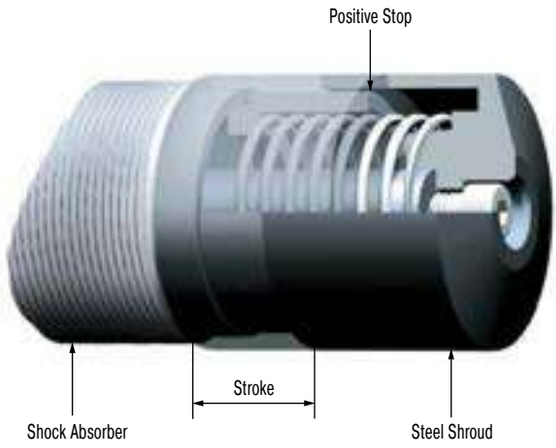
For MC/MA/ML 6425 to 64100 models

250-0076
Flanged Stop Collar



For MC/MA/ML64150M model

Mounting, installation, ... see page 96.



Steel Shroud

For industrial shock absorbers with a 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

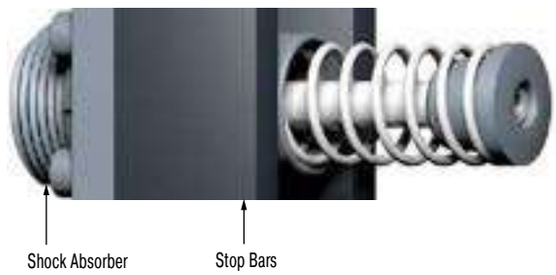
Mounting information
To mount the steel shroud it‘s necessary to remove the rod end button of the shock absorber.

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

Flanged Stop Collar

Flanged stop collars provide industrial shock absorbers with a secure front mount and a positive mechanical stop. No specific mounting panel thickness is required.

Material
Hardened high tensile steel



Stop Bar

Stop bars are used in pairs and come two per package for assembly. Hard metric stop bars are aviailable upon request.

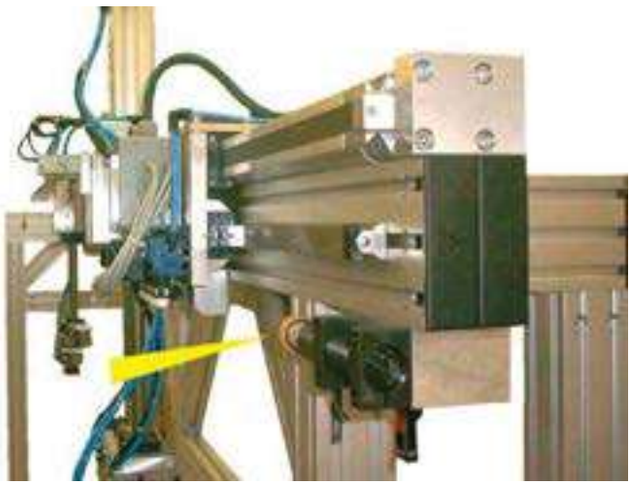
Material
Hardened high tensile steel

Application Examples

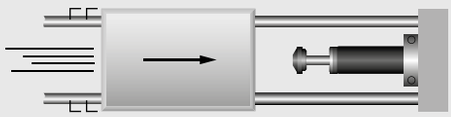
MC33

Quicker, gentle positioning

ACE industrial shock absorbers optimize portals for machine loading and increase productivity. This device is driven by piston rodless pneumatic cylinders where 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 MC3350-1-S model 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

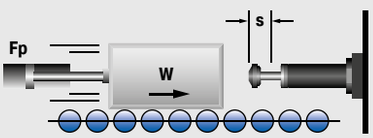


MC45

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 MC4575-0. 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.

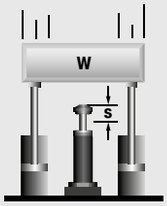
A variety of different dampers are used to slow the rapid movements of a badminton robot
FMTC vzw, 3001 Leuven, Belgium



MC64-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.

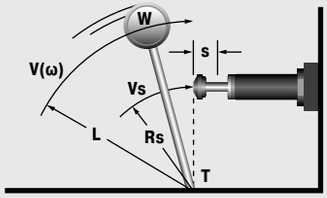


MAGNUMS allow for emergency quick disconnection of the pipelines from the oil rigs
Subsea Technologies Ltd, Aberdeen, AB12 3AY, UK

MC64M

Emergency exits made safer with MAGNUM shock absorbers

MAGNUM 64150 industrial shock absorbers are integrated into the overall safety design for the Amsterdam metro system. In contrast to previous solutions, ACE shocks ensure rapid opening and stopping for a five-ton barrier located at the end of an emergency escape route. In this application, over 5,100 Nm of energy are able to be absorbed per stroke. Through installing shock absorbers in end positions of the design, over 63,700 kg of effective weight are able to be absorbed. ACE provided an excellent solution, even with an impact speed of approximately 1.8 meters per second and the barrier exit grille at an unusual impact angle.

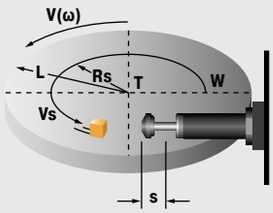


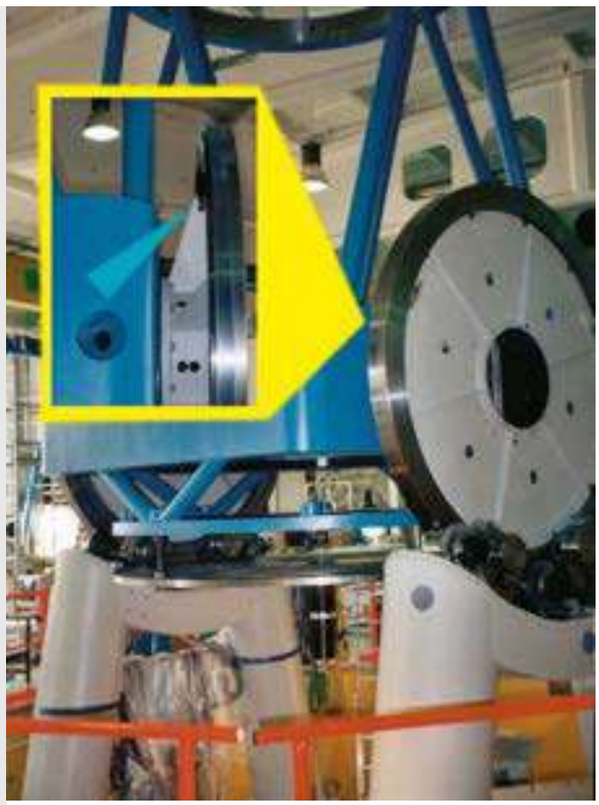
A heavy, five-ton barrier safely stopped by MAGNUM shock absorbers
J.P. van Eesteren B.V., 1006 BD Amsterdam, Netherlands

MA/ML33

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, ML3325 industrial shock absorbers are used as braking elements. Should the telescope inadvertently overshoot the permissible swivel range, they will safely damp the travel of the valuable telescope.



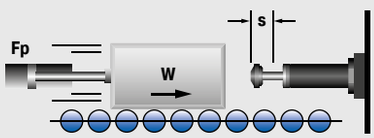


Perfect overshoot protection for precision telescope

MA/ML64

MAGNUM helps in the fight against people not buckling up

The Central-Hessian police department has developed an accident simulator with the help of ACE Stoßdämpfer GmbH aimed at significantly increasing the number of road traffic seatbelt wearers. The mobile simulator demonstrates strikingly that the smallest impact velocities lead to enormous forces, even when wearing seat belts, and can cause serious injuries when not. Adjustable MAGNUM type MA64150 dampers are installed to protect the simulator passengers and the end points of the construction at various speeds and moving masses. These are the largest adjustable dampers of the ACE product range; stronger special constructions are possible at any time.



MAGNUM dampers ensure the reliable braking of moving masses on the seat and the protection of the entire carriage construction
Central Hessian Police Department, Karl-Glöckner-Straße 2, 35394 Gießen, Germany

Heavy Industrial Shock Absorbers

Effective shock absorption for heavy loads

The heavy industrial shock absorbers from ACE top off the company's offerings in damping technology. This ACE category gives Designers a choice between self-compensating and adjustable machine elements.

Whichever design is chosen, this type of shock absorber impresses with its robustness and operational readiness wherever heavy loads need to be reliably stopped on-the-spot and 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 are the adjustable types with the designations "A". The range of effective loads covered is increased considerably for this purpose.

Heavy Industrial Shock Absorbers

CA2 to CA4

Page 102

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

A1 1/2 to A3

Page 106

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 utilization

Safe, reliable production

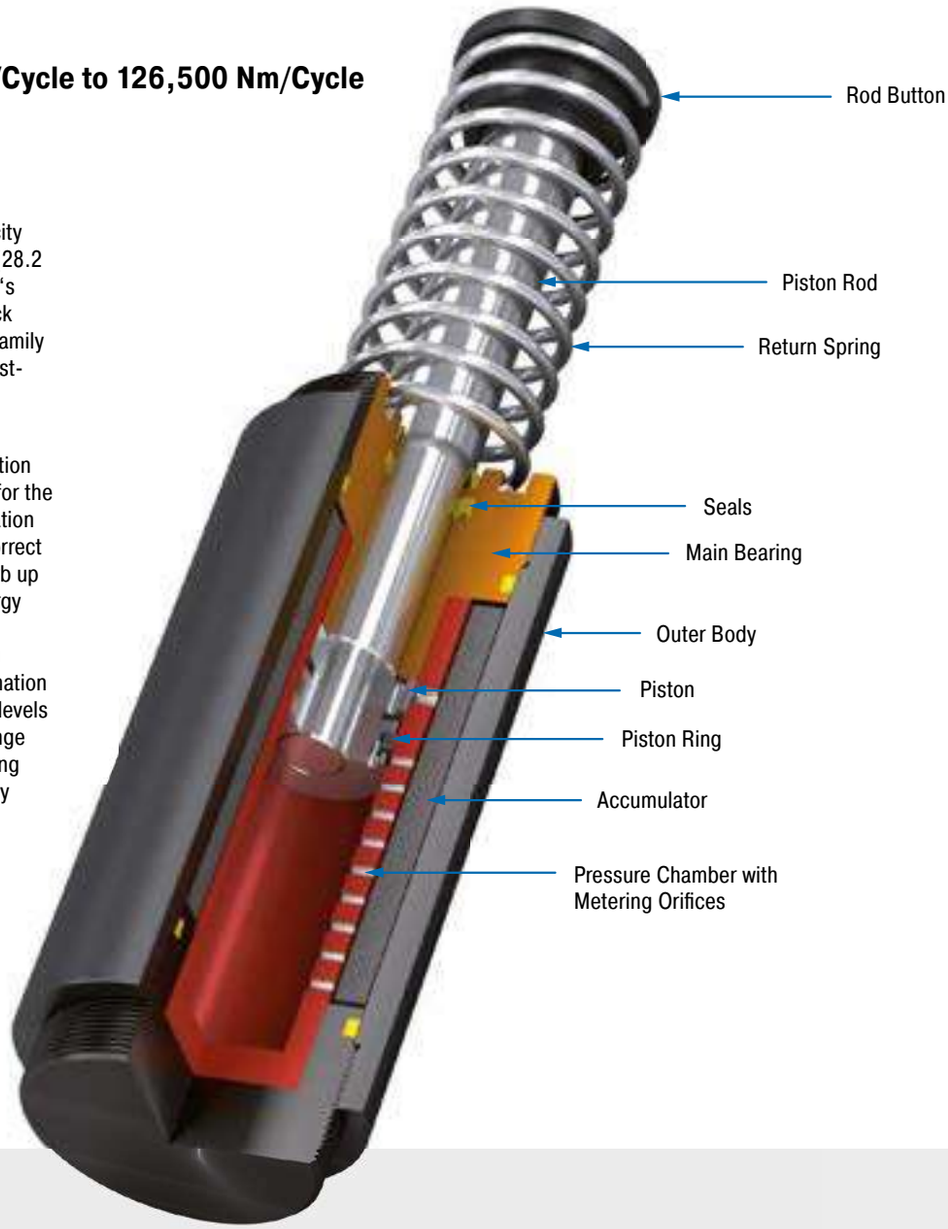
Maintenance-free and ready-to-install

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 weight of these high capacity absorbers are between 12.8 and 146 kg (28.2 lbs and 322 lbs.). They complement ACE's product range of self-compensating shock absorbers. All models from this product family are designed for applications where robustness and large energy absorption are important.

ACE uses our proprietary custom calculation program to design each shock absorber for the specific customer application. Customization helps reduce the risk of crashes and incorrect product sizing. The CA models can absorb up to 126,500 Nm (1,119,620 in-lbs) of energy and can be used in the area of effective weights between 700 kg and 326,000 kg (1,543 lbs and 718,707 lbs.). The combination of being extremely solid, absorbing high levels of energy and having a large damping range makes them invaluable. Self-compensating shock absorbers react to changing energy conditions, without adjustment.

