

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 4,250,000 in-lbs/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 0.91 in to 47.24 in, 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 centers, 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

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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

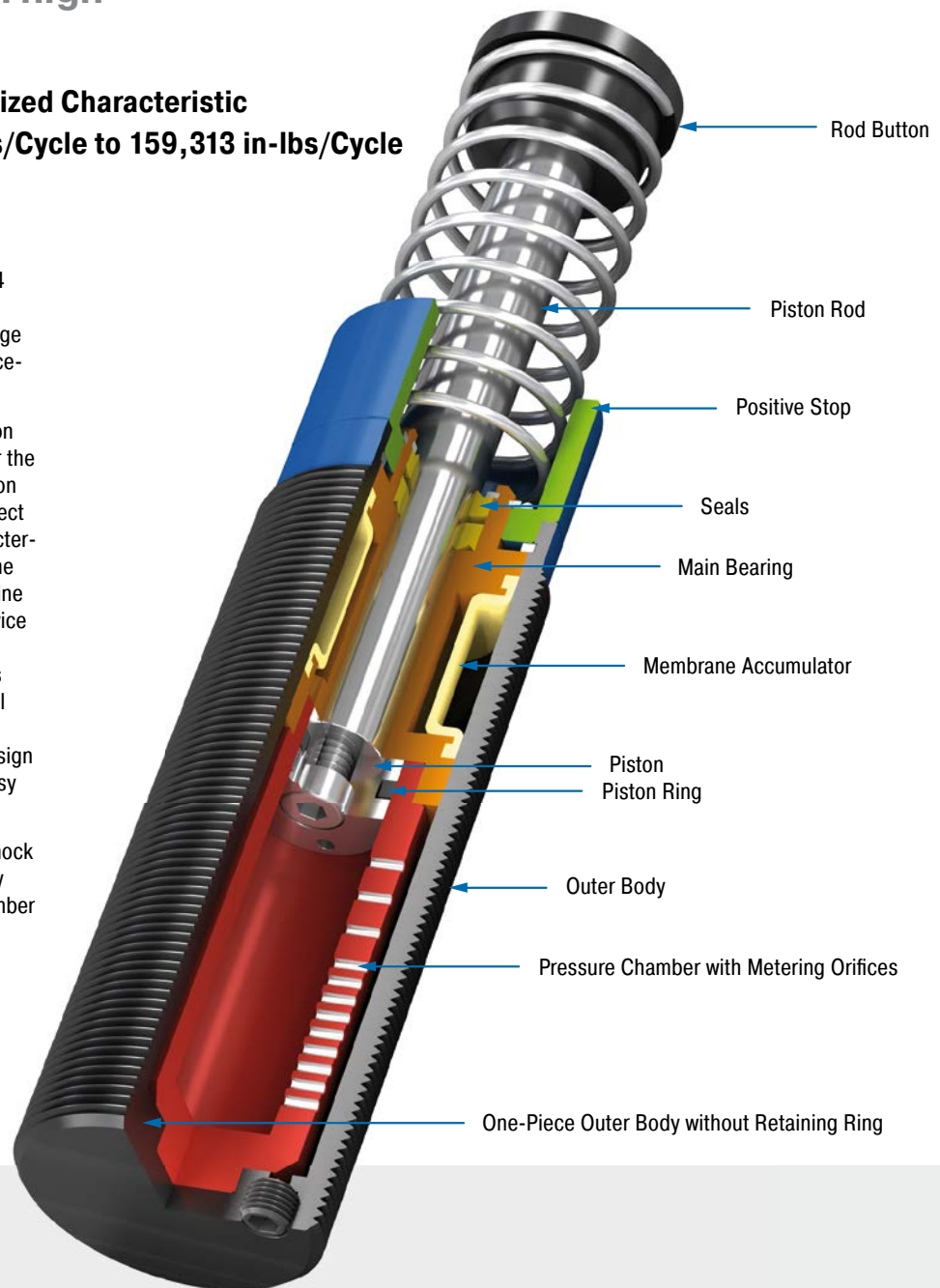
Industry design with high energy absorption

Self-Compensating or Optimized Characteristic
Energy capacity 2,744 in-lbs/Cycle to 159,313 in-lbs/Cycle
Stroke 0.91 in to 5.91 in

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: 2,744 in-lbs/Cycle to 159,313 in-lbs/Cycle

Impact velocity range: 0.06 ft/sec to 16 ft/sec. Other speeds on request.

Operating temperature range: 10 °F to 158 °F. 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

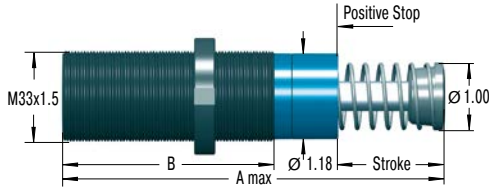
Damping medium: Automatic Transmission Fluid (ATF)

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.

