

Safety Products

Safety Shock Absorbers, Safety Dampers
Clamping Elements



Highest Protection under any Circumstances

For any budget and all requirements

Safely slowing down damaging forces from moving loads or Emergency braking are united in this product group from ACE. Although the safety shock absorbers, profile dampers and clamping elements differ so much in design, every single ACE component provides the best protection for your machine.

They demonstrate their main advantages in emergency stop situations and, based on the protection they provide, are very cost-effective. Furthermore, they can all be easily integrated in the existing construction designs and largely work independent of energy supplies.



Safety Shock Absorbers

Perfect protection for the worst case scenario

As an alternative to the standard shock absorber, Safety shock absorbers are the tried and tested low cost method of preventing those occasional emergency stops. Designed for occasional use, they primarily serve as reliable, effective protection in emergency stop situations.

The maintenance-free and ready-to-install machine elements are characterized in every respect by the well-known high ACE quality and maximum energy absorption of up to 480,000 Nm/Cycle. This means, in the product-family SCS33 up to SCS64 a service life of up to 1,000 full load emergency cycles is achieved.

Safety shock absorbers from ACE are available in a large choice with strokes of 23 mm to 1,200 mm, and the arrangement of orifice pattern can be calculated and produced specifically to the customer's requirements and depending on the application.



Safety Shock Absorbers



SCS33 to SCS64

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Self-Compensating or Optimized Characteristic
Industry design with high energy absorption
 Finishing and processing centres, Conveyor systems, Portal systems,
 Test stations



SCS38 to SCS63

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High Rack Damper, Optimized Characteristic
Low reaction forces with long strokes
 Shelf storage systems, Heavy load applications, Conveyor systems,
 Conveyor systems



CB63 to CB160

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Crane Installations, Optimized Characteristic
High resetting forces with gas pressure accumulator
 Heavy load applications, Heavy load applications, Conveyor systems,
 Portal systems



EB63 to EB160

Page 272

Crane Installations, Optimized Characteristic
Low return force with spring assembly
 Heavy load applications, Heavy load applications, Conveyor systems,
 Portal systems

Top machine protection

Latest damping technology

Attractive cost-benefit ratio

Maximum strokes

Wide application spectrum

Robust design



SCS33 to SCS64

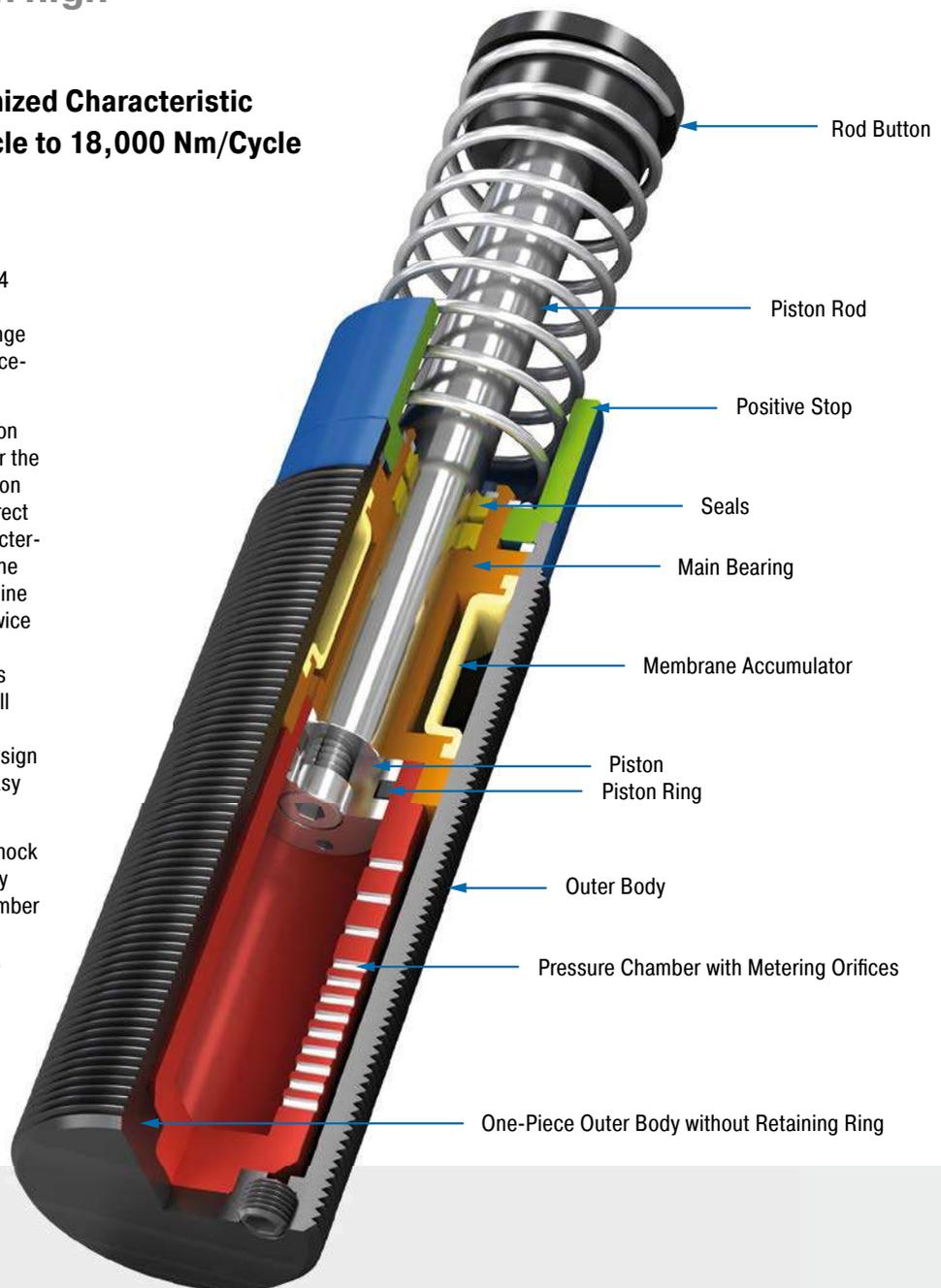
Industry design with high energy absorption

Self-Compensating or Optimized Characteristic
Energy capacity 310 Nm/Cycle to 18,000 Nm/Cycle
Stroke 23.1 mm to 150 mm

Effective emergency stop: the ACE safety shock absorbers from the SCS33 to SCS64 product family are based on the innovative technology of the successful MAGNUM range shock absorbers. They are also maintenance-free and ready-to-install.

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. Due to the optimized characteristic curve for the respective application, the energy absorption of these hydraulic machine elements can be increased to more than twice the level of the MAGNUM model of ACE industrial shock absorber per stroke. Users benefit from a service life of up to 1,000 full load emergency cycles with a very good price-performance ratio. Their compact design in sizes M33x1.5 to M64x2 makes them easy to integrate into current applications.

These slimline, high-performance safety shock absorbers are only designed for emergency stop situations. They can be used for a number of tasks in gantries and conveyor systems, processing centres or assembly machines.



Technical Data

Energy capacity: 310 Nm/Cycle to 18,000 Nm/Cycle

Impact velocity range: 0.02 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 corrosion-resistant coating

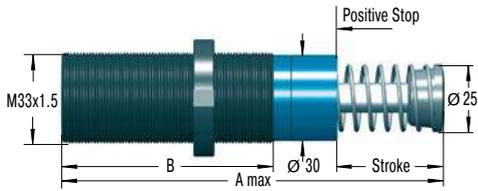
Damping medium: Automatic Transmission Fluid (ATF)

Application field: Finishing and processing centers, Conveyor systems, Portal systems, Test stations, Machines and plants, Swivel units, Cranes

Note: The shock absorber can be pushed through its stroke. In creep speed conditions the shock absorber provides minimal resistance and there is no braking effect.

On request: Special oils, special flanges etc.

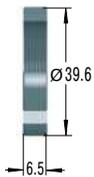
SCS33



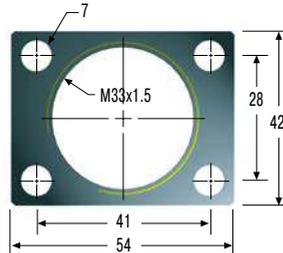
The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Accessories

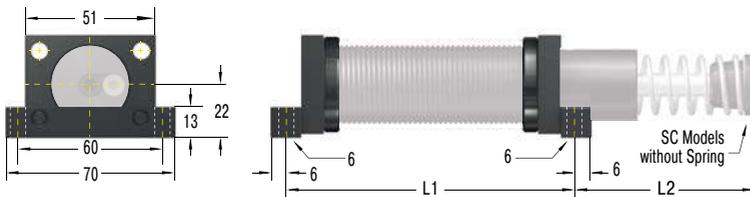
250-0292 Locking Ring



250-0293 Rectangular Flange



250-0294 Side Foot Mounting Kit



TYPES	Dimensions	
	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

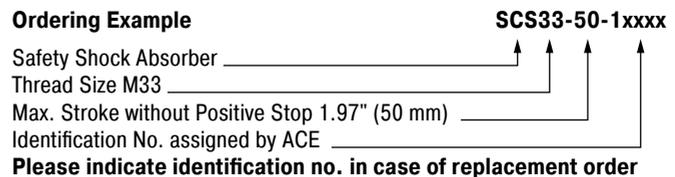
250-0294 = 1 locknut, 2 flanges, 2 bars, 4 screws M6x40, DIN 912
Torque max.: 11 Nm
Clamping torque: 90 Nm
Bolts to mount assembled shock & mount not included.

Complete details required when ordering

- Moving load: m (kg)
- Impact velocity range: v (m/s) max.
- Creep speed: vs (m/s)
- Motor power: P (kW)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (N))
- Number of absorbers in parallel: n

or technical data according to formula and calculations on page 275.

Ordering Example



Please indicate identification no. in case of replacement order

Please contact the factory for complete part number.

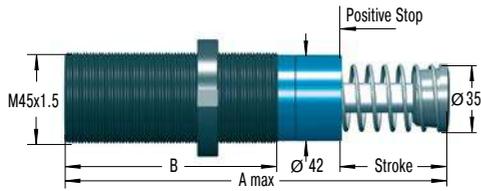
Performance and Dimensions

TYPES	Max. Energy Capacity		Return Force min. N	Return Force max. N	Stroke mm	A max. mm	B mm	Side Load Angle max. °	Weight kg
	E ₃ Self-compensating Nm/cycle	E ₂ Optimised Nm/cycle							
SCS33-25	310	500	45	90	23.2	138	83	3	0.51
SCS33-50	620	950	45	135	48.6	189	108	2	0.63

¹ The values are reduced by 20 % at max. side load angle.