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

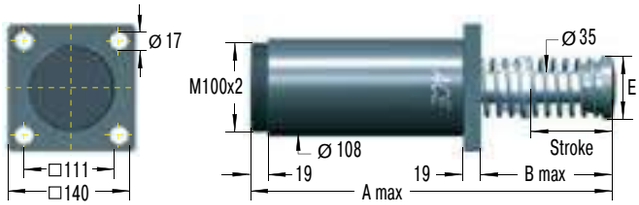
Note: For emergency use only applications and for continous use it is possible to exceed the published max. capacity ratings. In this case, please consult ACE.

Safety information: 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.

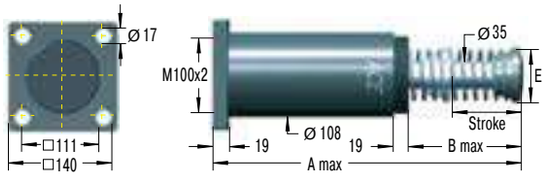
On request: Special oils, nickel-plated, increased corrosion protection or other special options are available on request.

Issue 04.2018 – Specifications subject to change

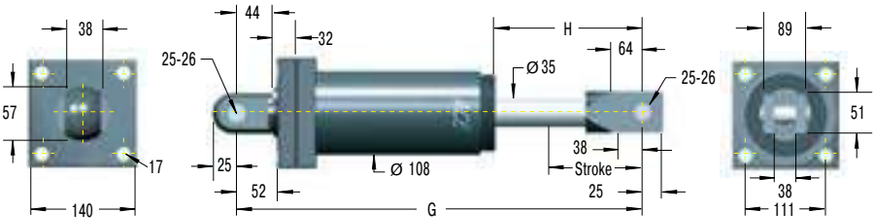
CA2-F Front Flange



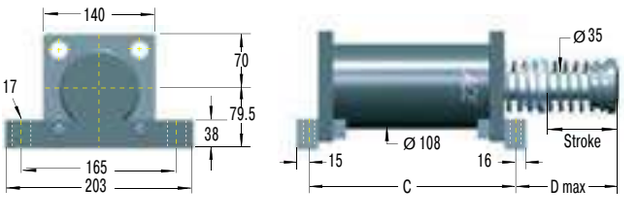
CA2-R Rear Flange



CA2-C Clevis Mount



CA2-S 2“ Bore 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

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 **CA2x4F-3**

- Self-Compensating
- Bore Size ⌀ 2"
- Stroke Length 4" (102 mm)
- Front Flange Mounting
- Effective Weight Range Version

Dimensions

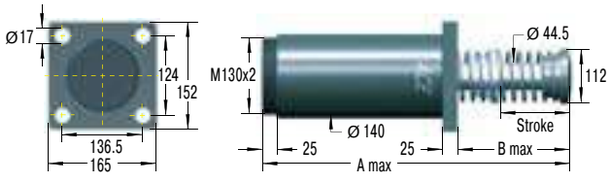
TYPES	Stroke mm	A max. mm	B max. mm	C mm	D max. mm	E mm
CA2X2	50	313	110	173	125	70
CA2X4	102	414	160	224	175	70
CA2X6	152	516	211	275	226	70
CA2X8	203	643	287	326	302	92
CA2X10	254	745	338	377	353	108

Performance

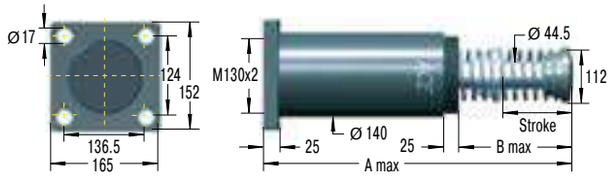
	Max. Energy Capacity			Effective Weight							
TYPES	[1] E_3 Nm/cycle	[2] E_4 Nm/h	[2] E_4 with Air/Oil Tank Nm/h	[3] We min. kg	[3] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
CA2X2-1	3,600	1,100,000	1,350,000	700	2,200	-1	210	285	0.25	3	12.8
CA2X2-2	3,600	1,100,000	1,350,000	1,800	5,400	-2	210	285	0.25	3	12.8
CA2X2-3	3,600	1,100,000	1,350,000	4,500	13,600	-3	210	285	0.25	3	12.8
CA2X2-4	3,600	1,100,000	1,350,000	11,300	34,000	-4	210	285	0.25	3	12.8
CA2X4-1	7,200	1,350,000	1,700,000	1,400	4,400	-1	150	285	0.50	3	14.8
CA2X4-2	7,200	1,350,000	1,700,000	3,600	11,000	-2	150	285	0.50	3	14.8
CA2X4-3	7,200	1,350,000	1,700,000	9,100	27,200	-3	150	285	0.50	3	14.8
CA2X4-4	7,200	1,350,000	1,700,000	22,600	68,000	-4	150	285	0.50	3	14.8
CA2X6-1	10,800	1,600,000	2,000,000	2,200	6,500	-1	150	400	0.60	3	16.9
CA2X6-2	10,800	1,600,000	2,000,000	5,400	16,300	-2	150	400	0.60	3	16.9
CA2X6-3	10,800	1,600,000	2,000,000	13,600	40,800	-3	150	400	0.60	3	16.9
CA2X6-4	10,800	1,600,000	2,000,000	34,000	102,000	-4	150	400	0.60	3	16.9
CA2X8-1	14,500	1,900,000	2,400,000	2,900	8,700	-1	230	650	0.70	3	19.3
CA2X8-2	14,500	1,900,000	2,400,000	7,200	21,700	-2	230	650	0.70	3	19.3
CA2X8-3	14,500	1,900,000	2,400,000	18,100	54,400	-3	230	650	0.70	3	19.3
CA2X8-4	14,500	1,900,000	2,400,000	45,300	136,000	-4	230	650	0.70	3	19.3
CA2X10-1	18,000	2,200,000	2,700,000	3,600	11,000	-1	160	460	0.80	3	22.8
CA2X10-2	18,000	2,200,000	2,700,000	9,100	27,200	-2	160	460	0.80	3	22.8
CA2X10-3	18,000	2,200,000	2,700,000	22,600	68,000	-3	160	460	0.80	3	22.8
CA2X10-4	18,000	2,200,000	2,700,000	56,600	170,000	-4	160	460	0.80	3	22.8

[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.

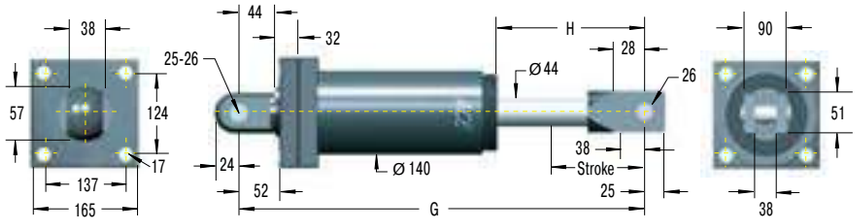
CA3-F Front Flange



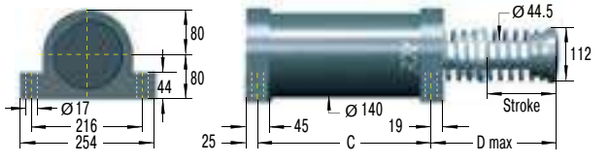
CA3-R Rear Flange



CA3-C Clevis Mount



CA3-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

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 **CA3x5-3F**

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

Dimensions

TYPES	Stroke mm	A max. mm	B max. mm	C mm	D max. mm
CA3X5	127	490.5	211	254	224
CA3X8	203	641	286	330	300
CA3X12	305	890	434	432	447

Performance

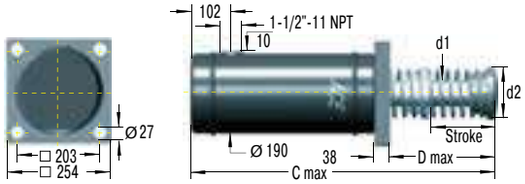
	Max. Energy Capacity			Effective Weight							
TYPES	[1] E_3 Nm/cycle	[2] E_4 Nm/h	[2] E_4 with Air/Oil Tank Nm/h	[3] We min. kg	[3] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
CA3X5-1	14,125	2,260,000	2,800,000	2,900	8,700	-1	270	710	0.6	3	28.9
CA3X5-2	14,125	2,260,000	2,800,000	7,250	21,700	-2	270	710	0.6	3	28.9
CA3X5-3	14,125	2,260,000	2,800,000	18,100	54,350	-3	270	710	0.6	3	28.9
CA3X5-4	14,125	2,260,000	2,800,000	45,300	135,900	-4	270	710	0.6	3	28.9
CA3X8-1	22,600	3,600,000	4,520,000	4,650	13,900	-1	280	740	0.8	3	33.4
CA3X8-2	22,600	3,600,000	4,520,000	11,600	34,800	-2	280	740	0.8	3	33.4
CA3X8-3	22,600	3,600,000	4,520,000	29,000	87,000	-3	280	740	0.8	3	33.4
CA3X8-4	22,600	3,600,000	4,520,000	72,500	217,000	-4	280	740	0.8	3	33.4
CA3X12-1	33,900	5,400,000	6,780,000	6,950	20,900	-1	270	730	1.2	3	40.6
CA3X12-2	33,900	5,400,000	6,780,000	17,400	52,200	-2	270	730	1.2	3	40.6
CA3X12-3	33,900	5,400,000	6,780,000	43,500	130,450	-3	270	730	1.2	3	40.6
CA3X12-4	33,900	5,400,000	6,780,000	108,700	326,000	-4	270	730	1.2	3	40.6

[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.

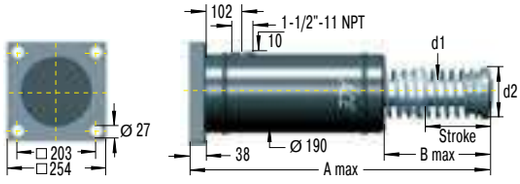
[2] Figures for oil recirculation systems on request.

[3] The effective weight range limits can be raised or lowered to special order.

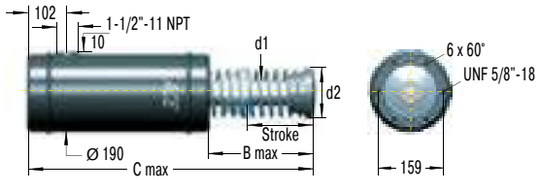
CA4-F Front Flange



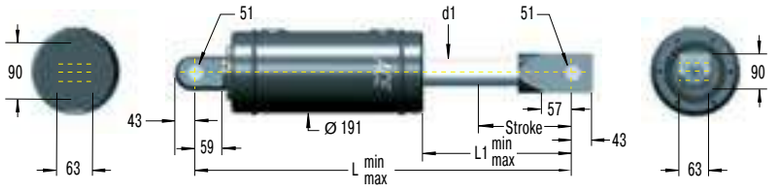
CA4-R Rear Flange



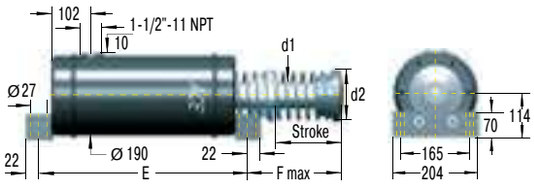
CA4-FRP 6 Tapped Holes, Primary Mounting



CA4-C Clevis Mount



CA4-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

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 **CA4x8R-5**

- Self-Compensating
- Bore Size ⌀ 4"
- Stroke Length 8" (203 mm)
- Rear Flange Mounting
- Effective Weight Range Version

Dimensions

TYPES	Stroke mm	A max. mm	B max. mm	C max. mm	D max. mm	d1 mm	d2 mm	E mm	F mm
CA4X6	152	716	278	678	240	54	114	444	256
CA4X8	203	818	329	780	291	54	114	495	307
CA4X16	406	1,300	608.5	1,262.6	569	63.5	127	698	585

Performance

	Max. Energy Capacity				Effective Weight						
TYPES	[1] E_3 Nm/cycle	E_4 Nm/h	E_4 with Air/Oil Tank Nm/h	E_4 with Oil Recirculation Nm/h	[2] We min. kg	[2] We max. kg	Hardness	Return Force min. N	Return Force max. N	Return Time s	Weight kg
CA4X6-3	47,500	3,000,000	5,100,000	6,600,000	3,500	8,600	-3	480	1,000	1.8	60.0
CA4X6-5	47,500	3,000,000	5,100,000	6,600,000	8,600	18,600	-5	480	1,000	1.8	60.0
CA4X6-7	47,500	3,000,000	5,100,000	6,600,000	18,600	42,700	-7	480	1,000	1.8	60.0
CA4X8-3	63,300	3,400,000	5,600,000	7,300,000	5,000	11,400	-3	310	1,000	2.3	68.0
CA4X8-5	63,300	3,400,000	5,600,000	7,300,000	11,400	25,000	-5	310	1,000	2.3	68.0
CA4X8-7	63,300	3,400,000	5,600,000	7,300,000	25,000	57,000	-7	310	1,000	2.3	68.0
CA4X16-3	126,500	5,600,000	9,600,000	12,400,000	10,000	23,000	-3	310	1,000	ask	146.0
CA4X16-5	126,500	5,600,000	9,600,000	12,400,000	23,000	50,000	-5	310	1,000	ask	146.0
CA4X16-7	126,500	5,600,000	9,600,000	12,400,000	50,000	115,000	-7	310	1,000	ask	146.0

[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.