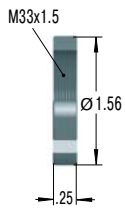
SCS33



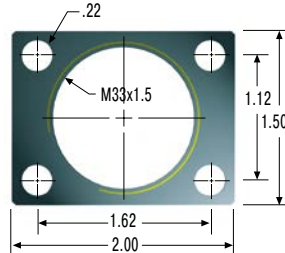
The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Accessories

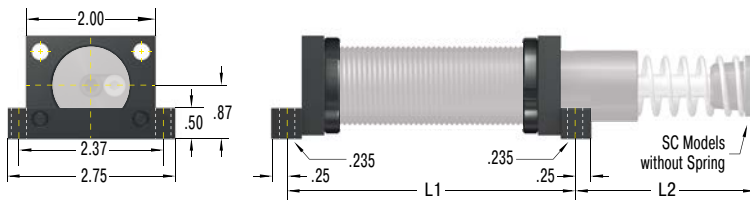
250-0292 Locking Ring



250-0293 Rectangular Flange



250-0294 Side-Foot Mount Assembly



Dimensions

TYPES	L1 inch	L2 inch
MC, MA, ML3325	3.75	1.94
MC, MA, ML3350	4.75	2.94
SC3325	5.31	1.94
SC3350	7.31	2.94
SCS33-25	3.75	1.94
SCS33-50	4.75	2.94

250-0294 = 1 locknut, 2 flanges, 2 bars, 4 screws M6x40, DIN 912
Torque max.: 97 in-lbs
Clamping torque: 797 in-lbs
Bolts to mount assembled shock & mount not included.

Complete details required when ordering

Moving load: W (lbs)
Impact velocity range: v (ft/s) max.
Creep speed: vs (ft/s)
Motor power: HP (horsepower)
Stall torque factor: ST (normal, 2.5)
(Alternatively: Propelling force F (lbs))
Number of absorbers in parallel: n

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

Ordering Example

SCS33-50-1xxxx
Safety Shock Absorber _____
Thread Size M33 _____
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.

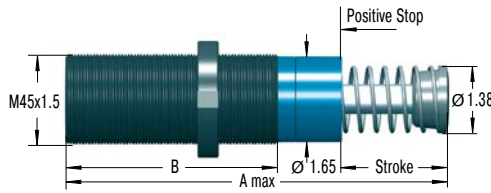
Performance and Dimensions

TYPES	Max. Energy Capacity		Return Force min. lbs	Return Force max. lbs	Stroke inch	A max. inch	B inch	Side Load Angle max. °	Weight lbs
	E ₃ Self-compensating in-lbs/cycle	E ₃ Optimised in-lbs/cycle							
SCS33-25	2,744	4,425	10.1	20.2	0.91	5.44	3.27	3	1.12
SCS33-50	5,487	8,408	10.1	30.3	1.91	7.44	4.25	2	1.39

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

Self-Compensating or Optimized Characteristic

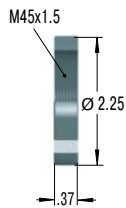
SCS45



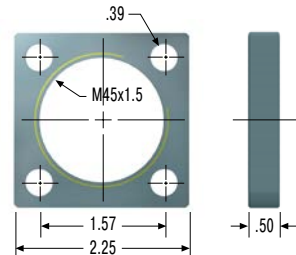
The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Accessories

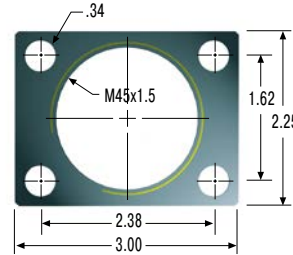
250-0297 Locking Ring



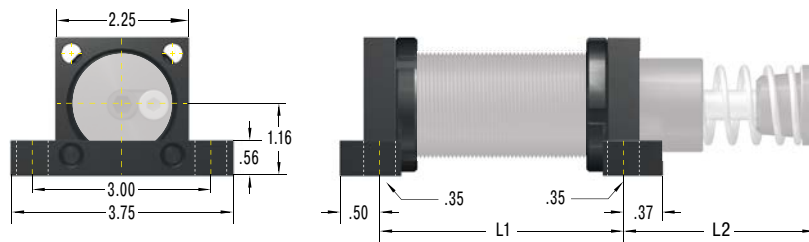
250-0298 Square Flange



250-0299 Rectangular Flange



250-0300 Side-Foot Mount Assembly



Dimensions		
TYPES	L1 inch	L2 inch
MC, MA, ML4525	3.50	1.94
MC, MA, ML4550	4.38	3.06
MC, MA4575	5.38	4.06
SC4525	5.10	2.09
SC4550	7.10	3.09
SCS45-25	3.50	1.94
SCS45-50	4.38	3.06
SCS45-75	5.38	4.06

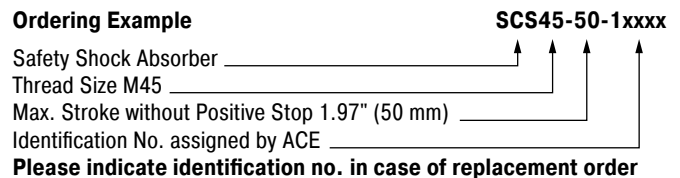
250-0300 = 1 locknut, 2 flanges, 2 bars, 4 screws M8x50, DIN 912
 Torque max.: 239 in-lbs
 Clamping torque: 3,098 in-lbs
 Bolts to mount assembled shock & mount not included.