Self-Compensating or Optimized Characteristic

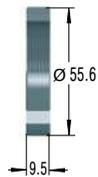
SCS45



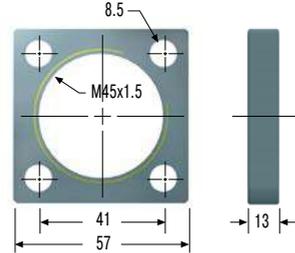
The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Accessories

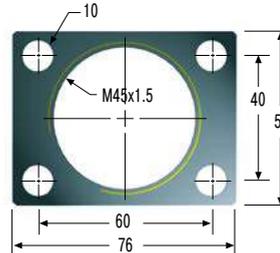
250-0297
Locking Ring



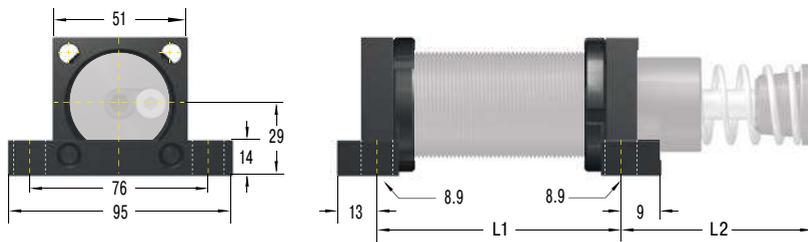
250-0298
Square Flange



250-0299
Rectangular Flange



250-0300
Side Foot Mounting Kit



Dimensions		
TYPES	L1 mm	L2 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

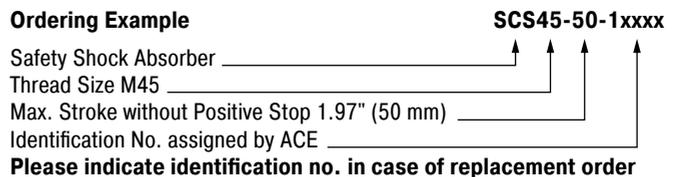
250-0300 = 1 locknut, 2 flanges, 2 bars, 4 screws M8x50, DIN 912
Torque max.: 27 Nm
Clamping torque: 350 Nm
Bolts to mount assembled shock & mount not included.

Complete details required when ordering

- Moving load: m (kg)
- Impact velocity range: v (m/s) max.
- Creep speed: vs (m/s)
- Motor power: P (kW)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (N))
- Number of absorbers in parallel: n

or technical data according to formula and calculations on page 275.

Ordering Example



Please indicate identification no. in case of replacement order

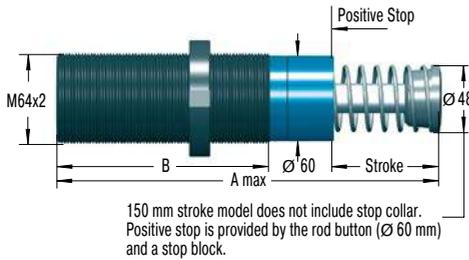
Please contact the factory for complete part number.

Performance and Dimensions

TYPES	Max. Energy Capacity		Return Force min. N	Return Force max. N	Stroke mm	A max. mm	B mm	Side Load Angle max. °	Weight kg
	E ₃ Self-compensating Nm/cycle	E ₃ Optimised Nm/cycle							
SCS45-25	680	1,200	70	100	23.1	145	95	3	1.14
SCS45-50	1,360	2,350	70	145	48.5	195	120	2	1.36
SCS45-75	2,040	3,500	50	180	73.9	246	145	1	1.59

¹ The values are reduced by 20 % at max. side load angle.

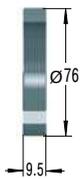
SCS64



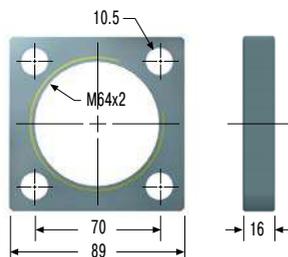
The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Accessories

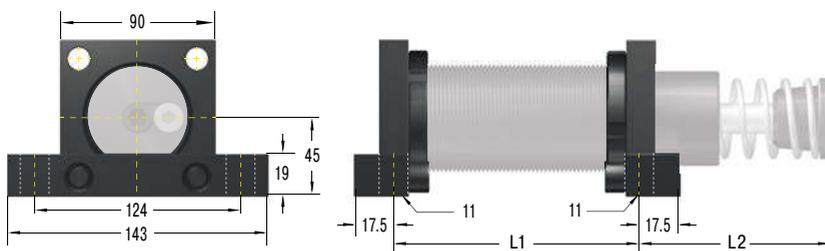
250-0301
Locking Ring



250-0302
Square Flange



250-0304
Side Foot Mounting Kit



Dimensions		
TYPES	L1 mm	L2 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.

Complete details required when ordering

- Moving load: m (kg)
- Impact velocity range: v (m/s) max.
- Creep speed: vs (m/s)
- Motor power: P (kW)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (N))
- Number of absorbers in parallel: n

or technical data according to formula and calculations on page 275.

Ordering Example

SCS64-50-1xxxx
Safety Shock Absorber _____
Thread Size M64 _____
Max. Stroke without Positive Stop 1.97" (50 mm) _____
Identification No. assigned by ACE _____
Please indicate identification no. in case of replacement order

Please contact the factory for complete part number.

Performance and Dimensions

TYPES	Max. Energy Capacity		Return Force min. N	Return Force max. N	Stroke mm	A max. mm	B mm	Side Load Angle max. °	Weight kg
	E ₃ Self-compensating Nm/cycle	E ₃ Optimised Nm/cycle							
SCS64-50	3,400	6,000	90	155	48.6	225	140	3	2.90
SCS64-100	6,800	12,000	105	270	99.4	326	191	2	3.70
SCS64-150	10,200	18,000	75	365	150.0	450	241	1	5.10

¹ The values are reduced by 20 % at max. side load angle.

SCS38 to SCS63

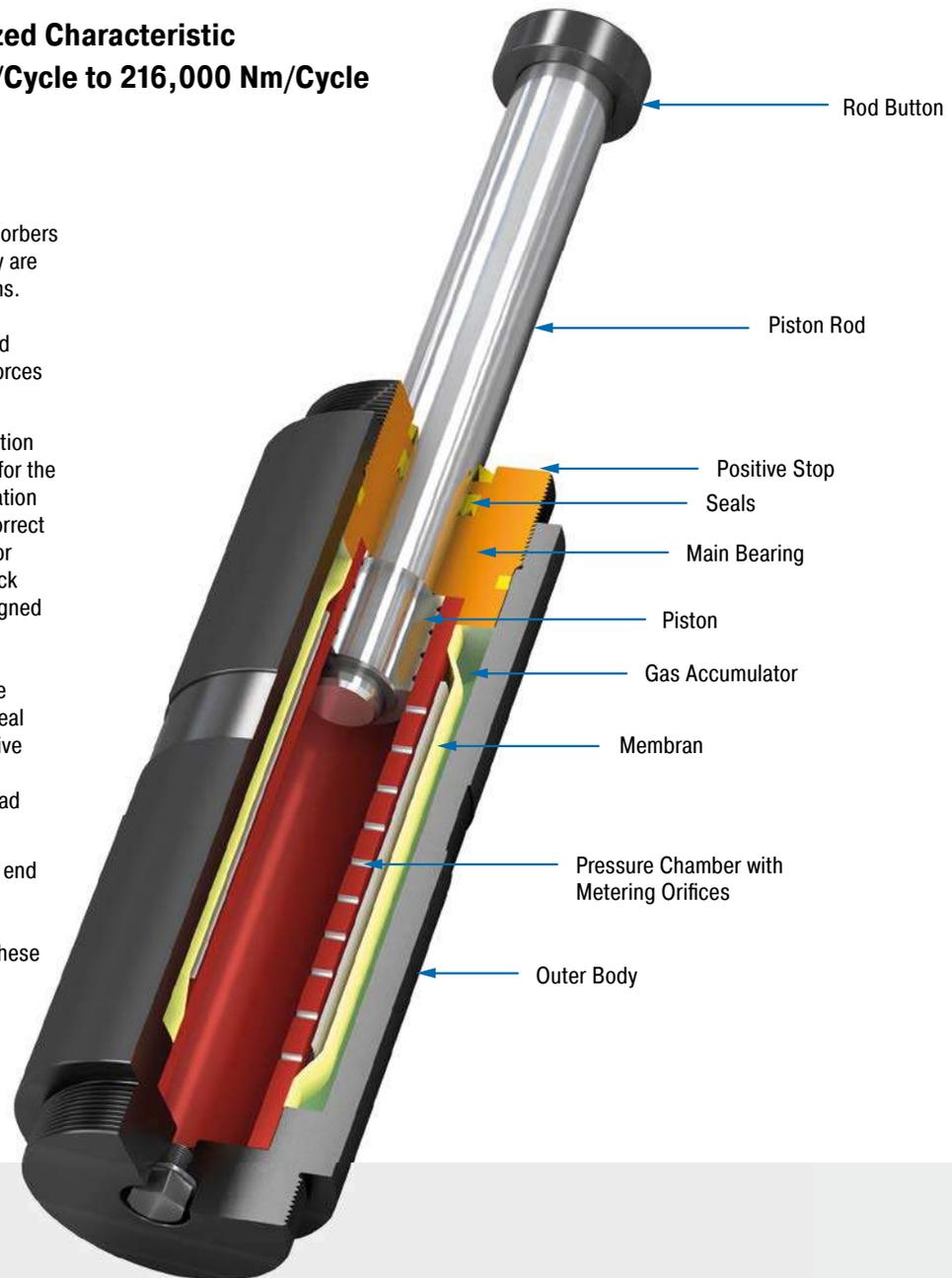
Low reaction forces with long strokes

High Rack Damper, Optimized Characteristic
Energy capacity 3,600 Nm/Cycle to 216,000 Nm/Cycle
Stroke 50 mm to 1,200 mm

Slim with a long stroke: safety shock absorbers from the SCS38 to SCS63 product family are designed for emergency-stop applications. Strokes of up to 1,200 mm (47.24") are possible with these maintenance-free and ready-to-install dampers. Low reaction forces result due to the large strokes.

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 characteristic curve or damping characteristics of all safety shock absorbers from ACE are individually designed to the specific customer application. The metering orifices for the applications are specially calculated and produced. These tailor-made machine elements are the ideal protection because they are less expensive than industrial shock absorbers and are effective with up to 1,000 possible full load emergency stops.

Anyone who wants to reliably protect the end positions of rack operating equipment, conveyor and crane systems, heavy duty applications and test benches chooses these safety shock absorbers from ACE.



Technical Data

Energy capacity: 3,600 Nm/Cycle to 216,000 Nm/Cycle

Impact velocity range: 0.5 m/s to 4.6 m/s. Other speeds on request.

Reacting force: At max. capacity rating = 80 kN to 210 kN

Operating temperature range: -20 °C to 60 °C. Other temperatures on request.

Mounting: In any position

Positive stop: Integrated

Material: Outer body, Rod end button: Steel corrosion-resistant coating; Piston rod: Hard chrome plated steel

Damping medium: Automatic Transmission Fluid (ATF)

Filling pressure: Approx. 2 bar. Rod return by integrated nitrogen accumulator.

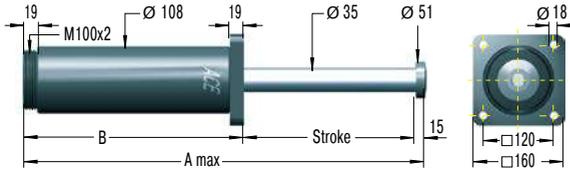
Application field: Shelf storage systems, Heavy load applications, Conveyor systems, Conveyor systems, Portal systems, Test stations

Note: The shock absorber can be pushed through its stroke. In creep speed conditions the shock absorber provides minimal resistance and there is no braking effect.