A1 1/2 to A3

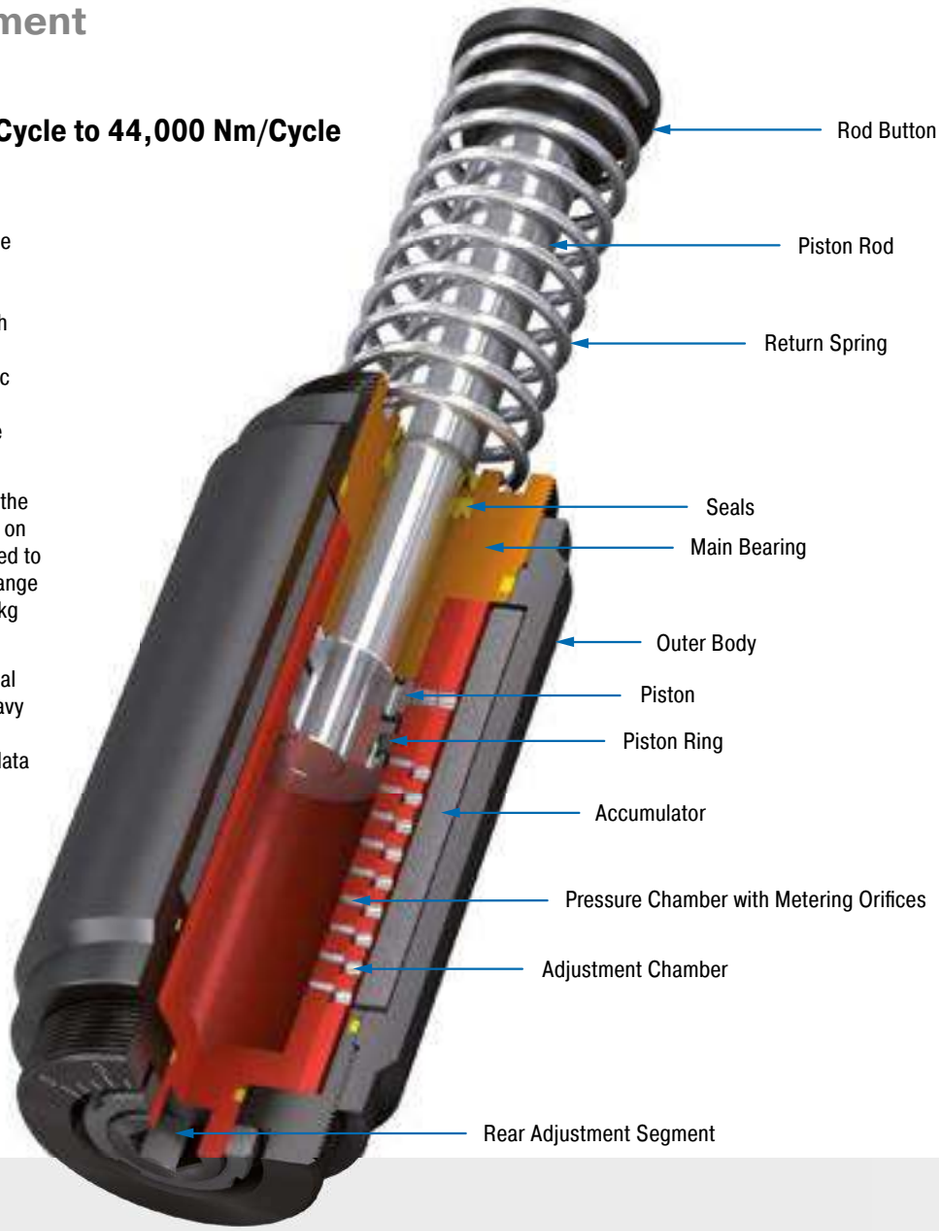
Deceleration of heavy loads and progressive adjustment

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 A1 1/2 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.

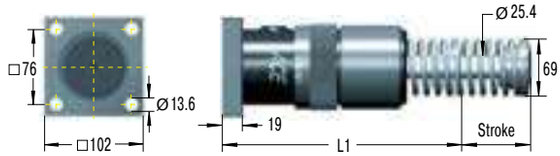
Safety information: External materials in the surrounding area can attack the seal components and lead to a shorter service life. Please contact ACE for appropriate solution suggestions. Do not paint the shock absorbers due to heat emission.

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

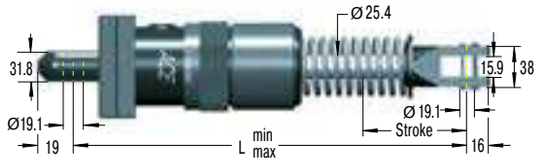
Issue 04.2018 – Specifications subject to change

A1 1/2-F Front Flange

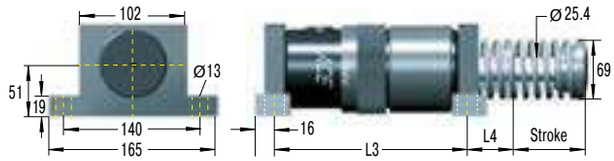
A1 1/2-R Rear Flange



A1 1/2-C Clevis Mount



A1 1/2-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 **A1½x2R**

Adjustable
Bore Size ⌀ 1½"
Stroke Length 2" (50.8 mm)
Rear Flange Mounting

Dimensions

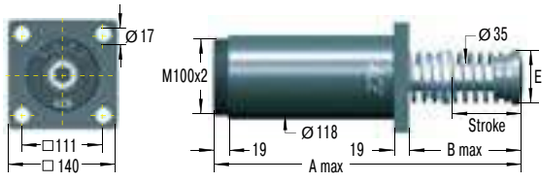
TYPES	Stroke mm	L min. mm	L max. mm	L1 mm	L2 mm	L3 mm	L4 mm
A11/2X2	50	277.8	328.6	195.2	54.2	-	-
A11/2X31/2	89	316.6	405.6	233	54.2	170	58.6
A11/2X5	127	354.8	481.8	271.5	54.2	208	58.6
A11/2X61/2	165	412	577	329	73	246	78

Performance

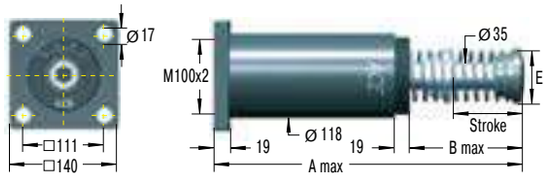
	Max. Energy Capacity			Effective Weight						
TYPES	[1] E_3 Nm/cycle	[2] E_4 Nm/h	[2] E_4 with Air/Oil Tank Nm/h	[3] We min. kg	[3] We max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
A11/2X2	2,350	362,000	452,000	195	32,000	160	210	0.10	5	7.6
A11/2X31/2	4,150	633,000	791,000	218	36,000	110	210	0.25	4	8.9
A11/2X5	5,900	904,000	1,130,000	227	41,000	90	230	0.40	3	9.4
A11/2X61/2	7,700	1,180,000	1,469,000	308	45,000	90	430	0.40	2	12.0

[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.

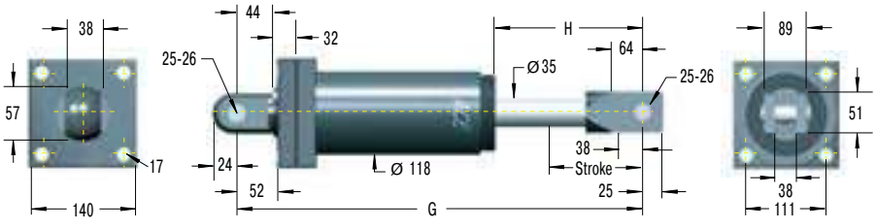
A2-F Front Flange



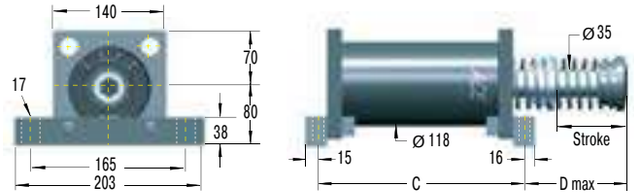
A2-R Rear Flange



A2-C Clevis Mount



A2-S 2“ Bore 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 **A2x6-R**

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

Dimensions

TYPES	Stroke mm	A max. mm	B max. mm	C mm	D max. mm	E mm
A2X2	50	313	110	173	125	70
A2X4	102	414	160	224	175	70
A2X6	152	516	211	275	226	70
A2X8	203	643	287	326	302	92
A2X10	254	745	338	377	353	108

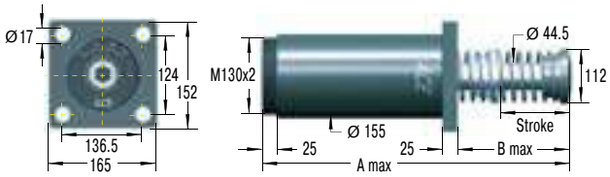
Performance

	Max. Energy Capacity			Effective Weight						
TYPES	[1] E_3 Nm/cycle	[2] E_4 Nm/h	[2] E_4 with Air/Oil Tank Nm/h	[3] We min. kg	[3] We max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
A2X2	3,600	1,100,000	1,350,000	250	77,000	210	285	0.25	3	14.3
A2X4	9,000	1,350,000	1,700,000	250	82,000	150	285	0.50	3	16.7
A2X6	13,500	1,600,000	2,000,000	260	86,000	150	400	0.60	3	19.3
A2X8	19,200	1,900,000	2,400,000	260	90,000	230	650	0.70	3	22.3
A2X10	23,700	2,200,000	2,700,000	320	113,000	160	460	0.80	3	26.2

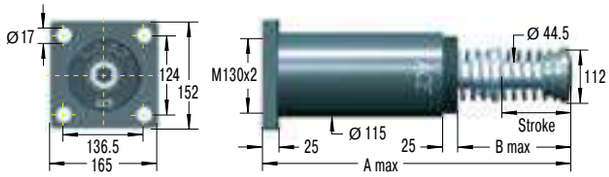
[1] For emergency use only applications it is sometimes possible to exceed the above ratings. Please consult ACE for further details.
[2] Figures for oil recirculation systems on request.
[3] The effective weight range limits can be raised or lowered to special order.

Issue 04.2018 – Specifications subject to change

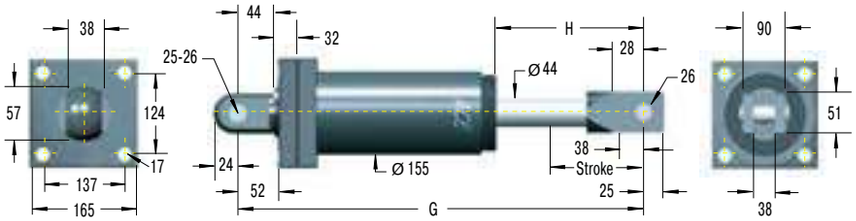
A3-F Front Flange



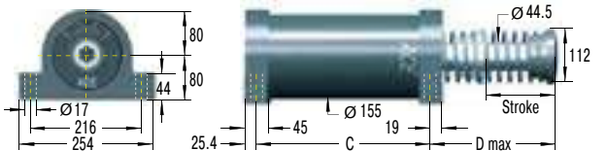
A3-R Rear Flange



A3-C Clevis Mount



A3-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 **A3x8R**

Adjustable
Bore Size ⌀ 3"
Stroke Length **8"** (203 mm)
Rear Flange Mounting

Dimensions

TYPES	Stroke mm	A max. mm	B max. mm	C mm	D max. mm
A3X5	127	490.5	211	254	224
A3X8	203	641	286	330	300
A3X12	305	890	434	432	447

Performance

	Max. Energy Capacity			Effective Weight						
TYPES	[1] E_3 Nm/cycle	[2] E_4 Nm/h	[2] E_4 with Air/Oil Tank Nm/h	[3] We min. kg	[3] We max. kg	Return Force min. N	Return Force max. N	Return Time s	Side Load Angle max. °	Weight kg
A3X5	15,800	2,260,000	2,800,000	480	154,000	270	710	0.6	3	32.7
A3X8	28,200	3,600,000	4,520,000	540	181,500	280	740	0.8	3	38.5
A3X12	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.