Complete details required when ordering

- Moving load: W (lbs)
- Impact velocity range: v (ft/s) max.
- Creep speed: vs (ft/s)
- Motor power: HP (horsepower)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (lbs))
- Number of absorbers in parallel: n

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

Ordering Example



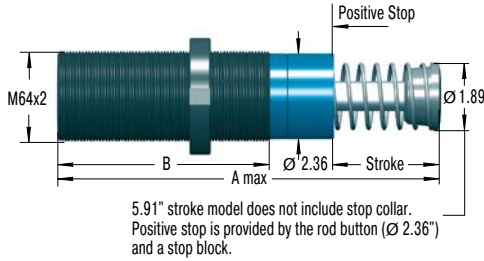
Please indicate identification no. in case of replacement order
 Please contact the factory for complete part number.

Performance and Dimensions

TYPES	Max. Energy Capacity		Return Force min. lbs	Return Force max. lbs	Stroke inch	A max. inch	B inch	Side Load Angle max. °	Weight lbs
	E ₃ Self-compensating in-lbs/cycle	E ₃ Optimised in-lbs/cycle							
SCS45-25	6,019	10,621	15.7	22.5	0.91	5.71	3.74	3	2.51
SCS45-50	12,037	20,799	15.7	32.6	1.91	7.68	4.72	2	3.00
SCS45-75	18,056	30,978	11.2	40.5	2.91	9.69	5.71	1	3.51

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

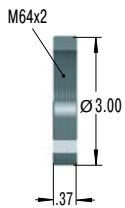
SCS64



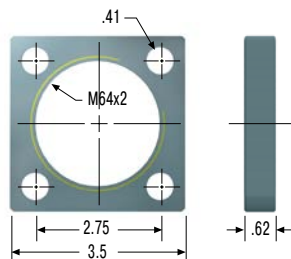
The calculation and selection of the most suitable damper should be carried out or be approved by ACE.

Accessories

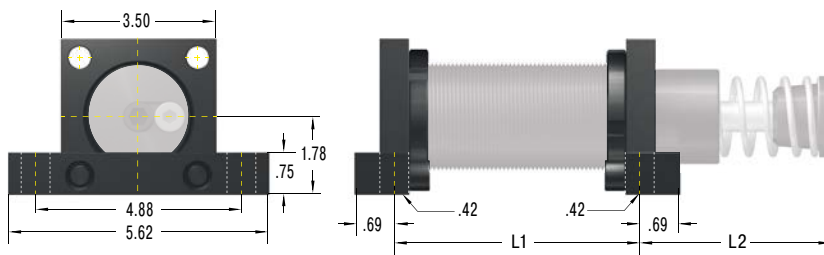
250-0301 Locking Ring



250-0302 Square Flange



250-0304 Side-Foot Mount Assembly



Dimensions		
TYPES	L1 inch	L2 inch
ML6425	4.00	2.54
MC, MA, ML6450	5.00	3.54
MC, MA64100	7.00	5.54
MC, MA64150	9.00	8.42
SCS64-50	5.00	3.54
SCS64-100	7.00	5.54
SCS64-150	9.00	8.42

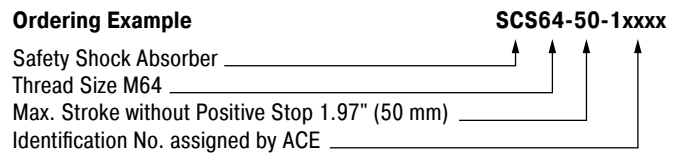
250-0304 = 1 locknut, 2 flanges, 2 bars, 4 screws M10x80, DIN 912
 Torque max.: 443 in-lbs
 Clamping torque: 3,098 in-lbs
 Bolts to mount assembled shock & mount not included.

Complete details required when ordering

- Moving load: W (lbs)
- Impact velocity range: v (ft/s) max.
- Creep speed: vs (ft/s)
- Motor power: HP (horsepower)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (lbs))
- Number of absorbers in parallel: n

or technical data according to formulae 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. lbs	Return Force max. lbs	Stroke inch	A max. inch	B inch	Side Load Angle max. °	Weight lbs
	E ₃ Self-compensating in-lbs/cycle	E ₃ Optimised in-lbs/cycle							
SCS64-50	30,093	53,104	20.2	34.8	1.91	8.86	5.51	3	6.39
SCS64-100	60,185	106,209	23.6	60.7	3.91	12.83	7.52	2	8.16
SCS64-150	90,278	159,313	16.9	82.1	5.91	17.72	9.49	1	11.25