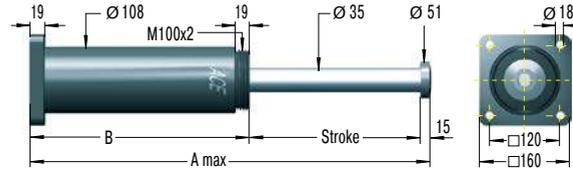
On request: Special oils, special flanges, additional corrosion protection etc.

Integrated rod sensor for indicating the complete extension of the piston rod. Type normally closed or normally open, option PNP or NPN switch.

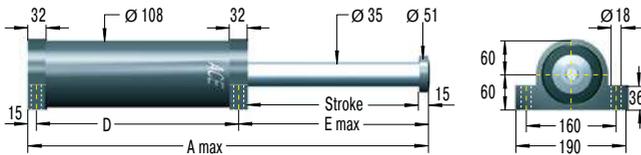
SCS38-F Front Flange



SCS38-R Rear Flange



SCS38-S Foot Mount



Technical Data

Impact velocity range: 0.90 m/s to 4.6 m/s

Complete details required when ordering

Moving load: m (kg)
 Impact velocity range: v (m/s) max.
 Creep speed: vs (m/s)
 Motor power: P (kW)
 Stall torque factor: ST (normal, 2.5)
 (Alternatively: Propelling force F (N))
 Number of absorbers in parallel: n

or technical data according to formula and calculations on page 275.

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

Ordering Example

SCS38-400-F-X
 Safety Shock Absorber _____
 Bore Size \varnothing 1.50" (38 mm) _____
 Stroke 15.75" (400 mm) _____
 Mounting Style: Front Flange _____
 Identification No. assigned by ACE _____

Please indicate identification no. in case of replacement order

Please contact the factory for complete part number.

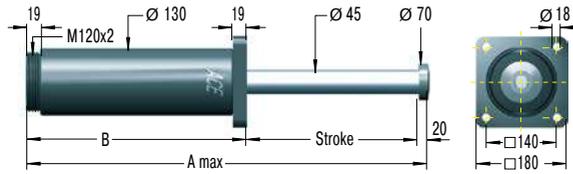
Performance and Dimensions

TYPES	Energy capacity Nm/cycle	Return Force		Stroke mm	A max. mm	B mm	D mm	E max. mm	Mounting Style		Mounting Style	
		min. N	max. N						¹ F and S Side Load Angle max. °	¹ R Side Load Angle max. °	F and R Weight kg	S Weight kg
SCS38-50	3,600	600	700	50	270	205	175	80	5.0	4.0	12.0	13.0
SCS38-100	7,200	600	700	100	370	255	225	132	5.0	4.0	14.0	15.0
SCS38-150	10,800	600	700	150	470	305	275	180	5.0	4.0	16.0	17.0
SCS38-200	14,400	600	700	200	570	355	325	230	5.0	4.0	18.0	19.0
SCS38-250	18,000	600	700	250	670	405	375	280	4.7	3.7	20.0	21.0
SCS38-300	21,600	600	700	300	785	470	440	330	3.9	2.9	22.0	22.0
SCS38-350	25,200	600	700	350	885	520	490	380	3.4	2.4	24.0	25.0
SCS38-400	28,800	600	700	400	1,000	585	555	430	3.0	2.0	26.0	27.0
SCS38-500	36,000	600	700	500	1,215	700	670	530	2.4	1.4	30.0	31.0
SCS38-600	43,200	600	700	600	1,430	815	785	630	1.9	0.9	34.0	34.0
SCS38-700	50,400	600	700	700	1,645	930	900	730	1.6	0.6	38.0	39.0
SCS38-800	57,600	600	700	800	1,860	1,045	1,015	830	1.3	0.3	43.0	44.0

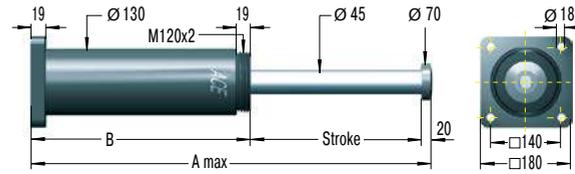
¹ The values are reduced by 20 % at max. side load angle.

High Rack Damper, Optimized Characteristic

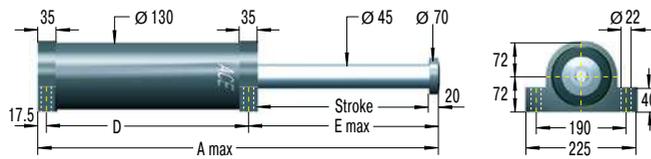
SCS50-F Front Flange



SCS50-R Rear Flange



SCS50-S Foot Mount



Technical Data

Impact velocity range: 0.61 m/s to 4.6 m/s

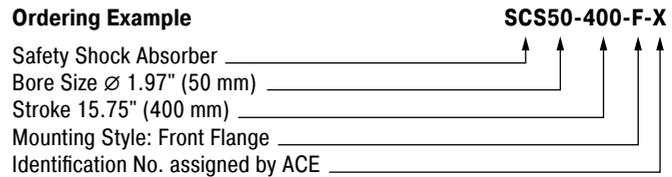
Complete details required when ordering

- Moving load: m (kg)
- Impact velocity range: v (m/s) max.
- Creep speed: vs (m/s)
- Motor power: P (kW)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (N))
- Number of absorbers in parallel: n

or technical data according to formula and calculations on page 275.

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

Ordering Example



Please indicate identification no. in case of replacement order

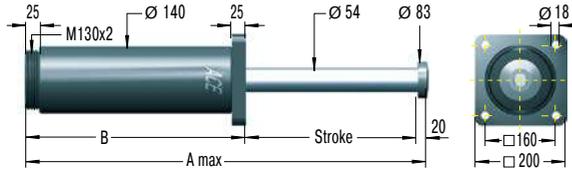
Please contact the factory for complete part number.

Performance and Dimensions

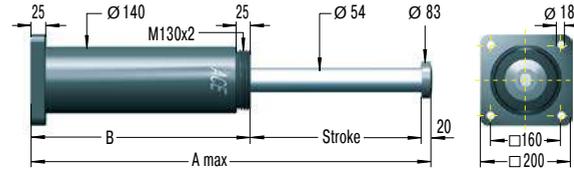
TYPES	Energy capacity Nm/cycle	Return Force		Stroke mm	A max. mm	B mm	D mm	E max. mm	Mounting Style		Mounting Style	
		min. N	max. N						¹ F and S Side Load Angle max. °	¹ R Side Load Angle max. °	F and R Weight kg	S Weight kg
SCS50-100	14,000	1,000	1,200	100	390	270	235	138	5.0	4.0	22.0	23.0
SCS50-150	21,000	1,000	1,200	150	490	320	285	188	5.0	4.0	25.0	26.0
SCS50-200	28,000	1,000	1,200	200	590	370	335	238	5.0	4.0	27.0	28.0
SCS50-250	35,000	1,000	1,200	250	690	420	385	288	4.5	3.5	30.0	31.0
SCS50-300	42,000	1,000	1,200	300	805	485	450	338	3.8	2.8	33.0	34.0
SCS50-350	49,000	1,000	1,200	350	905	535	500	388	3.3	2.3	35.0	37.0
SCS50-400	56,000	1,000	1,200	400	1,020	600	565	438	2.9	1.9	38.0	40.0
SCS50-500	70,000	1,000	1,200	500	1,235	715	680	538	2.3	1.3	44.0	45.0
SCS50-600	84,000	1,000	1,200	600	1,450	830	795	638	1.9	0.9	50.0	51.0
SCS50-700	98,000	1,000	1,200	700	1,665	945	910	738	1.6	0.6	55.0	57.0
SCS50-800	112,000	1,000	1,200	800	1,880	1,060	1,025	838	1.3	0.3	61.0	63.0
SCS50-1000	140,000	1,000	1,200	1,000	2,310	1,290	1,255	1,038	1.0	0.0	72.0	74.0

¹ The values are reduced by 20 % at max. side load angle.

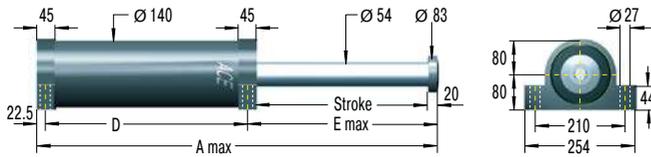
SCS63-F Front Flange



SCS63-R Rear Flange



SCS63-S Foot Mount



Technical Data

Impact velocity range: 0.50 m/s to 4.6 m/s

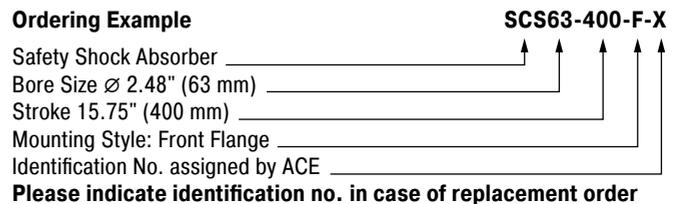
Complete details required when ordering

- Moving load: m (kg)
- Impact velocity range: v (m/s) max.
- Creep speed: vs (m/s)
- Motor power: P (kW)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (N))
- Number of absorbers in parallel: n

or technical data according to formula and calculations on page 275.

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

Ordering Example



Please contact the factory for complete part number.

Performance and Dimensions

TYPES	Energy capacity Nm/cycle	Return Force		Stroke mm	A max. mm	B mm	D mm	E max. mm	Mounting Style		Mounting Style	
		min. N	max. N						¹ F and S Side Load Angle max. °	¹ R Side Load Angle max. °	F and R Weight kg	S Weight kg
SCS63-100	18,000	1,500	2,500	100	405	285	240	143	5.0	4.0	29.0	32.0
SCS63-150	27,000	1,500	2,500	150	505	335	290	193	5.0	4.0	32.0	35.0
SCS63-200	36,000	1,500	2,500	200	605	385	340	243	5.0	4.0	35.0	38.0
SCS63-250	45,000	1,500	2,500	250	705	435	390	293	5.0	4.0	38.0	42.0
SCS63-300	54,000	1,500	2,500	300	805	485	440	343	5.0	4.0	41.0	45.0
SCS63-350	63,000	1,500	2,500	350	925	555	510	393	5.0	4.0	45.0	49.0
SCS63-400	72,000	1,500	2,500	400	1,025	605	560	443	5.0	4.0	48.0	52.0
SCS63-500	90,000	1,500	2,500	500	1,245	725	680	543	4.2	3.2	55.0	60.0
SCS63-600	108,000	1,500	2,500	600	1,445	825	780	643	3.4	2.4	62.0	66.0
SCS63-700	126,000	1,500	2,500	700	1,665	945	900	746	2.9	1.9	69.0	73.0
SCS63-800	144,000	1,500	2,500	800	1,865	1,045	1,000	843	2.5	1.5	75.0	79.0
SCS63-1000	180,000	1,500	2,500	1,000	2,285	1,265	1,220	1,043	1.9	0.9	89.0	93.0
SCS63-1200	216,000	1,500	2,500	1,200	2,705	1,485	1,440	1,243	1.4	0.4	102.0	106.0

¹ The values are reduced by 20 % at max. side load angle.