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, use of an air-oil tank is the solution.

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

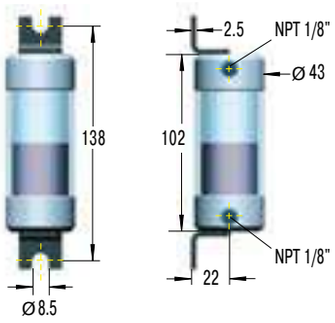
In addition, the air-oil tank provides an opportunity for controlled piston return if no permanent return force through an integrated spring in the shock absorber is desired.

Air/Oil Tanks AO

AO1

Oil capacity 20 cm³

Material: Aluminium caps



AO3

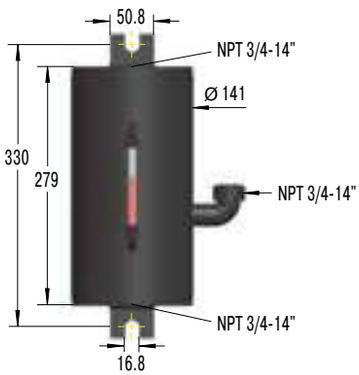
Oil capacity 370 cm³

Material: Steel

AO6

Oil capacity 2,600 cm³

Material: Steel



Detail drawings on request

Technical Data

Operating pressure: Max. 8 bar (116 psi)

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.

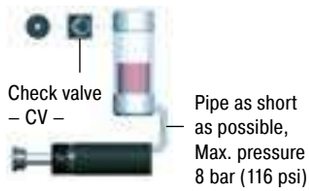
Safety instructions: Exhaust tank before carrying out service. Check valve holds pressure!

Suggested air/oil tanks in accordance with E_4 ratings

Issue 04.2018 – Specifications subject to change

Connection Examples

1

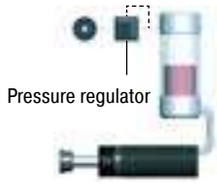


Piston rod returns immediately to extended position when load moves away. Operation without main air supply possible for short periods.

2

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

3

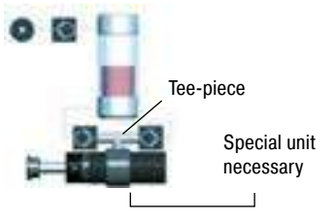


Return force can be adjusted by pressure regulator. Ensure safe minimum pressure to return shock absorber.

4

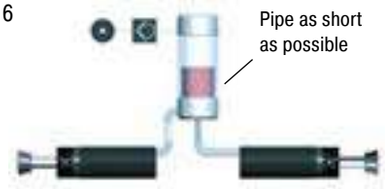
Spring return with air/oil tank. No air supply connected. Note: Will extend return time.

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.

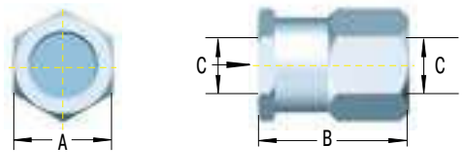
Selection Chart Air/Oil Tanks

	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 (290 psi)
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

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.

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

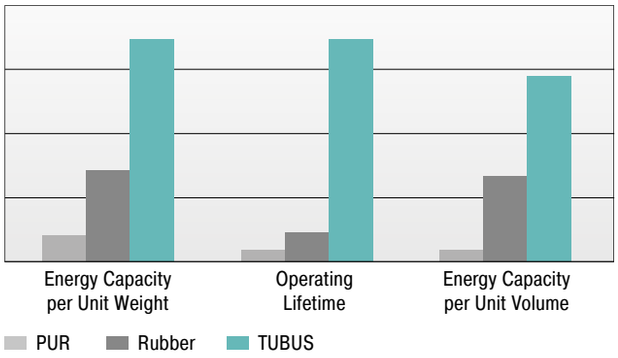
Physical Properties of TUBUS Profile Dampers

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.

An advantage over other damping elements is TUBUS´ 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

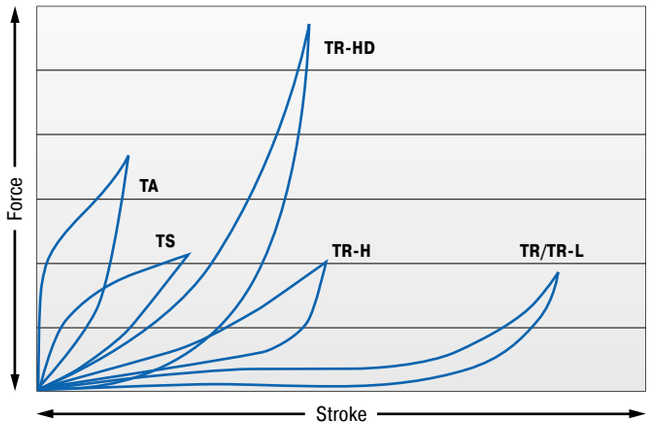
The innovative TUBUS dampers absorb energy while exhibiting the following damping characteristics:

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.

Capacity Chart

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

TYPES	Max. Energy Capacity [1] E_3 Nm/cycle	Max. Energy Capacity Emergency Stop E_3 Nm/cycle	Stroke max. mm	Page
TA12-5	2.0	3.0	5	117
TA17-7	6.0	9.0	7	117
TA21-9	10.0	16.0	9	117
TA22-10	11.5	21.0	10	117
TA28-12	29.0	46.0	12	117
TA34-14	48.0	87.0	14	117
TA37-16	65.0	112.0	16	117
TA40-16	82.0	130.0	16	117
TA43-18	112.0	165.0	18	117
TA47-20	140.0	173.0	20	117
TA50-22	170.0	223.0	22	117
TA54-22	201.0	334.0	22	117
TA57-24	242.0	302.0	24	117
TA62-25	304.0	361.0	25	117
TA65-27	374.0	468.0	27	117
TA70-29	421.0	524.0	29	117
TA72-31	482.0	559.0	31	117
TA80-32	570.0	831.0	32	117
TA82-35	683.0	921.0	35	117
TA85-36	797.0	1,043.0	36	117
TA90-38	934.0	1,249.0	38	117
TA98-40	1,147.0	1,555.0	40	117
TA116-48	2,014.0	2,951.0	48	117
TS14-7	2.0	3.0	7	119
TS18-9	4.0	6.0	9	119
TS20-10	6.0	7.0	10	119
TS26-15	11.5	15.0	15	119
TS32-16	23.0	26.0	16	119
TS35-19	30.0	36.0	19	119
TS40-19	34.0	42.0	19	119
TS41-21	48.0	63.0	21	119
TS44-23	63.0	72.0	23	119
TS48-25	81.0	91.0	25	119
TS51-27	92.0	114.0	27	119
TS54-29	122.0	158.0	29	119
TS58-30	149.0	154.0	30	119
TS61-32	163.0	169.0	32	119
TS64-34	208.0	254.0	34	119
TS68-36	227.0	272.0	36	119
TS75-39	291.0	408.0	39	119
TS78-40	352.0	459.0	40	119
TS82-44	419.0	620.0	44	119
TS84-43	475.0	635.0	43	119
TS90-47	580.0	778.0	47	119
TS107-56	902.0	966.0	56	119
TR29-17	1.2	1.8	17	121
TR37-22	2.3	5.4	22	121
TR43-25	3.5	8.1	25	121
TR50-35	5.8	8.3	35	121
TR63-43	12.0	17.0	43	121
TR67-40	23.0	33.0	40	121
TR76-46	34.5	43.0	46	121
TR83-50	45.0	74.0	50	121
TR85-50	68.0	92.0	50	121
TR93-57	92.0	122.0	57	121
TR100-60	115.0	146.0	60	121
TR30-15H	2.7	5.7	15	123
TR39-19H	6.0	18.0	19	123
TR45-23H	8.7	24.0	23	123
TR52-32H	11.7	20.0	32	123
TR64-41H	25.0	46.0	41	123
TR68-37H	66.5	98.0	37	123
TR79-42H	81.5	106.0	42	123
TR86-45H	124.0	206.0	45	123
TR87-46H	158.0	261.0	46	123
TR95-50H	228.0	342.0	50	123
TR102-56H	290.0	427.0	56	123
TR42-14HD	405.0	567.0	14	127
TR47-12HD	857.0	1,200.0	12	127
TR47-17HD	850.0	1,190.0	17	127
TR52-14HD	1,634.0	2,288.0	14	127
TR57-21HD	1,194.0	1,672.0	21	127

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

TYPES	Max. Energy Capacity [1] E_3 Nm/cycle	Max. Energy Capacity Emergency Stop E_3 Nm/cycle	Stroke max. mm	Page
TR62-15HD	1,790	2,506	15	127
TR62-19HD	2,940	4,116	19	127
TR63-24HD	2,061	2,885	24	127
TR72-26HD	1,700	2,380	26	127
TR79-20HD	2,794	3,912	20	127
TR79-31HD	2,975	4,165	31	127
TR85-33HD	2,526	3,536	33	127
TR89-21HD	4,438	6,213	21	127
TR90-37HD	3,780	5,292	37	127
TR93-24HD	3,421	4,789	24	127
TR97-31HD	7,738	10,833	31	127
TR97-35HD	2,821	3,949	35	127
TR102-44HD	4,697	6,576	44	127
TR105-28HD	5,641	7,897	28	127
TR117-30HD	8,457	11,840	30	127

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

TUBUS TR-L

TYPES	Max. Energy Capacity [1] E_3 Nm/cycle	Max. Energy Capacity Emergency Stop E_3 Nm/cycle	Stroke max. mm	Page
TR29-17L	7.2	10.9	17	125
TR43-25L	14.0	32.7	25	125
TR63-43L	21.9	32.0	43	125
TR66-40L-1	102.0	143.0	40	125
TR66-40L-2	204.0	286.0	40	125
TR66-40L-3	306.0	428.0	40	125
TR66-40L-4	408.0	571.0	40	125
TR66-40L-5	510.0	714.0	40	125
TR76-45L-1	145.0	203.0	45	125
TR76-45L-2	290.0	406.0	45	125
TR76-45L-3	435.0	609.0	45	125
TR76-45L-4	580.0	812.0	45	125
TR76-45L-5	725.0	1,015.0	45	125
TR83-48L-1	180.0	252.0	48	125
TR83-48L-2	360.0	504.0	48	125
TR83-48L-3	540.0	756.0	48	125
TR83-48L-4	720.0	1,008.0	48	125
TR83-48L-5	900.0	1,260.0	48	125
TR99-60L-1	270.0	378.0	60	125
TR99-60L-2	540.0	756.0	60	125
TR99-60L-3	810.0	1,134.0	60	125
TR99-60L-4	1,080.0	1,512.0	60	125
TR99-60L-5	1,350.0	1,890.0	60	125
TR99-60L-6	1,620.0	2,268.0	60	125
TR99-60L-7	1,890.0	2,646.0	60	125
TR143-86L-1	600.0	840.0	86	125
TR143-86L-2	1,200.0	1,680.0	86	125
TR143-86L-3	1,800.0	2,520.0	86	125
TR143-86L-4	2,400.0	3,360.0	86	125
TR143-86L-5	3,000.0	4,200.0	86	125
TR143-86L-6	3,600.0	5,040.0	86	125
TR143-86L-7	4,200.0	5,880.0	86	125
TR188-108L-1	1,100.0	1,540.0	108	125
TR188-108L-2	2,200.0	3,080.0	108	125
TR188-108L-3	3,300.0	4,620.0	108	125
TR188-108L-4	4,400.0	6,160.0	108	125
TR188-108L-5	5,500.0	7,700.0	108	125
TR188-108L-6	6,600.0	9,240.0	108	125
TR188-108L-7	7,700.0	10,780.0	108	125

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

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Profile Dampers

TUBUS TA

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

TUBUS TS

Page 118

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

TUBUS TR

Page 120

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

TUBUS TR-H

Page 122

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

TUBUS TR-L

Page 124

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

TUBUS TR-HD

Page 126

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 to 48 mm

Very efficient energy guzzlers: The TA profile dampers from the ACE TUBUS-Series are maintenance-free and ready to install. They‘re made of co-polyester elastomer; a material that only heats up slightly and ensures consistent damping. The TA models absorbs most of the 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 (18 in-lbs to 26,119 in-lbs.). These dampers have a minimum height is thanks to the space-saving shape, with Ø 12 mm to Ø 116 mm (Ø 0.47“ to Ø 4.57“). The dampers can be very easily and quickly installed with the provided special screw.

These compact, cost-effective dampers 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 information: Mounting screw should additionally be secured with Loctite.