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

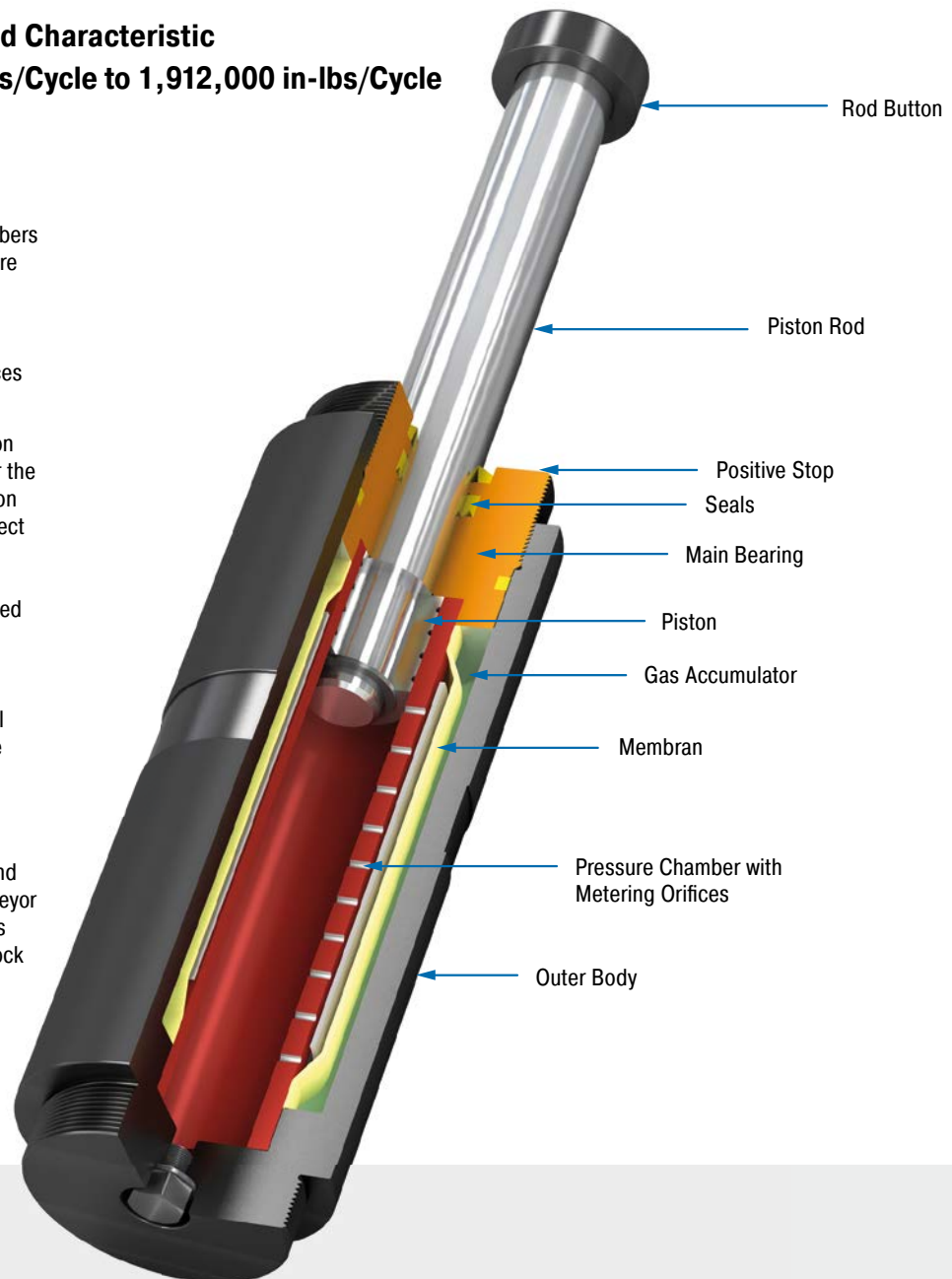
Energy capacity 32,000 in-lbs/Cycle to 1,912,000 in-lbs/Cycle

Stroke 1.97 in to 47.24 in

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 47.24" (1,200 mm) 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: 32,000 in-lbs/Cycle to 1,912,000 in-lbs/Cycle

Impact velocity range: 1.6 ft/sec to 15 ft/sec. Other speeds on request.

Reacting force: At max. capacity rating = 18,000 lbs to 47,200 lbs

Operating temperature range: 10 °F to 150 °F. 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)

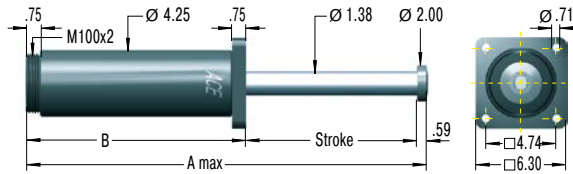
Filling pressure: Approx. 29 psi. Rod return by integrated nitrogen accumulator.

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

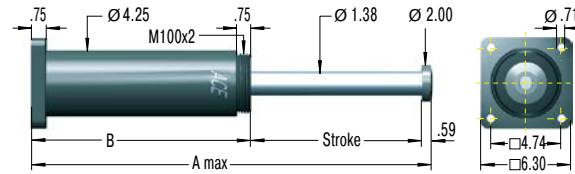
Note: The shock absorber can be pushed through its stroke. In creep speed conditions the shock absorber provides minimal resistance and there is no braking effect.