CB63 to CB160

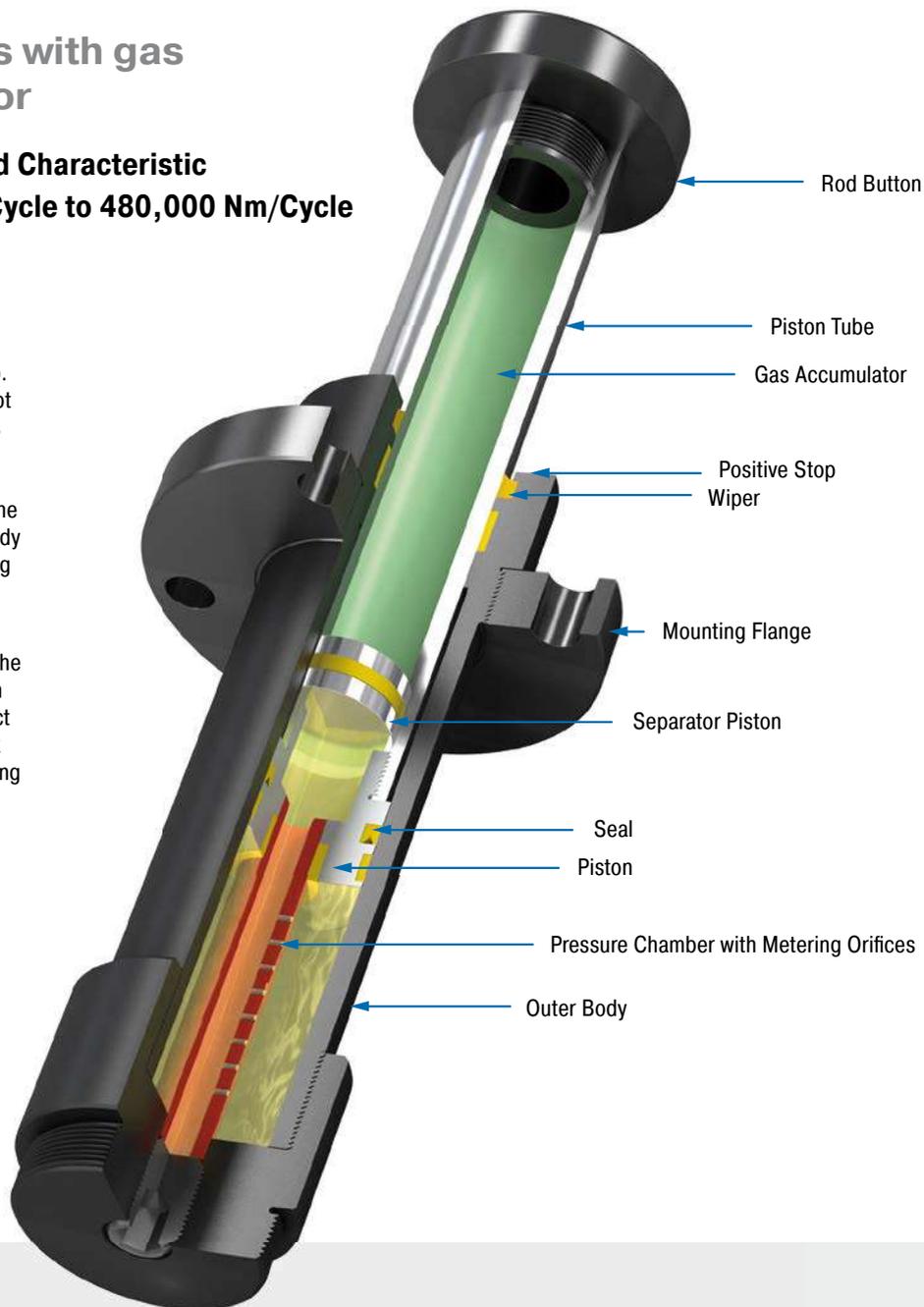
High resetting forces with gas pressure accumulator

Crane Installations, Optimized Characteristic
Energy capacity 16,000 Nm/Cycle to 480,000 Nm/Cycle
Stroke 100 mm to 800 mm

Robust powerhouse: the CB63 to CB160 product family with internal system seals are used in heavy duty areas for emergency stop. Even dirt or scratches to the piston rod do not lead to a leakage or failure. Compressed gas accumulators allow return forces of up to 100 kN (22,481 lb.) in the CB models, which can make applications in multiple bridge crane systems safer, for example. The absorber body and the robust, large-sized piston rod bearing are also designed for heavy duty operations.

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. Just like all ACE safety shock absorbers, the characteristic curve or damping characteristics of each individual CB unit is individually designed to the customer application.

Whether its crane systems or machines in heavy duty applications e.g. in the metal industry or in mining, these powerful safety shock absorbers reliably protect construction designs against expensive failure.



Technical Data

Energy capacity: 16,000 Nm/Cycle to 480,000 Nm/Cycle

Impact velocity range: 0.5 m/s to 4.6 m/s. Other speeds on request.

Reacting force: At max. capacity rating = 187 kN to 700 kN

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

Mounting: In any position

Positive stop: Integrated

Material: Outer body, Rod end button: Steel corrosion-resistant coating; Piston tube: Hard chrome plated steel

Damping medium: Automatic Transmission Fluid (ATF)

Filling pressure: Approx. 5.6 bar to 5.9 bar. Rod return by integrated nitrogen accumulator.

Application field: Heavy load applications, Heavy load applications, Conveyor systems, Portal systems

Note: The shock absorber can be pushed through its stroke. In creep speed conditions the shock absorber provides minimal resistance and there is no braking effect.

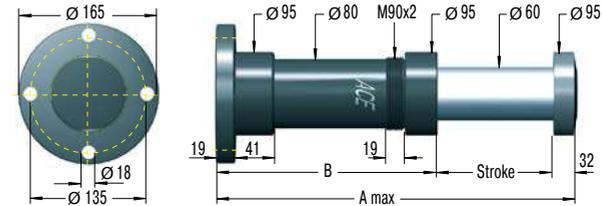
On request: Special oils, special flanges, additional corrosion protection etc.

CB63-F Front Flange



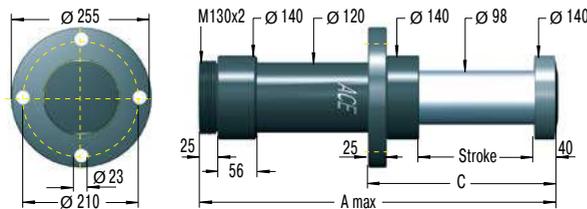
Reacting force: at max. capacity rating = 187 kN max.

CB63-R Rear Flange



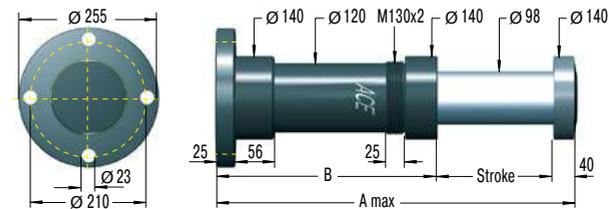
Reacting force: at max. capacity rating = 187 kN max.

CB100-F Front Flange



Reacting force: at max. capacity rating = 467 kN max.

CB100-R Rear Flange



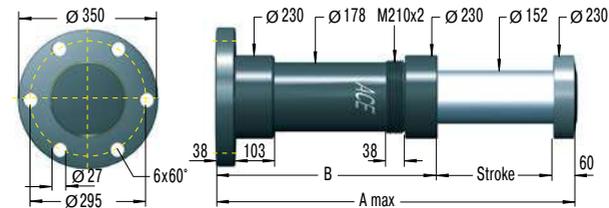
Reacting force: at max. capacity rating = 467 kN max.

CB160-F Front Flange



Reacting force: at max. capacity rating = 700 kN max.

CB160-R Rear Flange



Reacting force: at max. capacity rating = 700 kN max.

Complete details required when ordering

- Moving load: m (kg)
- Impact velocity range: v (m/s) max.
- Creep speed: vs (m/s)
- Motor power: P (kW)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (N))
- Number of absorbers in parallel: n

or technical data according to formula and calculations on page 275.

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

Ordering Example

CB63-400-F-X
 Safety Shock Absorber _____
 Bore Size 2.48" (63 mm) _____
 Stroke 15.75" (400 mm) _____
 Mounting Style: Front Flange _____
 Identification No. assigned by ACE _____
Please indicate identification no. in case of replacement order

Please contact the factory for complete part number.

Performance and Dimensions

TYPES	E ₃ Nm/cycle	Effective Weight		Return Force min. N	Return Force max. N	Stroke mm	A max. mm	B mm	C mm	Side Load Angle max. °	Weight kg
		We min. kg	We max. kg								
CB63-100	16,000	1,510	128,000	1,700	18,500	100	420	288	192	3.5	12.7
CB63-200	32,000	3,020	256,000	1,700	24,000	200	700	468	292	3.0	16.7
CB63-300	48,000	4,540	384,000	1,700	27,000	300	980	648	392	2.5	20.8
CB63-400	64,000	6,050	512,000	1,700	29,000	400	1,260	828	492	2.0	24.8
CB63-500	80,000	7,560	640,000	1,700	30,000	500	1,540	1,008	592	1.5	28.8
CB100-200	80,000	7,560	640,000	4,500	44,000	200	735	495	320	4.0	42.5
CB100-300	120,000	11,340	960,000	4,500	56,000	300	1,005	665	420	3.5	50.8
CB100-400	160,000	15,120	1,280,000	4,500	65,000	400	1,275	835	520	3.0	59.1
CB100-500	200,000	18,900	1,600,000	4,500	71,000	500	1,545	1,005	620	2.5	67.5
CB100-600	240,000	22,680	1,920,000	4,500	76,000	600	1,815	1,175	720	2.0	75.8
CB160-400	240,000	22,700	1,920,000	11,000	71,000	400	1,400	940	600	4	154.0
CB160-600	360,000	34,000	2,880,000	11,000	71,000	600	2,000	1,340	800	3	188.0
CB160-800	480,000	45,400	3,840,000	11,000	71,000	800	2,600	1,740	1,000	2	221.0

¹ The values are reduced by 20 % at max. side load angle.