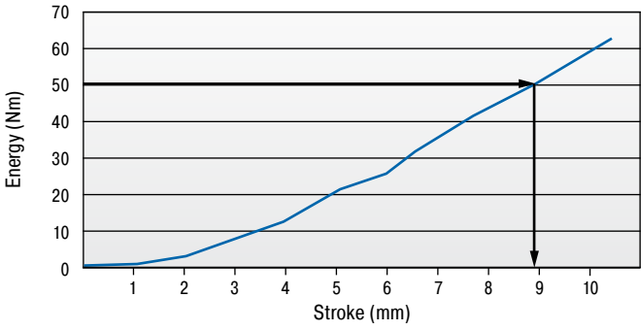
On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

Issue 04.2018 – Specifications subject to change

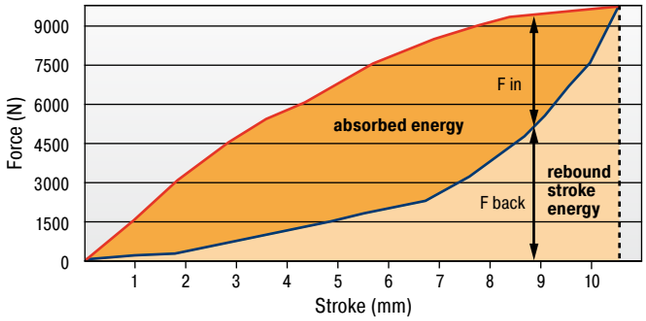
TA

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-⌀ 1.46" (37 mm)
Stroke 0.63" (16 mm)

Performance and Dimensions

TYPES	[1] E_3 Nm/cycle	Emergency Stop E_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	0.006
TA21-9	10.0	16	9	18	21	18	26	5	M5	0.017
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.

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 product family 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

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

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

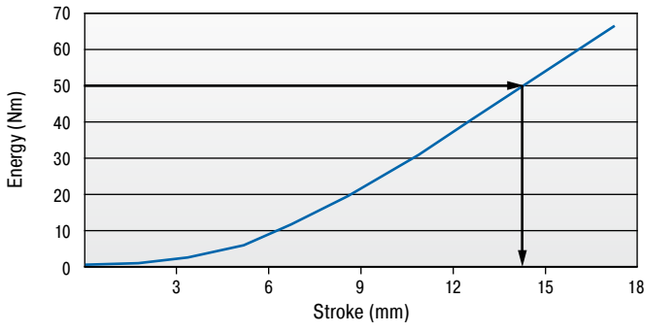
On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

Issue 04.2018 – Specifications subject to change

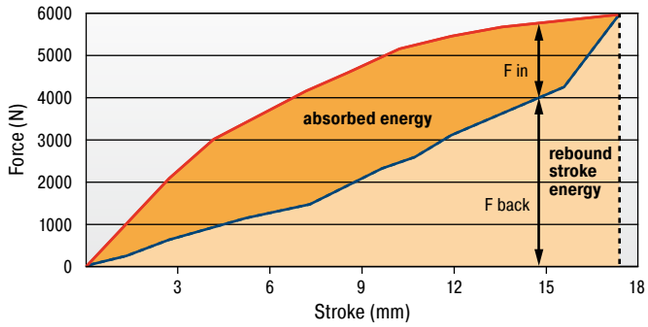
TS

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-⌀ 1.73" (44 mm)
Stroke 0.91" (23 mm)

Performance and Dimensions

TYPES	[1] E_3 Nm/cycle	Emergency Stop E_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	0.007
TS18-9	4.0	6	9	18	18	16	24	5	M5	0.008
TS20-10	6.0	7	10	21	20	19	27	6	M6	0.008
TS26-15	11.5	15	15	28	26	25	37	6	M6	0.015
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	0.121
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	0.332
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	0.583
TS107-56	902.0	966	56	110	107	100	147	16	M16	0.733

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

TUBUS TR

Compact size and soft deceleration

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

For long, soft braking action: The TUBUS TR models deliver linear damping forces. 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 product family 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, Dock constructions for shipbuilding

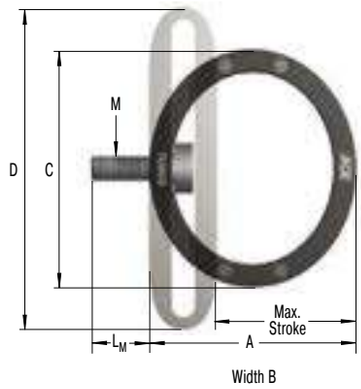
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

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

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

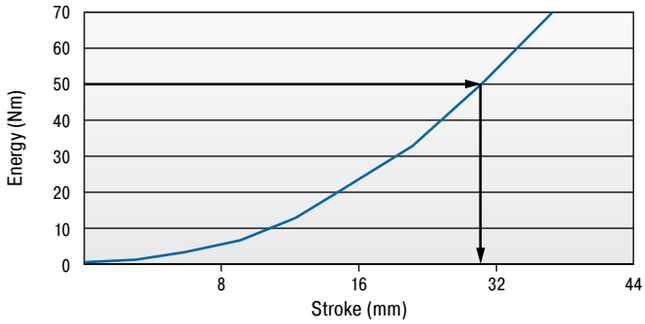
Issue 04.2018 – Specifications subject to change

TR

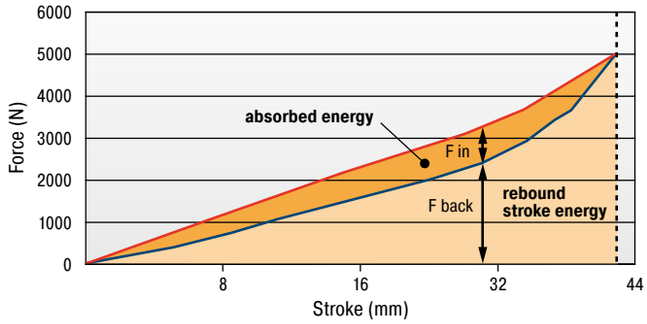


Characteristics

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-⌀ 3.66" (93 mm)
Stroke 2.24" (57 mm)

Performance and Dimensions

TYPES	[1] E_3 Nm/cycle	Emergency Stop E_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	0.007
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	0.022
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	0.077
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.

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 to 56 mm

Harder mixture of materials for higher energy absorption: The maintenance-free and ready-to-install TR-H 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 (3.9 in-lbs to 3,779 in-lbs) in these models. The supplied special screw makes them easy to mount.

The TR-H product family is space-saving with dimensions of Ø 30 mm to Ø 102 mm (Ø 1.18“ to Ø 4.02“). 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, Dock constructions for shipbuilding

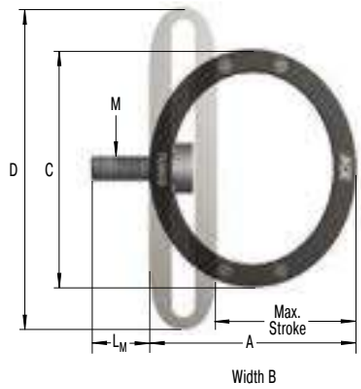
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

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

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

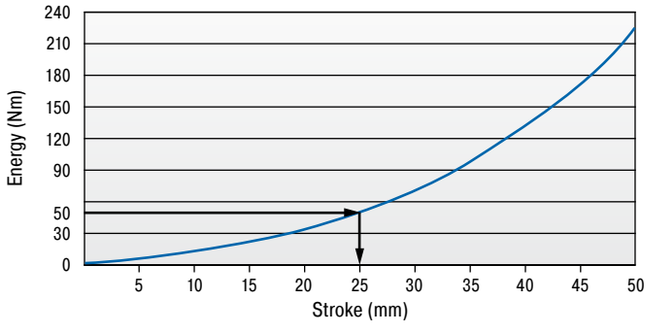
Issue 04.2018 – Specifications subject to change

TR-H

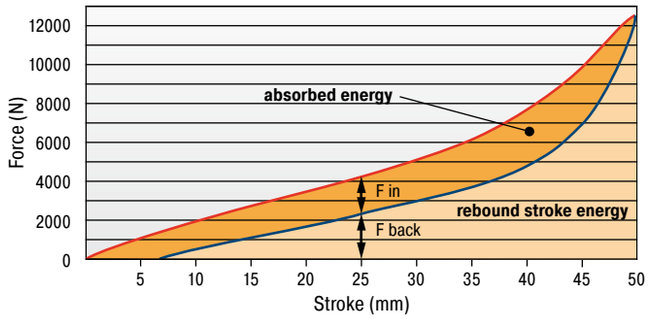


Characteristics

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-⌀ 3.74" (95 mm)
Stroke 1.97" (50 mm)
Hard Version

Performance and Dimensions

TYPES	[1] E_3 Nm/cycle	Emergency Stop E_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	0.006
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	0.027
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	0.083
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	0.202
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.

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 to 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 range 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

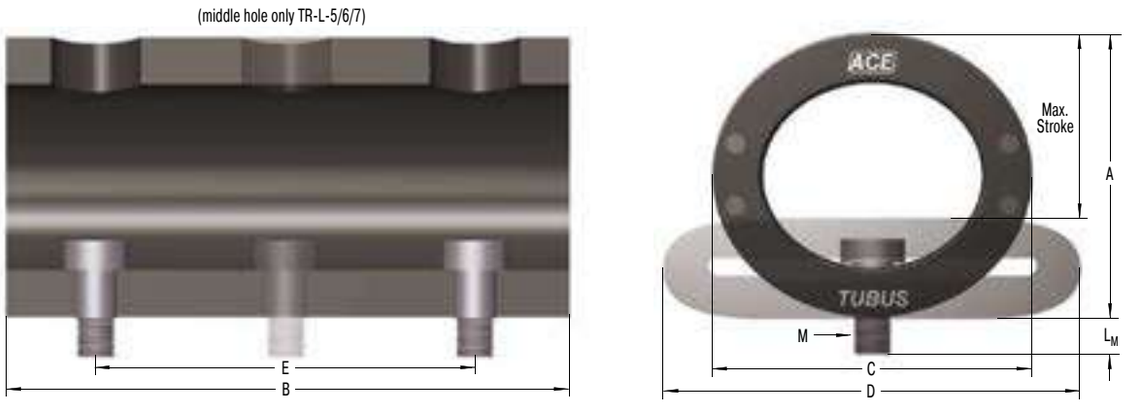
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

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

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

Issue 04.2018 – 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-⌀ 2.60" (66 mm)
Stroke 1.57" (40 mm)
Long Version
Length 2 = 12.01" (305 mm)

Performance and Dimensions

TYPES	[1] E_3 Nm/cycle	Emergency Stop E_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	0.029
TR43-25L	14.0	32.7	25	37	80	43	58	40	5	M5	0.061
TR63-43L	21.9	32.0	43	55	80	63	87	40	5	M5	0.101
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	0.809
TR66-40L-4	408.0	571.0	40	59	610	66	87	559	8	M8	1.064
TR66-40L-5	510.0	714.0	40	59	762	66	87	711	8	M8	1.344
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	1.820
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	0.869
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	0.589
TR99-60L-2	540.0	756.0	60	88	305	99	130	254	8	M8	1.164
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	3.744
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	1.570
TR143-86L-2	1,200.0	1,680.0	86	127	305	143	191	203	22	M16	2.840
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	7.070
TR143-86L-6	3,600.0	5,040.0	86	127	914	143	191	812	22	M16	8.370
TR143-86L-7	4,200.0	5,880.0	86	127	1,067	143	191	965	22	M16	9.480
TR188-108L-1	1,100.0	1,540.0	108	165	152	188	245	76	26	M16	2.479
TR188-108L-2	2,200.0	3,080.0	108	165	305	188	245	203	26	M16	4.035
TR188-108L-3	3,300.0	4,620.0	108	165	457	188	245	355	26	M16	7.210
TR188-108L-4	4,400.0	6,160.0	108	165	610	188	245	508	26	M16	9.820
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	13.930
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.

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 product family 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. Delivered with two included screws, the damper can be easily and quickly installed both horizontally or vertically. The drill hole distance can be 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

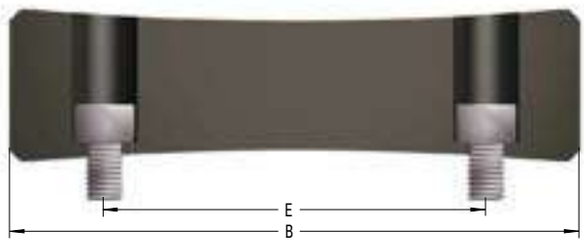
Note: Suitable for emergency stop applications and for continous use. For applications with preloading and increased temperatures please consult ACE.