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.

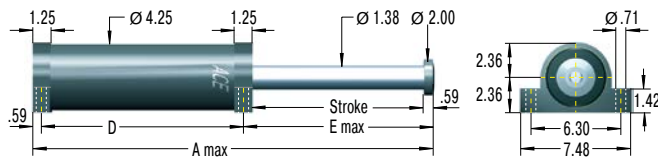
SCS38-F Front Flange



SCS38-R Rear Flange



SCS38-S Foot Mount



Technical Data

Impact velocity range: 3 ft/sec to 15 ft/sec

Complete details required when ordering

- Moving load: W (lbs)
- Impact velocity range: v (ft/s) max.
- Creep speed: vs (ft/s)
- Motor power: HP (horsepower)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (lbs))
- Number of absorbers in parallel: n

or technical data according to formulae 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.

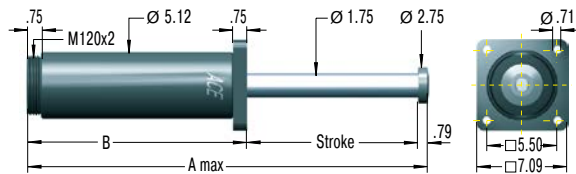
Performance and Dimensions

TYPES	Energy capacity in-lbs/cycle	Return Force		Stroke inch	A max. inch	B inch	D inch	E max. inch	Mounting Style		Mounting Style	
		min. lbs	max. lbs						¹ F and S Side Load Angle max. °	¹ R Side Load Angle max. °	F and R Weight lbs	S Weight lbs
SCS38-50	32,000	135	157	1.97	10.63	8.07	6.89	3.15	5.0	4.0	26.5	28.7
SCS38-100	64,000	135	157	3.94	14.57	10.04	8.77	5.21	5.0	4.0	30.9	33.1
SCS38-150	96,000	135	157	5.91	18.50	12.01	10.83	7.08	5.0	4.0	35.3	37.5
SCS38-200	127,000	135	157	7.87	22.44	13.98	12.80	9.05	5.0	4.0	39.7	41.9
SCS38-250	159,000	135	157	9.84	26.38	15.94	14.77	11.02	4.7	3.7	44.1	46.3
SCS38-300	191,000	135	157	11.81	30.91	18.50	17.33	12.99	3.9	2.9	48.5	48.5
SCS38-350	223,000	135	157	13.78	34.84	20.47	19.29	14.96	3.4	2.4	52.9	55.1
SCS38-400	255,000	135	157	15.75	39.37	23.03	21.85	16.93	3.0	2.0	57.3	59.5
SCS38-500	319,000	135	157	19.69	47.83	27.56	26.38	20.56	2.4	1.4	66.2	68.4
SCS38-600	382,000	135	157	23.62	56.30	32.09	30.91	24.80	1.9	0.9	75.0	75.0
SCS38-700	446,000	135	157	27.56	64.76	36.61	35.43	28.74	1.6	0.6	83.8	86.0
SCS38-800	510,000	135	157	31.50	73.23	41.14	39.97	32.67	1.3	0.3	94.8	97.0

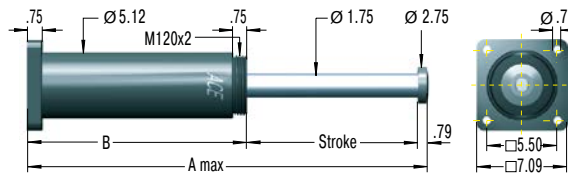
¹ The values are reduced by 20 % at max. side load angle.

High Rack Damper, Optimized Characteristic

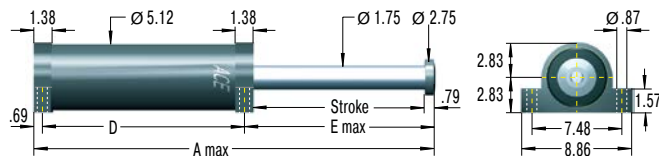
SCS50-F Front Flange



SCS50-R Rear Flange



SCS50-S Foot Mount



Technical Data

Impact velocity range: 2 ft/sec to 15 ft/sec

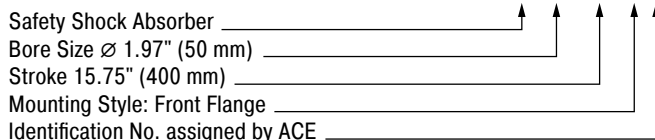
Complete details required when ordering

- Moving load: W (lbs)
- Impact velocity range: v (ft/s) max.
- Creep speed: vs (ft/s)
- Motor power: HP (horsepower)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (lbs))
- Number of absorbers in parallel: n

or technical data according to formulae 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

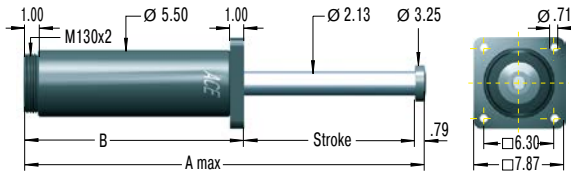
Please contact the factory for complete part number.