EB63 to EB160

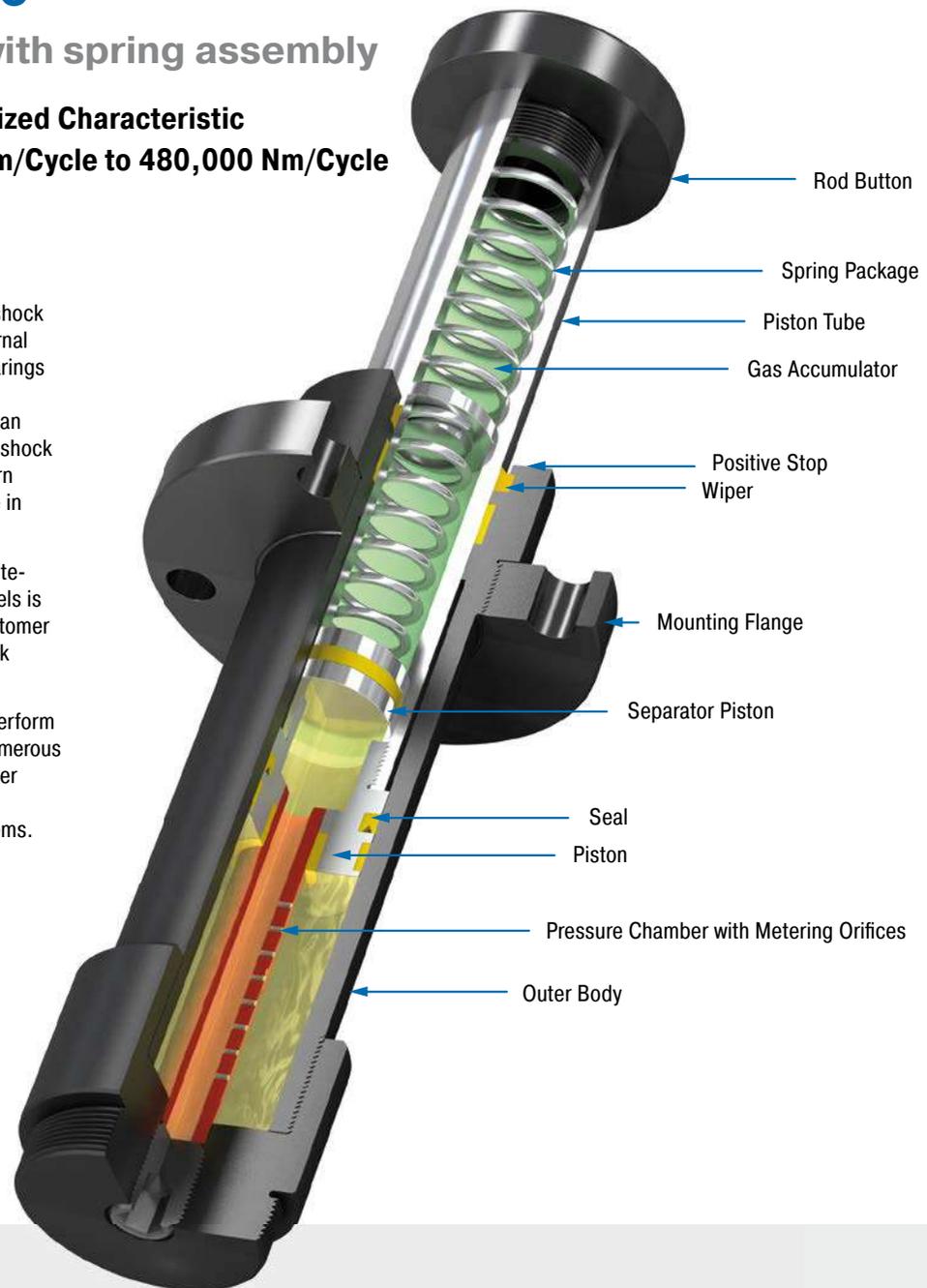
Low return force with spring assembly

Crane Installations, Optimized Characteristic
Energy capacity 16,000 Nm/Cycle to 480,000 Nm/Cycle
Stroke 100 mm to 800 mm

Reduced return forces: the ACE safety shock absorbers from the EB-Family offer internal system seals, large sized piston rod bearings and the maximum energy absorption for emergency stop applications. However, an integrated spring package in the robust shock absorber body makes sure that the return forces are reduced to a fraction of those in the CB-Family.

The damping characteristics of the maintenance-free and ready-to-install EB models is individually designed specific to the customer application, just like all ACE safety shock absorbers.

These safety shock absorbers reliably perform their services in crane systems and in numerous heavy duty applications, even if the power fails, because these hydraulic machine elements are independent braking systems.



Technical Data

Energy capacity: 16,000 Nm/Cycle to 480,000 Nm/Cycle

Impact velocity range: 0.5 m/s to 4.6 m/s. Other speeds on request.

Reacting force: At max. capacity rating = 187 kN to 700 kN

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

Mounting: In any position

Positive stop: Integrated

Material: Outer body, Rod end button: Steel corrosion-resistant coating; Piston tube: Hard chrome plated steel

Damping medium: Automatic Transmission Fluid (ATF)

Filling pressure: Approx. 0.55 bar to 1.1 bar. Rod return by integrated nitrogen accumulator combined with additional return spring.

Application field: Heavy load applications, Heavy load applications, Conveyor systems, Portal systems

Note: The shock absorber can be pushed through its stroke. In creep speed conditions the shock absorber provides minimal resistance and there is no braking effect.

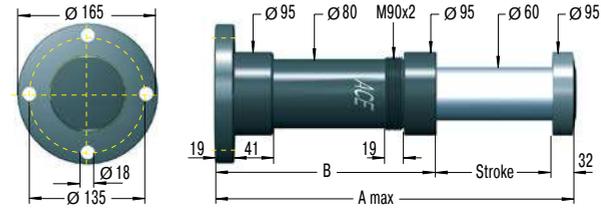
On request: Special oils, special flanges, additional corrosion protection etc.

EB63-F Front Flange



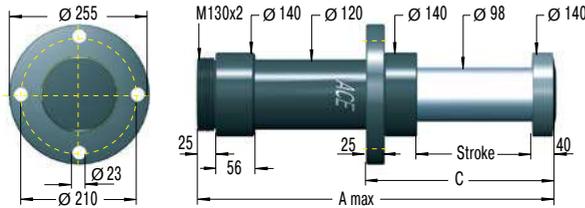
Reacting force: at max. capacity rating = 187 kN max.

EB63-R Rear Flange



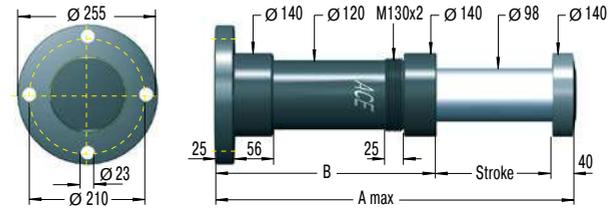
Reacting force: at max. capacity rating = 187 kN max.

EB100-F Front Flange



Reacting force: at max. capacity rating = 467 kN max.

EB100-R Rear Flange



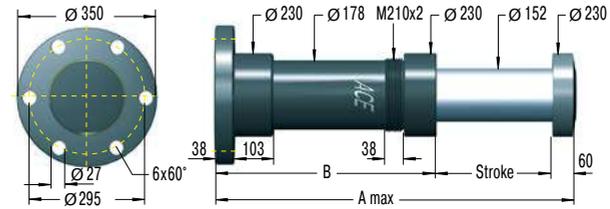
Reacting force: at max. capacity rating = 467 kN max.

EB160-F Front Flange



Reacting force: at max. capacity rating = 700 kN max.

EB160-R Rear Flange



Reacting force: at max. capacity rating = 700 kN max.

Complete details required when ordering

- Moving load: m (kg)
- Impact velocity range: v (m/s) max.
- Creep speed: vs (m/s)
- Motor power: P (kW)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (N))
- Number of absorbers in parallel: n

or technical data according to formula and calculations on page 275.

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

Ordering Example

EB63-400-F-X
 Safety Shock Absorber _____
 Bore Size 2.48" (63 mm) _____
 Stroke 15.75" (400 mm) _____
 Mounting Style: Front Flange _____
 Identification No. assigned by ACE _____
Please indicate identification no. in case of replacement order

Please contact the factory for complete part number.

Performance and Dimensions

TYPES	E ₃ Nm/cycle	Effective Weight		Return Force min. N	Return Force max. N	Stroke mm	A max. mm	B mm	C mm	1 Side Load Angle max. °	Weight kg
		We min. kg	We max. kg								
EB63-100	16,000	1,510	128,000	700	6,900	100	420	288	192	3.5	13.7
EB63-200	32,000	3,020	256,000	770	9,300	200	700	468	292	3.0	16.7
EB63-300	48,000	4,540	384,000	830	10,600	300	980	648	392	2.5	21.8
EB63-400	64,000	6,050	512,000	600	11,100	400	1,260	828	492	2.0	25.8
EB63-500	80,000	7,560	640,000	670	12,000	500	1,540	1,008	592	1.5	29.8
EB100-200	80,000	7,560	640,000	1,200	8,900	200	735	495	320	4.0	42.5
EB100-300	120,000	11,340	960,000	950	14,100	300	1,005	665	420	3.5	50.8
EB100-400	160,000	15,120	1,280,000	1,190	18,200	400	1,275	835	520	3.0	59.1
EB100-500	200,000	18,900	1,600,000	930	20,800	500	1,545	1,005	620	2.5	68.5
EB100-600	240,000	22,680	1,920,000	1,170	23,300	600	1,815	1,175	720	2.0	76.8
EB160-400	240,000	22,700	1,920,000	1,870	18,100	400	1,400	940	600	4	155.6
EB160-600	360,000	34,000	2,880,000	2,100	18,800	600	2,000	1,340	800	3	189.0
EB160-800	480,000	45,400	3,840,000	2,400	19,500	800	2,600	1,740	1,000	2	222.3

¹ The values are reduced by 20 % at max. side load angle.

Permitted Use

ACE safety shock absorbers are machine elements to brake moving masses in a defined end position in emergency stop situations for axial forces. The safety shock absorbers are not designed for regular operational usage.

Calculation of safety shock absorbers

The calculation of safety shock absorbers should generally be performed or checked by ACE.

Deceleration Properties

The orifice sizing and drill pattern in the pressure chamber are individually designed for each safety shock absorber. The respective absorption characteristic is optimized corresponding to the maximum mass that occurs in the emergency stop and the impact speed. Correspondingly, each safety shock absorber is given an individual identification number.

Model Code

For types SCS33 to 64, the individual five-digit identification numbers can be taken from the last digits of the shock absorber model code shown on the label. Example: SCS33-50-XXXXX. For type series SCS38 to SCS63, CB63 to CB160 and EB63 to EB160, the identification number is a five digit number. Example: SCS38-400-F-XXXXX. In addition to the model code, the label also shows the authorized maximum impact velocity and maximum authorised impact mass for the unit. The factory assigns these identification numbers. Please contact the factory for complete part number.

Mounting

To mount the shock absorber, we recommend the use of original ACE mounting accessories shown in catalog.

The mounting of each shock absorber must be exactly positioned so that the reaction force (Q) can be adequately transmitted into the mounting structure.

ACE recommends installation via the front flange -F mounting style that ensures the maximum protection against buckling. The damper must be mounted so that the moving loads are decelerated with the least possible side loading to the piston rod. The maximum permissible side load angles are detailed in our current catalogue.

The entire stroke length must be used for deceleration because only using part of the stroke can lead to overstressing and damage to the unit.

Mounting style front flange



Safety Shock Absorber SCS 38-66



Safety Shock Absorber CB

Environmental Requirements

The permissible **temperature range** for each shock absorber type can be found in our current catalogue.

Caution: Usage outside the specified temperature range can lead to premature breakdown and damage of the shock absorbers which can then result in severe system damage or machine failures.

Trouble free operation outdoors or in damp environments is only warranted if the dampers are coated with a specific corrosion protection finish.

Initial Start-Up Checks

First impacts on the shock absorber should only be tried after correctly mounting and with reduced impact speeds and – if possible – with reduced load. Differences between calculated and actual operating data can then be detected early on, and damage to your system can be avoided. If the shock absorbers were selected on calculated data that does not correspond to the maximum possible loading (i.e. selection based on drive power being switched off or at reduced impact speed) then these restricted impact conditions must not be exceeded during initial testing or subsequent use of the system. Otherwise you risk damaging the shock absorbers and/or your machine by overstressing materials. After the initial trial check that the piston rod fully extends again and that there are no signs of oil leakage. Also check that the mounting hardware is still securely tightened. You need to satisfy yourself that no damage has occurred to the piston rod, the body, or the mounting hardware.