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

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

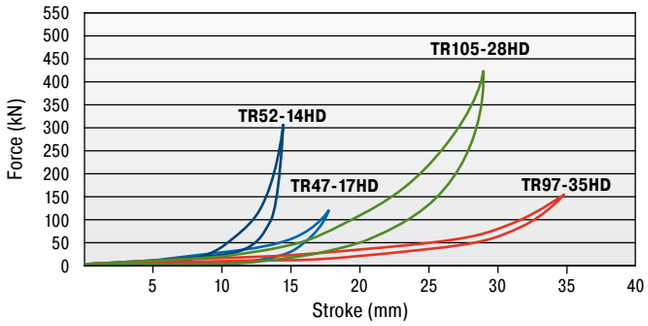
Issue 04.2018 – Specifications subject to change

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-⌀ 2.48" (63 mm)
Stroke 0.94" (24 mm)
Heavy Duty Version

Performance and Dimensions

TYPES	[1] E_3 Nm/cycle	Emergency Stop E_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	0.214
TR47-12HD	857	1,200	149,600	12	31	150	47	58	102	19	M10	0.224
TR47-17HD	850	1,190	122,100	17	32	150	47	70	102	24	M10	0.224
TR52-14HD	1,634	2,288	304,500	14	29	153	52	69	102	22	M10	0.224
TR57-21HD	1,194	1,672	104,800	21	48	149	57	79	102	18	M10	0.384
TR62-15HD	1,790	2,506	245,000	15	40	153	62	77	102	16	M10	0.374
TR62-19HD	2,940	4,116	389,900	19	41	152	62	94	102	16	M10	0.320
TR63-24HD	2,061	2,885	194,400	24	46	153	63	92	102	20	M10	0.377
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	0.640
TR79-31HD	2,975	4,165	226,600	31	58	155	79	112	102	23	M12	0.530
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	0.630
TR90-37HD	3,780	5,292	240,700	37	69	155	90	128	102	23	M12	0.820
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	0.870
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	1.080

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

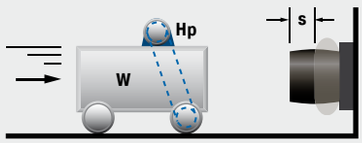
Application Examples

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

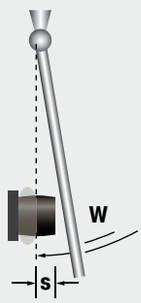


TUBUS TS

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



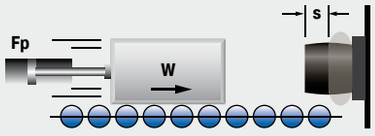
Issue 04.2018 – Specifications subject to change

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

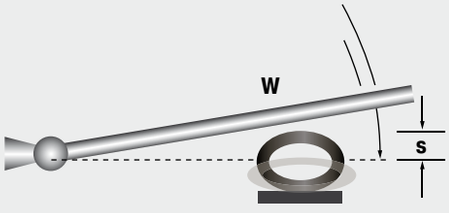


TUBUS TR

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



Special Profile Dampers

Cost-effective damping 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 sheer 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.

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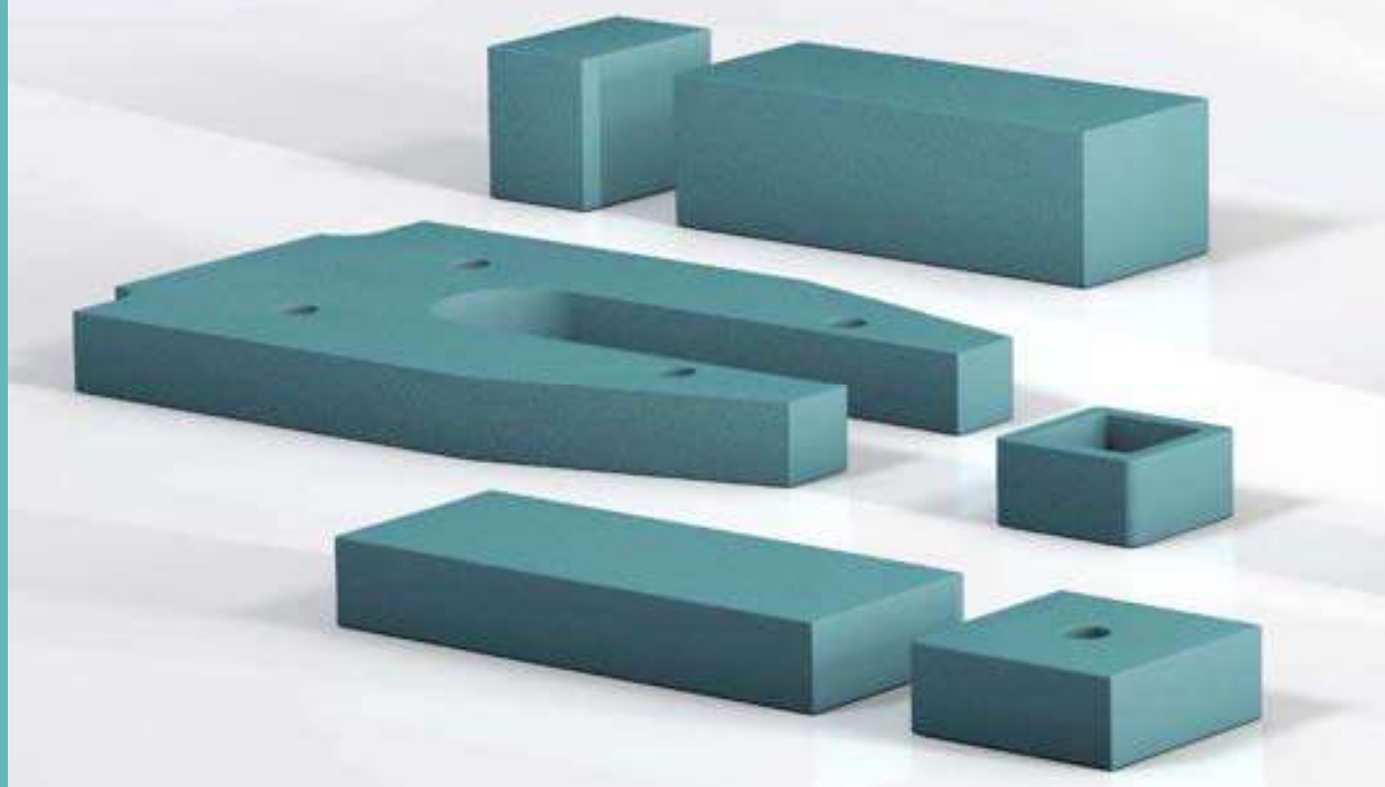
Damping Pads

Customized damping technology

With damping pads from the SLAB series, ACE provides solutions to effectively slow down loads impacting 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 to 30 N/cm² aand can be either cut to size according to each requirement or designed as a molded part. Simply use an adhesive to install. The standard plate heights are between 12.5 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

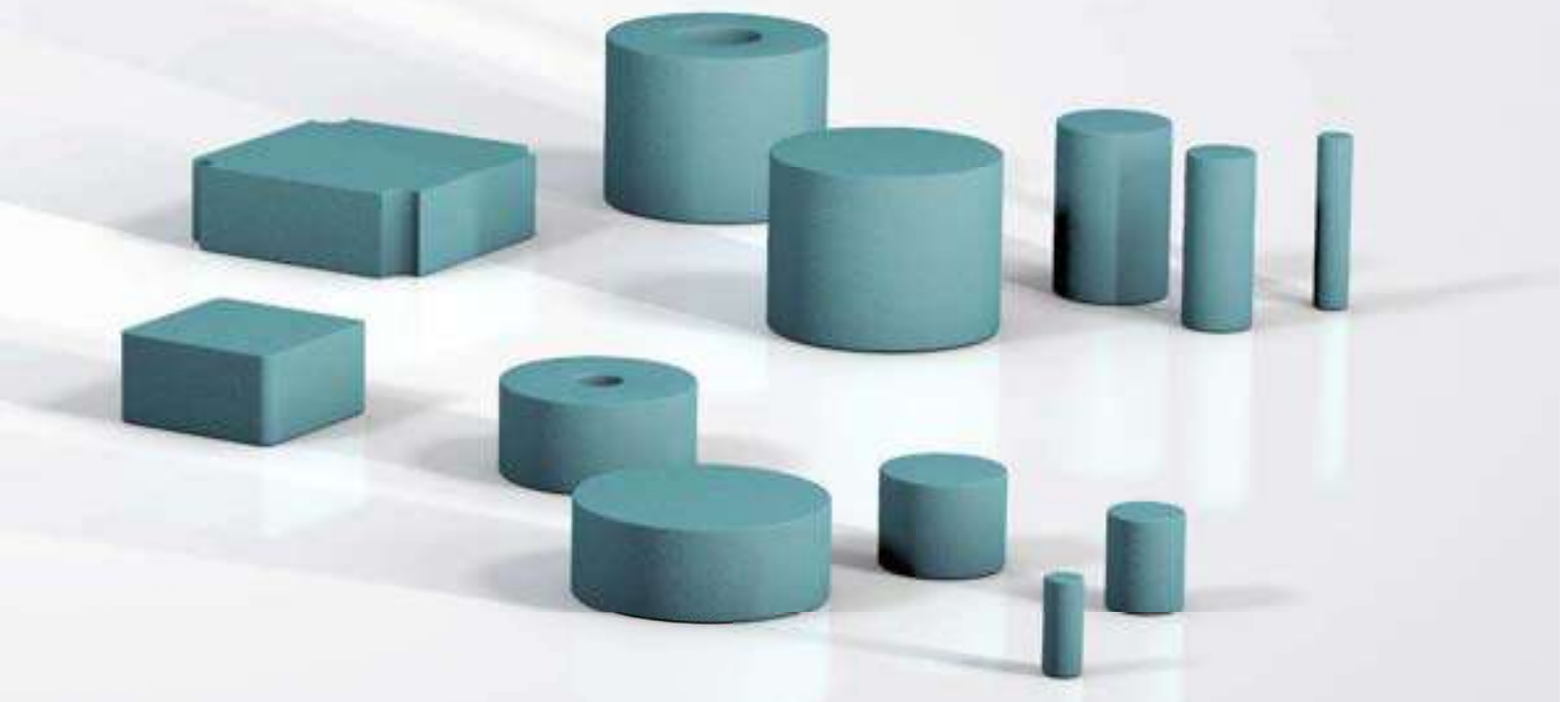
SLAB pads pre-assembled for each project

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.

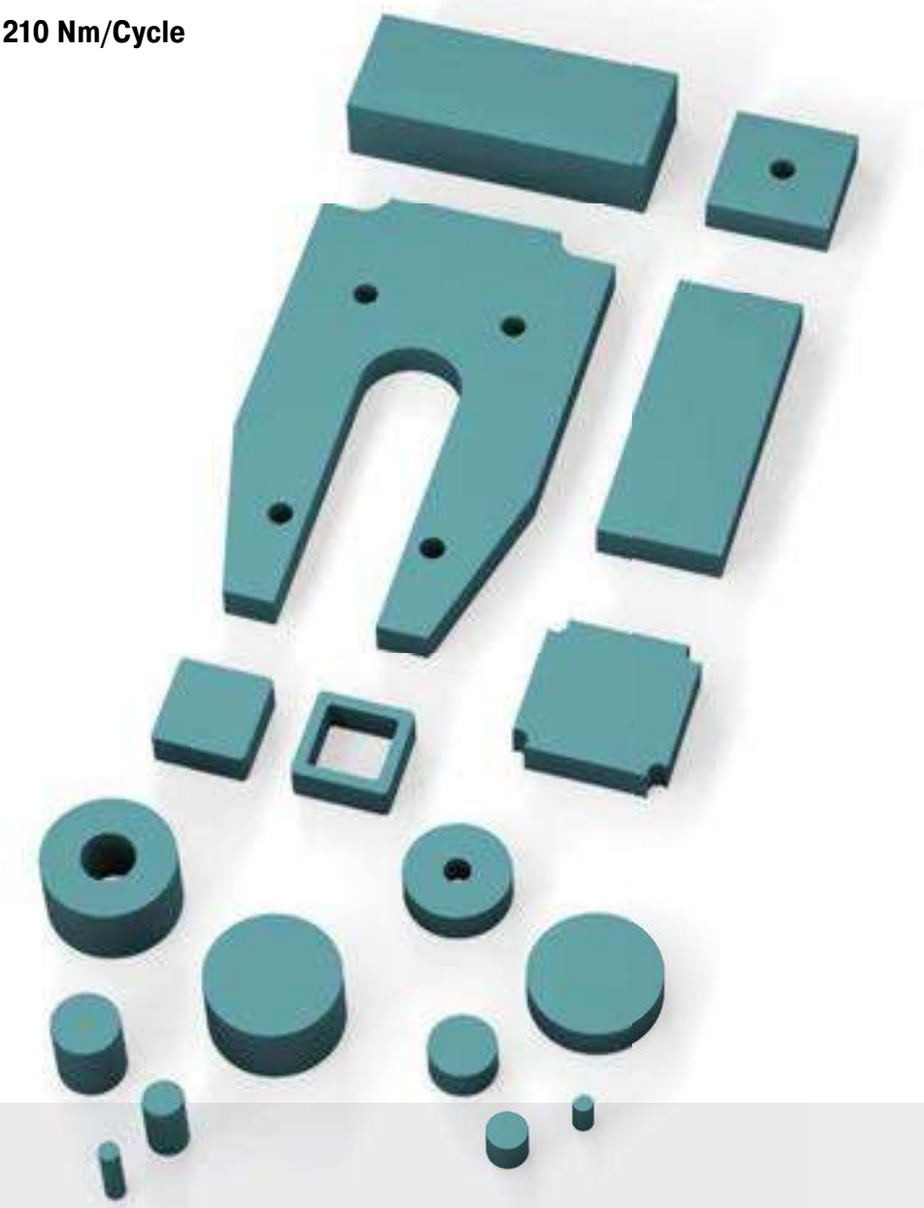
- Can be integrated quickly and cost-effectively
- Immense inner damping
- Pad thicknesses up to 80 mm on request
- Can be assembled with CNC cutting machines
- Patented formula



SLAB 030 to SLAB 300

Energy absorption in pad format

Connectable 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 pads of the product family 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/m^3
SL-100 = approx. 440 kg/m^3
SL-300 = approx. 680 kg/m^3

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, Buildings

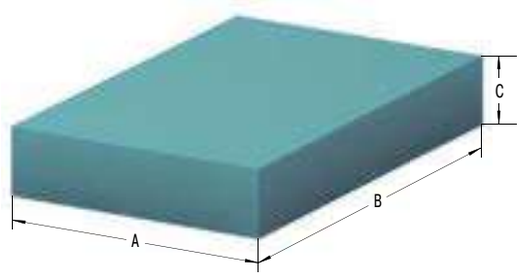
Note: Possibilities for cutting: Water jet cutting, stamping, splitting, sawing and drilling

Safety information: 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.