Performance and Dimensions

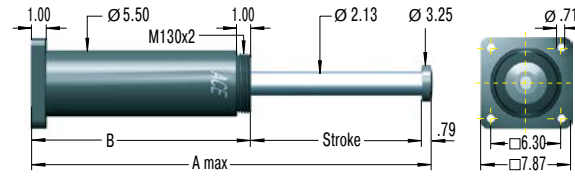
TYPES	Energy capacity in-lbs/cycle	Return Force		Stroke inch	A max. inch	B inch	D inch	E max. inch	Mounting Style		Mounting Style	
		min. lbs	max. lbs						¹ F and S Side Load Angle max. °	¹ R Side Load Angle max. °	F and R Weight lbs	S Weight lbs
SCS50-100	124,000	225	270	3.94	15.35	10.63	9.25	5.41	5.0	4.0	48.5	50.7
SCS50-150	186,000	225	270	5.91	19.29	12.60	11.22	7.38	5.0	4.0	55.1	57.3
SCS50-200	248,000	225	270	7.87	23.23	14.57	13.19	9.35	5.0	4.0	59.5	61.7
SCS50-250	310,000	225	270	9.84	27.17	16.54	15.16	11.32	4.5	3.5	66.2	68.4
SCS50-300	372,000	225	270	11.81	31.69	19.09	17.71	13.29	3.8	2.8	72.8	75.0
SCS50-350	434,000	225	270	13.78	35.63	21.06	19.69	15.25	3.3	2.3	77.2	81.6
SCS50-400	496,000	225	270	15.75	40.16	23.62	22.25	17.22	2.9	1.9	83.8	88.2
SCS50-500	620,000	225	270	19.69	48.62	28.15	26.77	21.16	2.3	1.3	97.0	99.2
SCS50-600	743,000	225	270	23.62	57.09	32.68	31.30	25.10	1.9	0.9	110.3	112.5
SCS50-700	867,000	225	270	27.56	65.55	37.20	35.83	29.03	1.6	0.6	121.3	125.7
SCS50-800	991,000	225	270	31.50	74.02	41.73	40.36	32.97	1.3	0.3	134.5	138.9
SCS50-1000	1,239,000	225	270	39.37	90.94	50.79	49.40	40.85	1.0	0.0	158.8	163.2

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

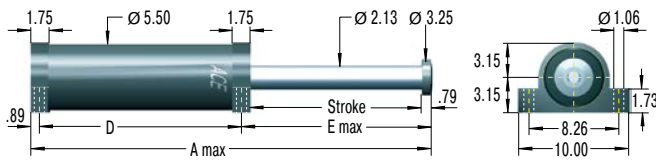
SCS63-F Front Flange



SCS63-R Rear Flange



SCS63-S Foot Mount



Technical Data

Impact velocity range: 1.6 ft/sec to 15 ft/sec

Complete details required when ordering

- Moving load: W (lbs)
- Impact velocity range: v (ft/s) max.
- Creep speed: vs (ft/s)
- Motor power: HP (horsepower)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (lbs))
- Number of absorbers in parallel: n

or technical data according to formulae 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

SCS63-400-F-X
 Safety Shock Absorber _____
 Bore Size \varnothing 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	Energy capacity in-lbs/cycle	Return Force		Stroke inch	A max. inch	B inch	D inch	E max. inch	Mounting Style		Mounting Style	
		min. lbs	max. lbs						¹ F and S Side Load Angle max. °	¹ R Side Load Angle max. °	F and R Weight lbs	S Weight lbs
SCS63-100	159,000	337	562	3.94	15.94	11.22	9.47	5.59	5.0	4.0	63.9	70.6
SCS63-150	239,000	337	562	5.91	19.88	13.19	11.44	7.56	5.0	4.0	70.6	77.2
SCS63-200	319,000	337	562	7.87	23.82	15.16	13.41	9.53	5.0	4.0	77.2	83.8
SCS63-250	398,000	337	562	9.84	27.76	17.13	15.39	11.49	5.0	4.0	83.8	92.6
SCS63-300	478,000	337	562	11.81	31.69	19.09	17.35	13.46	5.0	4.0	90.4	99.2
SCS63-350	558,000	337	562	13.78	36.42	21.85	20.11	15.43	5.0	4.0	99.2	108.0
SCS63-400	637,000	337	562	15.75	40.35	23.82	22.01	17.40	5.0	4.0	105.8	114.7
SCS63-500	797,000	337	562	19.69	49.02	28.54	26.80	21.34	4.2	3.2	121.3	132.3
SCS63-600	956,000	337	562	23.62	56.89	32.48	30.74	25.30	3.4	2.4	136.7	145.5
SCS63-700	1,115,000	337	562	27.56	65.55	37.20	35.46	29.21	2.9	1.9	152.1	161.0
SCS63-800	1,275,000	337	562	31.50	73.43	41.14	39.40	33.15	2.5	1.5	165.4	174.2
SCS63-1000	1,593,000	337	562	39.37	89.96	49.80	48.06	41.02	1.9	0.9	196.2	205.1
SCS63-1200	1,912,000	337	562	47.24	106.50	58.46	56.72	48.90	1.4	0.4	224.9	233.7