Fixed Mechanical Stop

Safety shock absorbers do not need an external stop as a stroke limiter. The stroke of the safety absorber is limited by the stop of the impact head on the shock absorber. For types SCS33 to SCS64, the fixed stop point is achieved with the integrated stop collar.

What Needs to be Checked after a Full Load Impact?

Safety shock absorbers that were originally checked only at reduced speed or load need to be checked again after a full load impact (i.e. emergency use) has occurred. Check that the piston rod fully extends to its full out position, that there are no signs of oil leakage and that the mounting hardware is still securely fixed. You need to satisfy yourself that no damage has occurred to the piston rod, the body, or the mounting hardware. If no damage has occurred, the safety shock absorber can be put back into normal operation (see **initial start-up**).

Maintenance

Safety shock absorbers are sealed systems and do not need special maintenance. Safety shock absorbers that are not used regularly (i.e. that are intended for emergency stop systems) should be checked within the normal time frame for safety checks, but **at least once a year**. At this time special attention must be paid to checking that the piston rod resets to its fully extended position, that there is no oil leakage and that the mounting brackets are still secure and undamaged. The piston rod must not show any signs of damage. Safety shock absorbers that are **in use regularly** should be checked **every three months**.

Repair Notice

If any damage to the shock absorber is detected or if there are any doubts as to the proper functioning of the unit please send the unit for service to ACE. Alternatively contact your local ACE office for further advice.

[Detailed information on the above listed points can be taken from the corresponding operating and assembly instructions.](#)

Calculation Data for the Design of Safety Shock Absorbers

More formulas on pages 10 to 13

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

1. **Weight to be decelerated** **W** [kg]
2. **Impact velocity at shock absorber** **v_d** [m/s]
3. **Propelling force** **F** [N]
4. **Number of absorbers in parallel** **n**

Key to symbols used

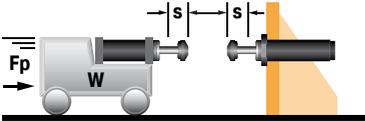
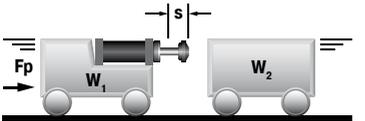
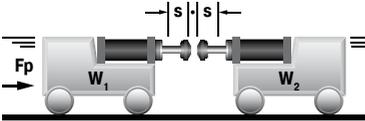
E ₁	Kinetic energy per cycle	Nm	² v _d	Impact velocity at shock absorber	m/s
E ₂	Propelling force energy per cycle	Nm	F	Propelling force	N
E ₃	Total energy per cycle (E ₁ + E ₂)	Nm	c	Cycles per hour	1/hr
¹ E ₄	Total energy per hour (E ₃ · x)	Nm/hr	s	Shock absorber stroke	m
We	Effective weight	kg	Q	Reaction force	N
W	Weight to be decelerated	kg	t	Deceleration time	s
n	Number of shock absorbers (in parallel)		a	Deceleration	m/s ²
² v	Velocity at impact	m/s			

¹ All mentioned values of E₄ 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.

In all the following examples the choice of shock absorbers made from the capacity chart is based upon the values of (E₃), (E₄), (We) and the desired shock absorber stroke (s).

Note: When using several shock absorbers in parallel, the values (E₃), (E₄) and (We) are divided according to the number of units used.

Application	Formula	Example																								
19 Wagon against 2 shock absorbers 	$E_1 = W \cdot v^2 \cdot 0.25$ $E_2 = F \cdot s$ $E_3 = E_1 + E_2$ $v_d = v \cdot 0.5$	<table border="0"> <tr> <td>W = 5000 kg</td> <td>E₁ = 5000 · 2² · 0.25</td> <td>=</td> <td>5000 Nm</td> </tr> <tr> <td>v = 2 m/s</td> <td>E₂ = 3500 · 0.10</td> <td>=</td> <td>350 Nm</td> </tr> <tr> <td>F = 3500 N</td> <td>E₃ = 5000 + 350</td> <td>=</td> <td>5350 Nm</td> </tr> <tr> <td>s = 0.10 m (chosen)</td> <td>v_d = 2 · 0.5</td> <td>=</td> <td>1 m/s</td> </tr> </table> <p>Chosen from capacity chart: Model SCS38-100 self-compensating</p>	W = 5000 kg	E₁ = 5000 · 2² · 0.25	=	5000 Nm	v = 2 m/s	E₂ = 3500 · 0.10	=	350 Nm	F = 3500 N	E₃ = 5000 + 350	=	5350 Nm	s = 0.10 m (chosen)	v_d = 2 · 0.5	=	1 m/s								
W = 5000 kg	E₁ = 5000 · 2² · 0.25	=	5000 Nm																							
v = 2 m/s	E₂ = 3500 · 0.10	=	350 Nm																							
F = 3500 N	E₃ = 5000 + 350	=	5350 Nm																							
s = 0.10 m (chosen)	v_d = 2 · 0.5	=	1 m/s																							
20 Wagon against wagon 	$E_1 = \frac{W_1 \cdot W_2}{(W_1 + W_2)} \cdot (v_1 + v_2)^2 \cdot 0.5$ $E_2 = F \cdot s$ $E_3 = E_1 + E_2$ $v_d = v_1 + v_2$	<table border="0"> <tr> <td>W = 7000 kg</td> <td>E₁ = $\frac{7000 \cdot 10000}{(7000+10000)} \cdot 1.7^2 \cdot 0.5$</td> <td>=</td> <td>5950 Nm</td> </tr> <tr> <td>v₁ = 1.2 m/s</td> <td>E₂ = 5000 · 0.10</td> <td>=</td> <td>500 Nm</td> </tr> <tr> <td>W₂ = 10000 kg</td> <td>E₃ = 5950 + 500</td> <td>=</td> <td>6450 Nm</td> </tr> <tr> <td>v₂ = 0.5 m/s</td> <td>v_d = 1.2 + 0.5</td> <td>=</td> <td>1.7 m/s</td> </tr> <tr> <td>F = 5000 N</td> <td></td> <td></td> <td></td> </tr> <tr> <td>s = 0.10 m (chosen)</td> <td></td> <td></td> <td></td> </tr> </table> <p>Chosen from capacity chart: Model SCS50-100 self-compensating</p>	W = 7000 kg	E₁ = $\frac{7000 \cdot 10000}{(7000+10000)} \cdot 1.7^2 \cdot 0.5$	=	5950 Nm	v ₁ = 1.2 m/s	E₂ = 5000 · 0.10	=	500 Nm	W ₂ = 10000 kg	E₃ = 5950 + 500	=	6450 Nm	v ₂ = 0.5 m/s	v_d = 1.2 + 0.5	=	1.7 m/s	F = 5000 N				s = 0.10 m (chosen)			
W = 7000 kg	E₁ = $\frac{7000 \cdot 10000}{(7000+10000)} \cdot 1.7^2 \cdot 0.5$	=	5950 Nm																							
v ₁ = 1.2 m/s	E₂ = 5000 · 0.10	=	500 Nm																							
W ₂ = 10000 kg	E₃ = 5950 + 500	=	6450 Nm																							
v ₂ = 0.5 m/s	v_d = 1.2 + 0.5	=	1.7 m/s																							
F = 5000 N																										
s = 0.10 m (chosen)																										
21 Wagon against wagon 2 shock absorbers 	$E_1 = \frac{W_1 \cdot W_2}{(W_1 + W_2)} \cdot (v_1 + v_2)^2 \cdot 0.25$ $E_2 = F \cdot s$ $E_3 = E_1 + E_2$ $v_d = \frac{v_1 + v_2}{2}$	<table border="0"> <tr> <td>W = 7000 kg</td> <td>E₁ = $\frac{7000 \cdot 10000}{(7000+10000)} \cdot 1.7^2 \cdot 0.25$</td> <td>=</td> <td>2975 Nm</td> </tr> <tr> <td>v₁ = 1.2 m/s</td> <td>E₂ = 5000 · 0.10</td> <td>=</td> <td>500 Nm</td> </tr> <tr> <td>W₂ = 10000 kg</td> <td>E₃ = 2975 + 510</td> <td>=</td> <td>3475 Nm</td> </tr> <tr> <td>v₂ = 0.5 m/s</td> <td>v_d = (1.2 + 0.5) : 2</td> <td>=</td> <td>0.85 m/s</td> </tr> <tr> <td>F = 5000 N</td> <td></td> <td></td> <td></td> </tr> <tr> <td>s = 0.10 m (chosen)</td> <td></td> <td></td> <td></td> </tr> </table> <p>Chosen from capacity chart: Model SCS38-100 self-compensating</p>	W = 7000 kg	E₁ = $\frac{7000 \cdot 10000}{(7000+10000)} \cdot 1.7^2 \cdot 0.25$	=	2975 Nm	v ₁ = 1.2 m/s	E₂ = 5000 · 0.10	=	500 Nm	W ₂ = 10000 kg	E₃ = 2975 + 510	=	3475 Nm	v ₂ = 0.5 m/s	v_d = (1.2 + 0.5) : 2	=	0.85 m/s	F = 5000 N				s = 0.10 m (chosen)			
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F = 5000 N																										
s = 0.10 m (chosen)																										

Application Examples

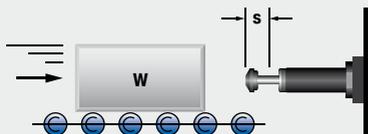
SCS45

Controlled emergency stop

ACE safety shock absorbers protect precision assembly jigs for the aircraft industry. The basic mount of this coordinate measuring machine for the production of parts in the aircraft industry is made of granite and must not be damaged. To avoid damage from operating errors or mishandling, all movement axes were equipped with safety shock absorbers of the type SCS45-50EU. If the turntables malfunction the safety shock absorbers decelerate the loads before expensive damage can occur to the granite measuring tables.



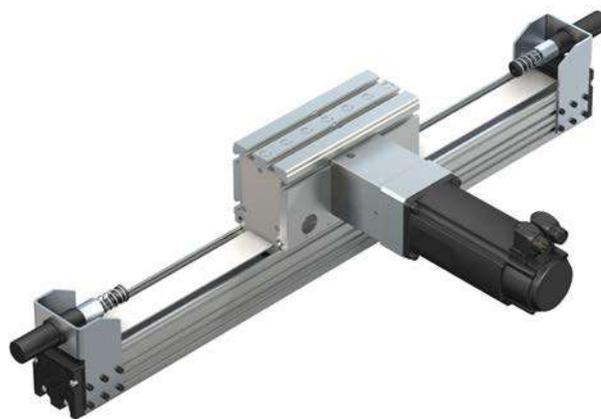
Optimally protected turntable



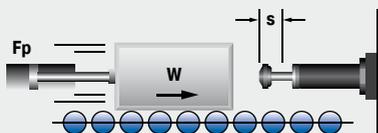
SCS33, SCS45

High-level protection of linear modules

Safety shock absorbers produced by ACE are installed in the top linear system models of one of the most prestigious companies in the field of drive and control technology. Their job: to protect the z-axis from damage caused by uncontrolled movements. Various safety dampers are used for different load ranges. Tests have shown that, in the worst case, a collision speed of up to 5 m/s might occur. To be on the safe side, the interpretations were based in all cases on a slightly higher value.