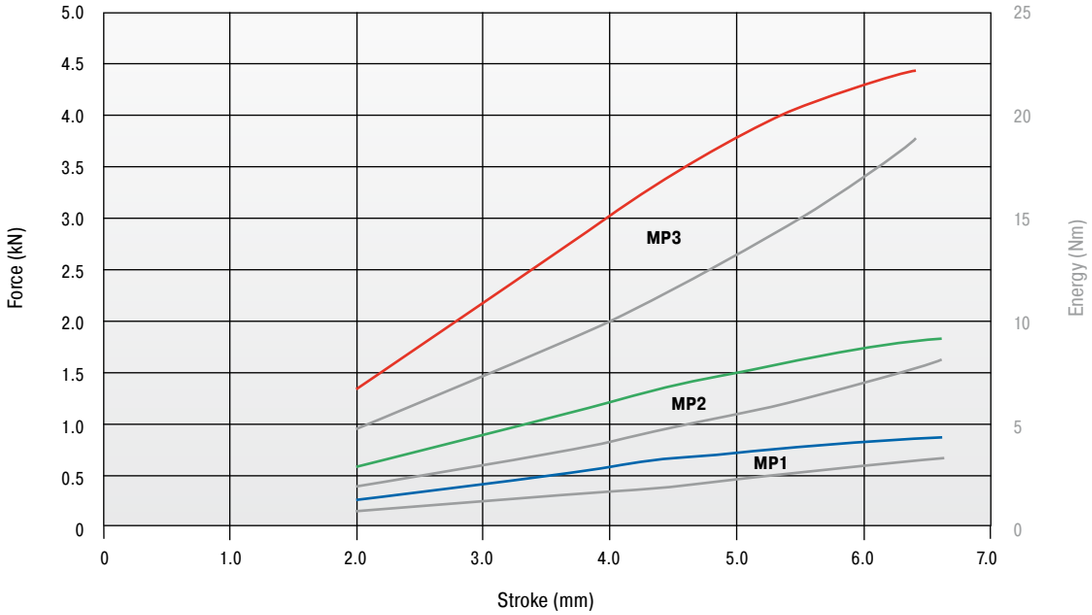
Issue 04.2018 – Specifications subject to change

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**

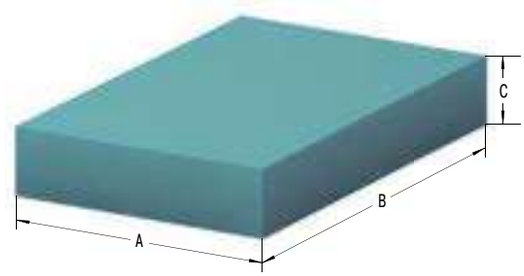
ACE-SLAB
Material Type
Material Thickness 0.49" (12.5 mm)
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] E_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

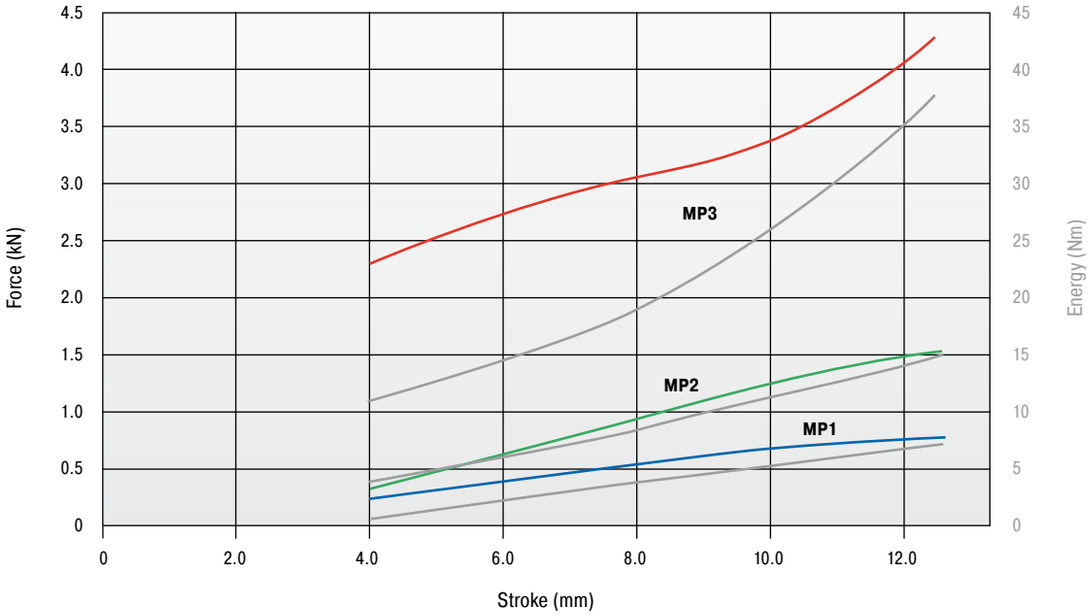
[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

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 0.98" (25 mm)
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

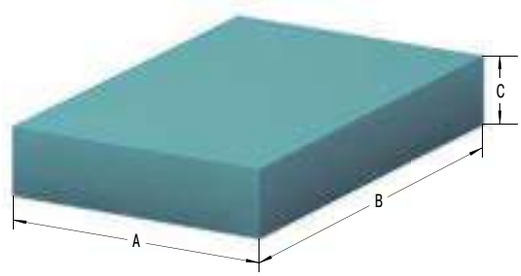
Performance and Dimensions

TYPES	[1] E_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.

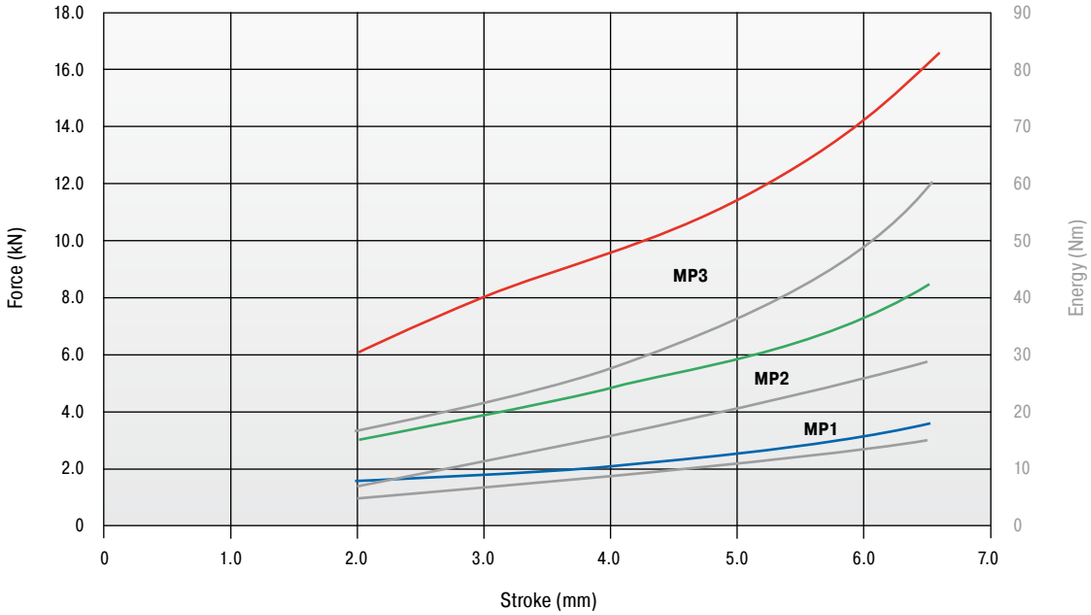
Issue 04.2018 – Specifications subject to change

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**

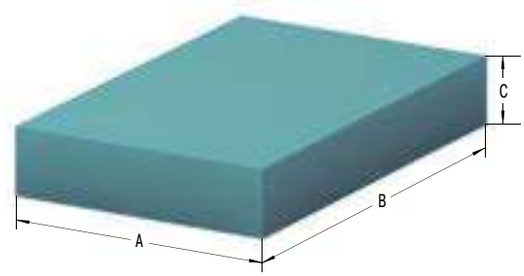
ACE-SLAB
Material Type
Material Thickness 0.49" (12.5 mm)
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] E_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

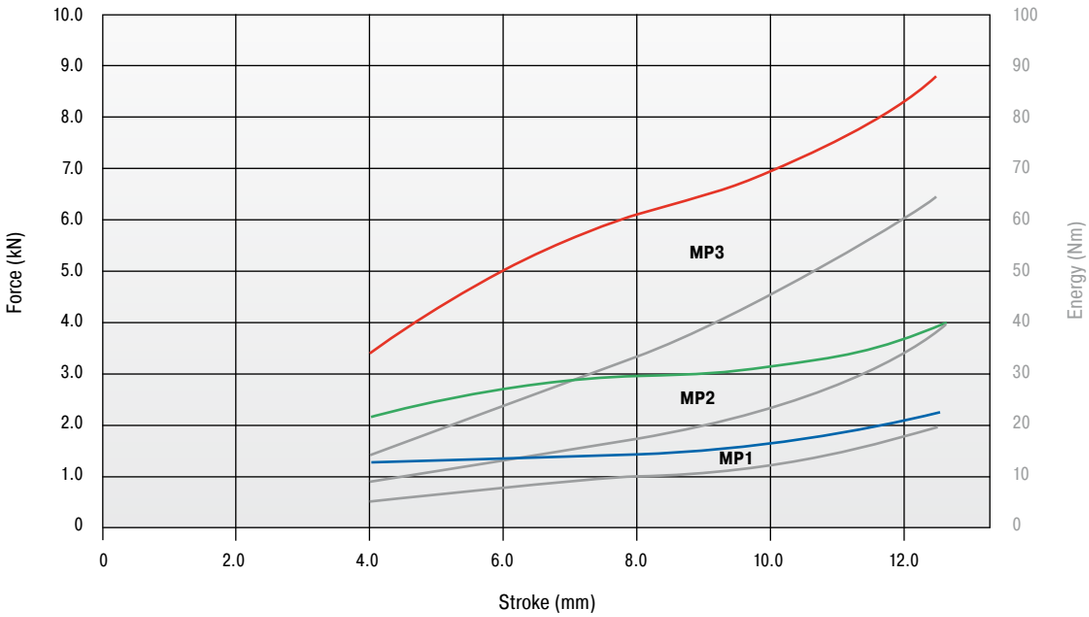
[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

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 0.98" (25 mm)
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

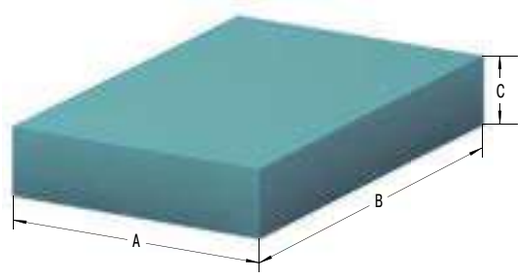
Performance and Dimensions

TYPES	[1] E_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.