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

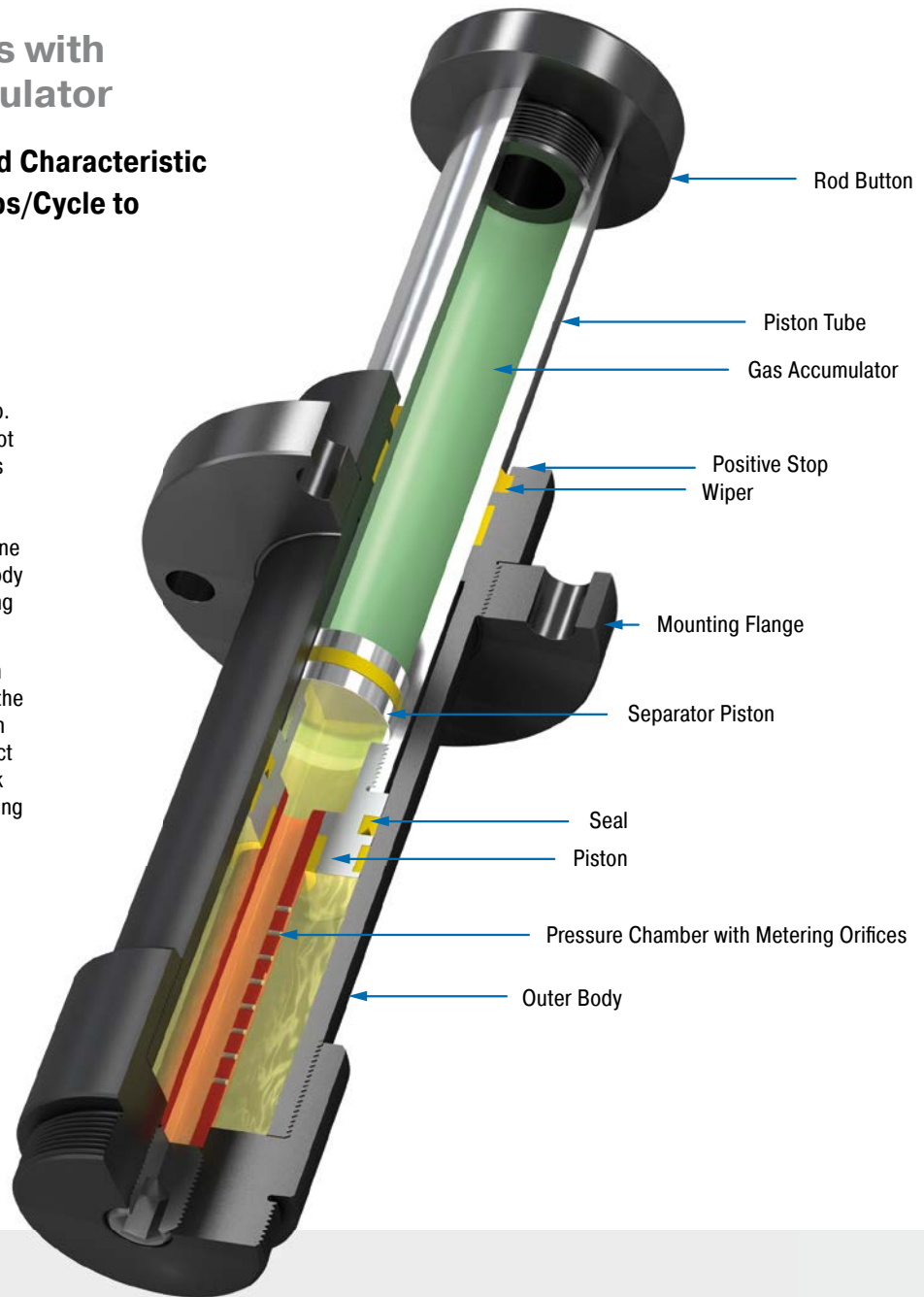
Energy capacity 141,600 in-lbs/Cycle to 4,248,000 in-lbs/Cycle

Stroke 3.94 in to 31.50 in

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 22,481 lb. (100 kN) 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: 141,600 in-lbs/Cycle to 4,248,000 in-lbs/Cycle

Impact velocity range: 1.6 ft/sec to 15 ft/sec. Other speeds on request.

Reacting force: At max. capacity rating = 42,000 lbs to 157,000 lbs

Operating temperature range: 10 °F to 150 °F. 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)

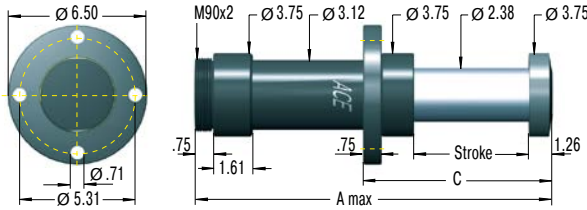
Filling pressure: Approx. 81 psi to 86 psi. Rod return by integrated nitrogen accumulator.