For protecting equipment and modules such as these, the SCS series from ACE is the ideal solution in the emergency stop sector
Roth GmbH & Co. KG, 90411 Nürnberg, Germany
and Bosch Rexroth AG, 97816 Lohr am Main, Germany



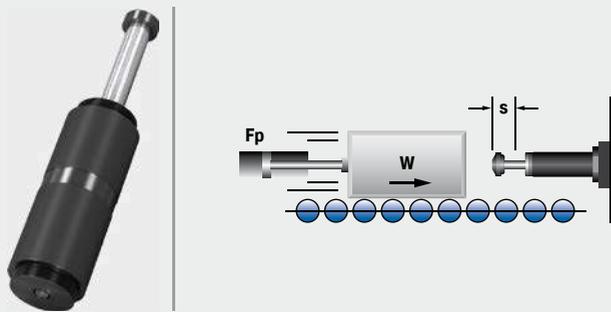
SCS38

Safe driving in end positions with ACE

The aim was to protect a driving simulation capsule on two of its eight axes. The demands placed on a potential emergency stopper were high because it was clear that its failure would lead to massive damage to the complete construction as well as to the capsule. Even the possibility of damage to the health of the test personnel could not be ruled out and was taken into consideration in a diverse range of mass-speed combinations. Two ACE safety shock absorbers now safely contain destructive forces, e.g. during power outages, and eliminate high risks.



ACE safety shock absorbers protect end positions in two axes of a driving simulator
 Bosch Rexroth BV, Boxtel 5281 RV, The Netherlands
 and University of Stuttgart - FKFS, 70569 Stuttgart, Germany



Safety Dampers

Top for emergency stopping

The extremely successful TUBUS series from ACE is suitable for emergency stopping, as overrun protection or as end stop dampers. Available in different variations for heavy duty or crane installations, these profile dampers are perfect when loads do not need to be instantly decelerated or when working under extreme conditions.

Manufactured in co-polyester elastomer, the highly resistant absorbers provide high force and energy absorption 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 cost-effective and distinguished by the small, light design. With energy absorption within a range of 450 and 17,810 Nm, they can be considered as an alternative to hydraulic end position damping.



Safety Dampers



TUBUS TC and TC-S

Crane Installations

Compact powerhouse

Crane systems, Loading and lifting equipment, Hydraulic devices,
Electro-mechanical drives

Page 280

Extremely durable

Highly resistant co-polyester elastomers

Lightweight designs

Cost-effective use

Heavy-duty versions available



TUBUS TC and TC-S

Compact powerhouse

Crane Installations

Energy capacity 630 Nm/Cycle to 17,810 Nm/Cycle

Maximum stroke 30 mm to 198 mm

For even more protection: the profile dampers from the TC range of the ACE TUBUS-Series can also be used as safety dampers. These maintenance-free, ready-to-install damping elements made of co-polyester elastomer have been specially developed for use in crane systems and meet the international industry standards for OSHA and CMAA. The TC-S design employs a unique dual concept to achieve the spring rate required for crane systems.

Whether TC-S or TC, this range of models represents a cost-effective solution with high energy absorption for energy management systems. The very small and light design of \varnothing 64 mm to \varnothing 176 mm (\varnothing 2.52" to \varnothing 6.93") progressively covers energy absorption within a range of 450 Nm to 17,810 Nm (3,983 in-lbs to 157,632 in-lbs).

The profile dampers from the TC range protect cranes, loading and lifting equipment, hydraulic units and much more.



Technical Data

Energy capacity: 630 Nm/Cycle to 17,810 Nm/Cycle

Energy absorption: 31 % to 64 %

Dynamic force range: 80,000 N to 978,000 N

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

Construction size: 64 mm to 176 mm

Material hardness rating: Shore 55D

Material: Profile body: Co-Polyester Elastomer

Mounting: In any position

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.:

M12: 50 Nm

M16: 40 Nm (DIN912)

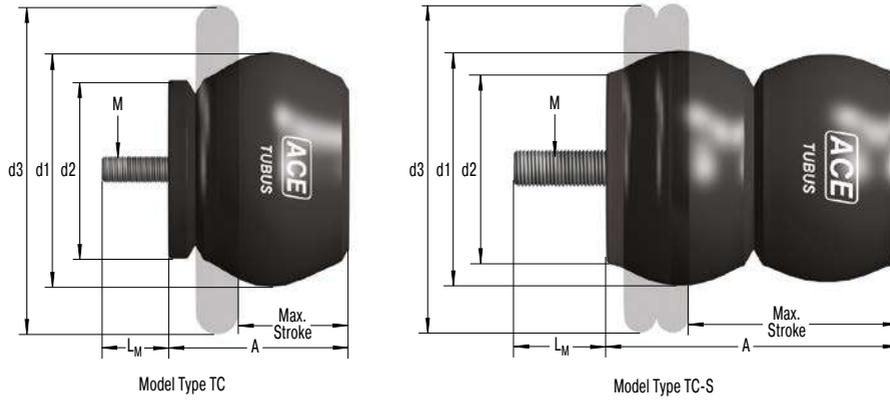
M16: 120 Nm (shouldered screw)

Application field: Crane systems, Loading and lifting equipment, Hydraulic devices, Electro-mechanical drives

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

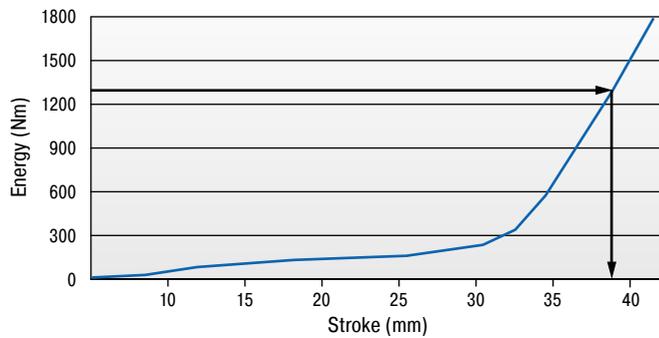
On request: Special strokes, -characteristics, -spring rates, -sizes and -materials.

TC and TC-S

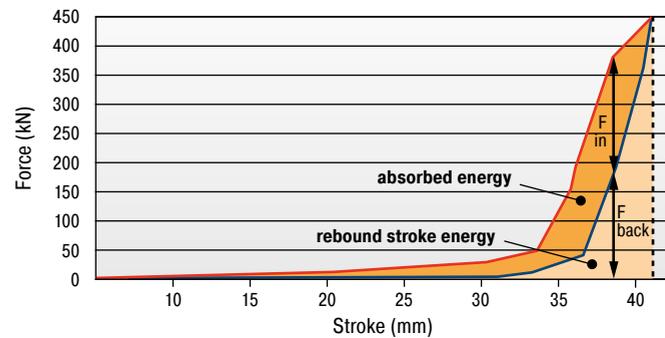


Characteristics

Type TC90-49
Energy-Stroke Characteristic (dynamic)
(with impact velocity over 0.5 m/s)



Type TC90-49
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 1,300 Nm the Energy-Stroke diagram shows that a stroke of about 38 mm is needed.

On the Force-Stroke diagram you can estimate the proportion of absorbed energy to rebound energy at this stroke length.

Note: With these types the return force towards the end of the stroke is significant and we recommend you try to use a minimum of 90 % of the total stroke available.

Dynamic ($v > 0.5$ m/s) and static ($v \leq 0.5$ 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

TUBUS Crane Buffer _____ **TC83-73-S**
 Outer-Ø 83 mm _____
 Stroke 73 mm _____
 Model Type Soft _____

Performance and Dimensions

TYPES	Emergency Stop		Stroke max. mm	A mm	d1 mm	d2 mm	d3 mm	L _M mm	M	Weight kg
	¹ E ₃ Nm/cycle	E ₃ Nm/cycle								
TC64-62-S	450	630	62	79	64	52	89	12	M12	0.174
TC74-76-S	980	1,372	76	96	74	61	114	12	M12	0.260
TC83-73-S	1,940	2,715	73	94	83	69	127	12	M12	0.328
TC86-39	1,210	1,695	39	56	86	78	133	12	M12	0.284
TC90-49	1,640	2,295	49	68	90	67	124	12	M12	0.264
TC100-59	1,785	2,500	59	84	100	91	149	12	M12	0.543
TC102-63	1,970	2,760	63	98	102	82	140	22	M16	0.662
TC108-30	1,900	2,660	30	53	108	77	133	12	M12	0.392
TC117-97	3,710	5,195	97	129	117	100	188	16	M16	1.043
TC134-146-S	7,310	10,230	146	188	134	117	215	30	M16	1.695
TC136-65	4,250	5,950	65	106	136	106	178	16	M16	1.147
TC137-90	6,350	8,890	90	115	137	113	216	21	M16	1.201
TC146-67-S	8,330	11,660	67	118	146	99	191	16	M16	1.573
TC150-178-S	8,860	12,400	178	241	150	132	224	16	M16	2.674
TC153-178-S	7,260	10,165	178	226	153	131	241	16	M16	2.522
TC168-124	10,100	14,140	124	166	168	147	260	16	M16	2.533
TC176-198-S	12,725	17,810	198	252	176	150	279	16	M16	3.660

¹ Max. energy capacity per cycle for continuous use.

Clamping Elements

On-the-spot clamping and stopping in emergencies and other situations

Clamping elements from the LOCKED series also serve the purpose of safety. These ACE products clamp and decelerate loads and are suitable for perfectly controlled holding, both linear and rotary, in all processes.

Alongside ACE LOCKED solutions for conventional rail, rod or rotation clamping, special clamps with safety function for Z-axes, which reliably help secure axes with a gravitational load, are available in the LOCKED LZ-P series. The latter solution is available for both pneumatic operation and as an electric version. Whether Z-axes, linear guide, rod or rotation clamping, the choice is (typical of ACE) as large as the performance capacity of the products, which are compatible with the solutions of all standard manufacturers.



LOCKED by ACE. After all, safe is safe.

Increased process reliability

Available as clamping and emergency stop brakes

Very short stop distances

Very high clamping forces

Compact designs

Ideal for all standard sizes



Rail Clamping

For safe deceleration of rail-guided construction elements

Safe deceleration of a mass that is traversed with the help of a rail and guide rail and track carriage combination must be complied with and not only for safety reasons; reliable clamps in the production processes are also becoming increasingly important.

Both features can be taken care of by the clamping elements from ACE. All clamping elements work with the patented spring steel plate system.

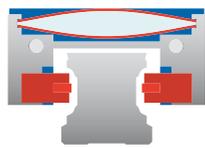
This system achieves braking and clamping forces of up to 10,000 N. The clamping elements are always individually adapted to the used linear guide. They are available for all rail sizes and profiles for all renowned manufacturers.

Function of clamping elements LOCKED PL/SL/PLK/SLK

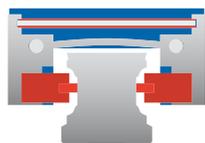
All process and safety clamps work with the reinforced spring steel plate system.

Compressed air is introduced between the two spring plates, which are connected with a surrounding rubber coating.

If pressure is applied, the clamping element can freely move; if the clamping element is vented clamping to the guide rail follows.



Clamping element ventilated



Clamping element vented

Released

The chamber filled with compressed air between the spring steel plates relaxes and thus releases the clamping/brake pads from the rail. The clamping element is now free to move.