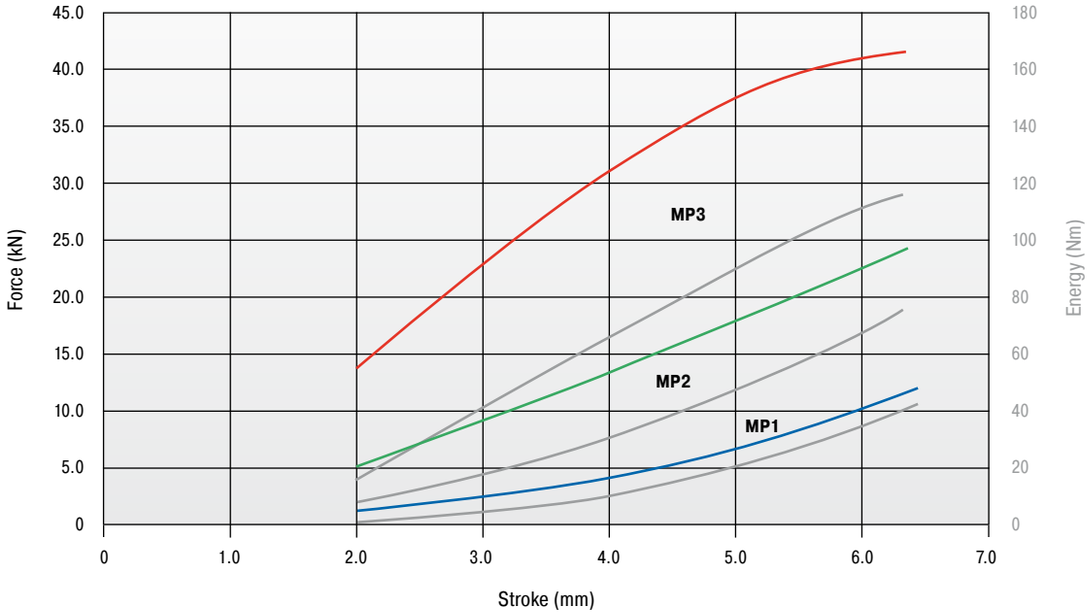
Issue 04.2018 – Specifications subject to change

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**

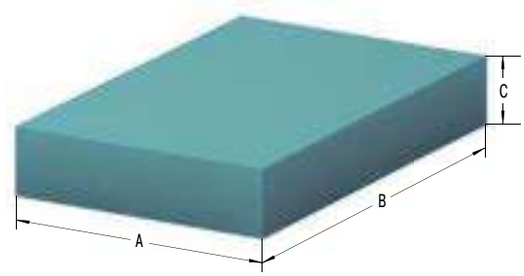
ACE-SLAB
Material Type
Material Thickness 0.49" (12.5 mm)
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] E_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

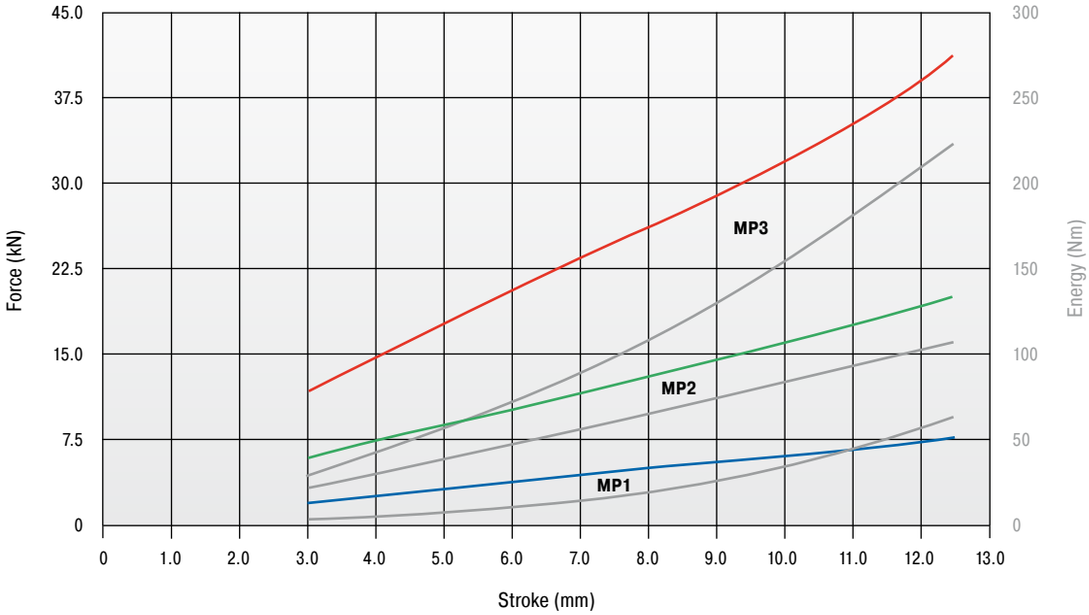
[1] Maximum energy absorption in terms of area graded pad sizes as a reference for the correct selection of material and pad size. The energy absorption depends on the individual impact surface and stroke utilization.

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 0.98" (25 mm)
Customers Specific Dimension/Shape
(D-Number is assigned by ACE)

Performance and Dimensions

TYPES	[1] E_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.

Issue 04.2018 – Specifications subject to change

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 U.S.
Sika Corporation
201 Polito Avenue

Lyndhurst, NJ 07071

T +1 (800) 933-SIKA (7452)
www.usa.sika.com

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**	change 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 04.2018 – Specifications subject to change

Sample Pads and Kits

Sample Kits

Part Number	Description	Dimensions
250-0800	SL-030-12 Sample Kit	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm x 12.5 mm
250-0801	SL-030-25 Sample Kit	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm x 12.5 mm
250-0802	SL-100-12 Sample Kit	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm x 12.5 mm
250-0803	SL-100-25 Sample Kit	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm x 12.5 mm
250-0804	SL-300-12 Sample Kit	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm x 12.5 mm
250-0805	SL-300-25 Sample Kit	50 x 50 mm / 70.7 x 70.7 mm / 100 x 100 mm x 12.5 mm
250-0806	SL-170-12/25 Sample Kit	220 mm x 150 mm x 12.5 mm & 25 mm
250-0807	SL-210-12/25 Sample Kit	220 mm x 150 mm x 12.5 mm & 25 mm
250-0808	SL-275-12/25 Sample Kit	220 mm x 150 mm x 12.5 mm & 25 mm
250-0809	SL-450-12/25 Sample Kit	220 mm x 150 mm x 12.5 mm & 25 mm
250-0810	SL-600-12/25 Sample Kit	220 mm x 150 mm x 12.5 mm & 25 mm
250-0811	SL-720-12/25 Sample Kit	220 mm x 150 mm x 12.5 mm & 25 mm

Additional Information
50 x 50 mm, 70.7 x 70.7 mm, 100 x 100 mm kits include 1 sample each of the MP1, MP2 and MP3.
220 mm x 150 mm x 12.5 mm & 25 mm kits include 1 sample each of the 12 and 25 MP4.

Shock Absorption Samples (Sold Separately)

Part Number	Description	Dimensions
SL-030-12-D-MP1	SL-030-12-D-MP1	50 mm x 50 mm
SL-030-12-D-MP2	SL-030-12-D-MP2	70.7 mm x 70.7 mm
SL-030-12-D-MP3	SL-030-12-D-MP3	100 mm x 100 mm
SL-030-12-D-MP4	SL-030-12-D-MP4	220 mm x 150 mm
	SL-030-12-D-MP4-V+K*	220 mm x 150 mm
SL-030-12-D-MP5	SL-030-12-D-MP5	1500 mm x 800 mm
SL-030-25-D-MP1	SL-030-25-D-MP1	50 mm x 50 mm
SL-030-25-D-MP2	SL-030-25-D-MP2	70.7 mm x 70.7 mm
SL-030-25-D-MP3	SL-030-25-D-MP3	100 mm x 100 mm
SL-030-25-D-MP4	SL-030-25-D-MP4	220 mm x 150 mm
SL-030-25-D-MP5	SL-030-25-D-MP5	1500 mm x 800 mm
SL-100-12-D-MP1	SL-100-12-D-MP1	50 mm x 50 mm
SL-100-12-D-MP2	SL-100-12-D-MP2	70.7 mm x 70.7 mm
SL-100-12-D-MP3	SL-100-12-D-MP3	100 mm x 100 mm
SL-100-12-D-MP4	SL-100-12-D-MP4	220 mm x 150 mm
	SL-100-12-D-MP4-V+K*	200 mm x 150 mm
SL-100-12-D-MP5	SL-100-12-D-MP5	1500 mm x 800 mm
SL-100-25-D-MP1	SL-100-25-D-MP1	50 mm x 50 mm
SL-100-25-D-MP2	SL-100-25-D-MP2	70.7 mm x 70.7 mm
SL-100-25-D-MP3	SL-100-25-D-MP3	100 mm x 100 mm
SL-100-25-D-MP4	SL-100-25-D-MP4	220 mm x 150 mm
SL-100-25-D-MP5	SL-100-25-D-MP5	1500 mm x 800 mm
SL-300-12-D-MP1	SL-300-12-D-MP1	50 mm x 50 mm
SL-300-12-D-MP2	SL-300-12-D-MP2	70.7 mm x 70.7 mm
SL-300-12-D-MP3	SL-300-12-D-MP3	100 mm x 100 mm
SL-300-12-D-MP4	SL-300-12-D-MP4	220 mm x 150 mm
	SL-300-12-D-MP4-V+K*	200 mm x 150 mm
SL-300-12-D-MP5	SL-300-12-D-MP5	1500 mm x 800 mm
SL-300-25-D-MP1	SL-300-25-D-MP1	50 mm x 50 mm
SL-300-25-D-MP2	SL-300-25-D-MP2	70.7 mm x 70.7 mm
SL-300-25-D-MP3	SL-300-25-D-MP3	100 mm x 100 mm
SL-300-25-D-MP4	SL-300-25-D-MP4	220 mm x 150 mm
SL-300-25-D-MP5	SL-300-25-D-MP5	1500 mm x 800 mm

* Has a layer for wear protection & adhesive on one side

Vibration Isolation Samples (Sold Separately)

Part Number	Description	Dimensions
SL-170-12-F-MP4	SL-170-12-F-MP4	220 mm x 150 mm
SL-170-25-F-MP4	SL-170-25-F-MP4	220 mm x 150 mm
SL-210-12-F-MP4	SL-210-12-F-MP4	220 mm x 150 mm
SL-210-25-F-MP4	SL-210-25-F-MP4	220 mm x 150 mm
SL-275-12-F-MP4	SL-275-12-F-MP4	220 mm x 150 mm
SL-275-25-F-MP4	SL-275-25-F-MP4	220 mm x 150 mm
SL-450-12-F-MP4	SL-450-12-F-MP4	220 mm x 150 mm
SL-450-25-F-MP4	SL-450-25-F-MP4	220 mm x 150 mm
SL-600-12-F-MP4	SL-600-12-F-MP4	220 mm x 150 mm
SL-600-25-F-MP4	SL-600-25-F-MP4	220 mm x 150 mm
SL-720-12-F-MP4	SL-720-12-F-MP4	220 mm x 150 mm
SL-720-25-F-MP4	SL-720-25-F-MP4	220 mm x 150 mm

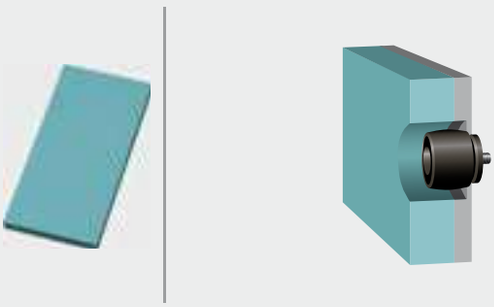
Application Examples

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

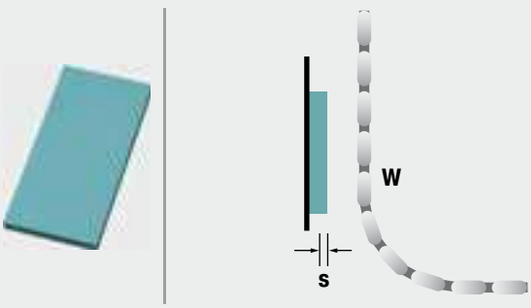


SL-030

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



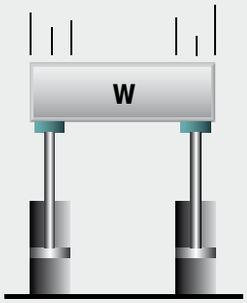
Issue 04.2018 – Specifications subject to change

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

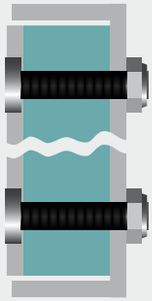


SL-030

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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