Engaged

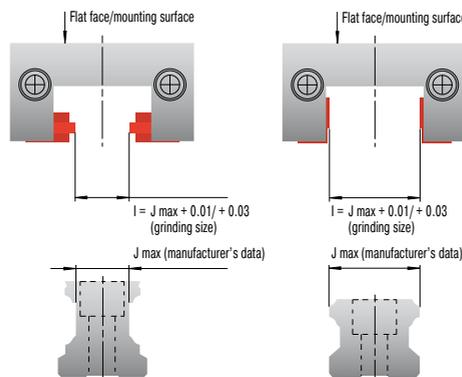
The clamping force of the mechanically pre-stressed spring steel plates is transferred to the clamping/brake pads as holding force. The clamping element is clamped on the guide rail.

Slot dimensions between braking and clamping linings and linear guide rail

The internal dimension "I" between the linings of every LOCKED rail clamping is ground to an exact value.

This is always 0.01 to 0.03 mm greater than the upper limit J max. of the respective linear guide rail (see drawing), resulting from the manufacturer's directives.

The maximum holding force results at J max. and, in the most unfavorable case, holding force losses up to 30 % can occur (see table).



Air Gap Lining/Linear Guide Rail mm	Loss in Holding Force %
0.01	5
0.03	10
0.05	20
0.07	30

Different brake pads for PL/PLK and for SL/SLK

The process clamps and safety clamps are available completely identical in their structure.

They differ only in the clamping and brake pads material.



Clamping



Braking

Position Clamping

The types of the LOCKED series PL and PLK are designed for clamping directly on the linear guide. The clamping linings are produced from tool steel and offer 100 % clamping force, even in the case of lubricated rails.

Position Clamping and Emergency Stop Braking

With the typical SL, SLK, low-wear sinter graphite linings are employed. These enable both a position clamping, as well as emergency stop braking on the linear guide. In case of lubricated rails, a stopping force of 60 % of the nominal stopping force should be considered.

Rod Clamping

The modular solution for exact holding at certain positions

Safe and reliable stopping at a position or an operating state is an important part of many production processes. This task can be performed by the clamping elements from ACE. If clamping on a rod is required, the clamping elements of the PN and PRK families are the right choice.

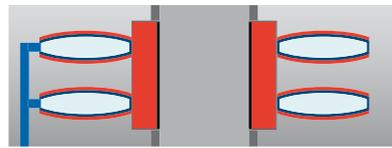
Thanks to the patented spring steel plate system the rod clamps transfer clamping forces of up to 36,000 N directly to the (piston) rod.

The PN and PRK rod clamps can absorb both axial and rotary forces.

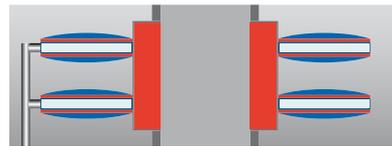
Function of clamping elements LOCKED PN and PRK

Consisting of a deck plate, one to four clamping units and a base plate, all rod clamps work with the reinforced spring steel plate system.

Through that, both axial and rotary forces can be absorbed.



Clamping element is released



Clamping element is engaged

Released

The membrane filled with compressed air relaxes the spring steel plate system and releases the clamping sleeve.

Engaged

The clamping force of the mechanically pre-stressed spring steel plates system is transferred as a holding force into the clamping sleeve. The rod or shaft is engaged.

Intelligent component system solution

By connecting up to four clamping units between the base and deck plates, it is possible to easily increase the clamping force.

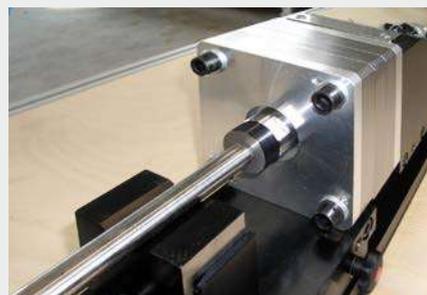


Modular construction

Component tolerances for LOCKED PN and PRK

Design-related, the addition of the individual component tolerances leads to an elastic axial tolerance allowance. This axial tolerance allowance can be up to 500 µm in the clamped status, according to implementation!

The axis/shaft/rod must be machined with at least h9-fit (or better) above h5. Deviations from the prescribed tolerance can lead to reduction of the stopping force, or functional failure.



Rod clamping

Rotational Clamping

The reliable protection against twisting

Reliable holding and securing against a rotation of a position are important elements in many production processes.

This task can be performed by means of the clamping elements of the Locked R family. The rotational clamps can, thanks to the patented spring steel plate system, transfer holding torques of up to 4,680 Nm to the shaft.

The spring accumulator can immediately clamp the axis during a power failure.

Function of clamping elements LOCKED R

The reinforced spring steel plate system transfers holding torques in the shortest possible time.



Clamping element is released

Released

The membrane filled with compressed air relaxes the spring steel plate system and releases the clamping ring. The shaft is free to move.



Clamping element is engaged

Engaged

The clamping force of the membrane/spring steel plates systems is transferred to the holding force of the clamping ring. The shaft is clamped.

Function of clamping elements LOCKED R-Z with additional air

If higher holding torques are required, the rotational clamps with an additional air function are used.

With the same size, significantly higher holding torques are achieved.



Increased clamping force with additional air

Engaged with additional air

By filling the outer membrane chamber with additional compressed air (4 or 6 bar), there is the possibility to increase the clamping force. The clamping element is engaged in this condition.

Clamping Elements



LOCKED PL

Process Clamping for Rail Systems

High clamping power for all rail profiles

tool machines, transport systems, feeder installations, positioning tables



LOCKED PLK

Process Clamping for Rail Systems, Compact

High clamping power for all compact design rail profiles

tool machines, transport systems, feeder installations, positioning tables



LOCKED SL

Safety Clamping for Rail Systems

Combined clamping and braking

tool machines, transport systems, feeder installations, positioning tables



LOCKED SLK

Safety Clamping for Rail Systems, Compact

Combined compact design clamping and braking

tool machines, transport systems, feeder installations, positioning tables



LOCKED LZ-P

Rail Clamping for Z-Axes

Certified safety clamping

Z-axes, vertical conveyor systems, jacking applications



LOCKED PN

Pneumatic Rod Clamping

Rod clamping with maximum clamping force

jacking systems, light presses, punching/stamping machines, stacking units



LOCKED PRK

Pneumatic Rod Clamping, Compact

Rod clamping with maximum clamping force in a compact size

jacking systems, light presses, punching/stamping machines, stacking units



LOCKED R

Pneumatic Rotational Clamping

Strong holding force on the shaft

drive shafts, torque motors, conveyor systems

Application Examples

SL

Special LOCKED SL elements for emergency stops

In order to secure the processing position of a special lathe in both the horizontal and the vertical axis, ACE LOCKED elements of the type SL35-1-6B are installed. They have the further advantage of preventing slippage through the vertical axis in the case of a malfunction. The products used in the SL-series not only have the correct track width and offer very high process clamping forces of up to 10,000 N, but can also apply the same force as an emergency-stop braking function. This is due to the specially integrated brake linings made of low-wear sintered metal.



ACE clamping and safety elements maintain a rock-solid hold on the axes in special lathes and secure the predetermined positions both horizontally and vertically

RASOMA Werkzeugmaschinen GmbH, 04720 Döbeln, Germany

SLK

Secure rail clamping

ACE clamping elements secure machines in the tyre industry. The goods accumulator/compensator of a material dispenser carries meandering, coiled, highly tear resistant material strips, which are fed at high speed to a tyre-manufacturing machine. To prevent damaging the machine, innovative type SLK25-1-6B clamping elements are employed.

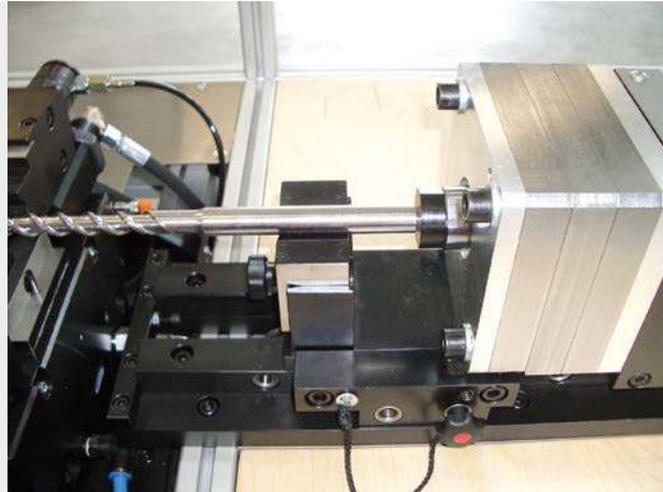


Secure material accumulator

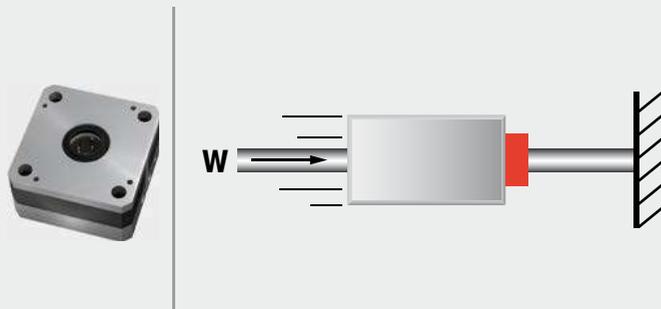
PN

Clamping elements as a variable stop

ACE clamping elements are inserted, as a variable stop, during a joining process for the production of drilling tools. They meet the requirements for a precise positioning of the workpiece head and an adaptation of the length tolerance of up to 3 mm, ideally. ACE was awarded the contract because the clamping element is attached on a bar and its PN LOCKED series is specifically designed for this purpose. For clamping on linear guides, rails, axles and shafts, ACE offers a great range of high-performance models.



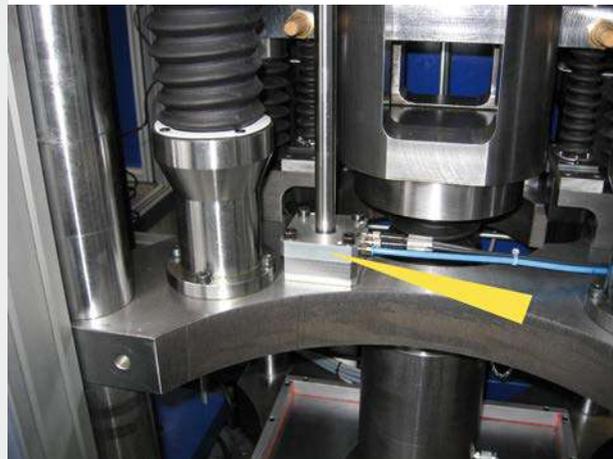
ACE clamping elements assist in the production of drilling tools: the LOCKED-P system clamps and at the same time absorbs the opposing forces of the joining process without difficulty
 GRAF automation GmbH, 88214 Ravensburg, Germany



PN

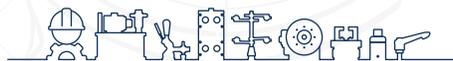
Secure rod clamping

Pneumatic rod clamping allows hydraulic presses to be used for any application. With the help of hydraulic presses, cut ceramic parts are manufactured during the week. So that the rods of the upper and lower stamping plate do not sag when the press is at a standstill over the weekend or during holidays and therefore have to be setup again on the next working day, PN80-25-2-6B type rod clamps are used.



Pneumatic rod clamping allows hydraulic presses to be used for any application
 KOMAGE Gellner Maschinenfabrik KG, 54427 Kell am See, Germany





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