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.

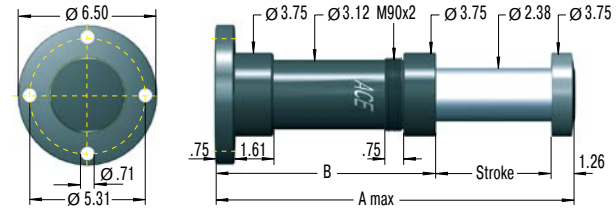
On request: Special oils, special flanges, additional corrosion protection etc.

CB63-F Front Flange



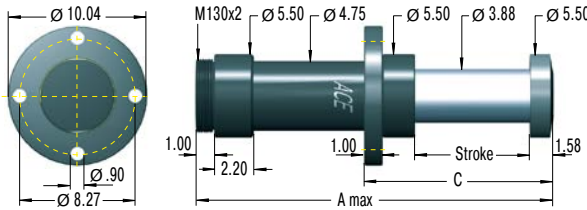
Reacting force: at max. capacity rating = **42,000 lbs max.**

CB63-R Rear Flange



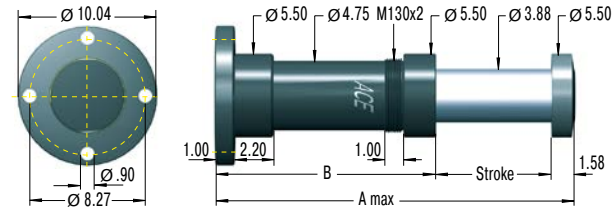
Reacting force: at max. capacity rating = **42,000 lbs max.**

CB100-F Front Flange



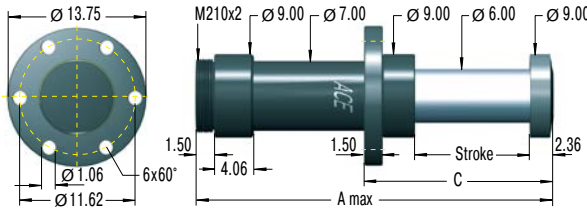
Reacting force: at max. capacity rating = **105,000 lbs max.**

CB100-R Rear Flange



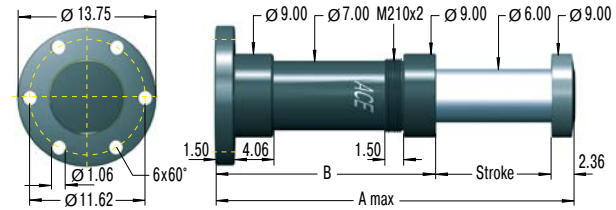
Reacting force: at max. capacity rating = **105,000 lbs max.**

CB160-F Front Flange



Reacting force: at max. capacity rating = **157,000 lbs max.**

CB160-R Rear Flange



Reacting force: at max. capacity rating = **157,000 lbs max.**

Complete details required when ordering

- Moving load: W (lbs)
- Impact velocity range: v (ft/s) max.
- Creep speed: vs (ft/s)
- Motor power: HP (horsepower)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (lbs))
- Number of absorbers in parallel: n

or technical data according to formulae 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 in-lbs/cycle	Effective Weight		Return Force min. lbs	Return Force max. lbs	Stroke inch	A max. inch	B inch	C inch	Side Load Angle max. °	Weight lbs
		We min. lbs	We max. lbs								
CB63-100	141,600	3,330	282,000	393	4,110	3.94	16.54	11.34	7.56	3.5	28.0
CB63-200	283,200	6,660	564,000	393	5,392	7.87	27.56	18.43	11.50	3.0	36.8
CB63-300	424,800	10,010	847,000	393	6,038	11.81	38.58	25.51	15.43	2.5	45.9
CB63-400	566,400	13,340	1,129,000	393	6,404	15.75	49.61	32.60	19.37	2.0	54.7
CB63-500	708,000	16,670	1,411,000	393	6,660	19.69	60.63	39.69	23.31	1.5	63.5
CB100-200	708,000	16,670	1,411,000	1,005	9,917	7.87	28.94	19.49	12.60	4.0	93.7
CB100-300	1,062,000	25,000	2,116,000	1,005	12,540	11.81	39.57	26.18	16.54	3.5	112.0
CB100-400	1,416,000	33,330	2,822,000	1,005	14,459	15.75	50.20	32.87	20.47	3.0	130.3
CB100-500	1,770,000	41,670	3,527,000	1,005	15,916	19.69	60.83	39.57	24.41	2.5	148.8
CB100-600	2,124,000	50,000	4,233,000	1,005	17,058	23.62	71.46	46.26	28.35	2.0	167.1
CB160-400	2,124,000	50,000	4,233,000	2,455	15,845	15.75	55.12	37.01	23.62	4	339.6
CB160-600	3,186,000	75,000	6,349,000	2,455	15,857	23.62	78.74	52.76	31.50	3	414.5
CB160-800	4,248,000	100,000	8,466,000	2,455	15,869	31.50	102.36	68.50	39.37	2	487.3

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 141,600 in-lbs/Cycle to

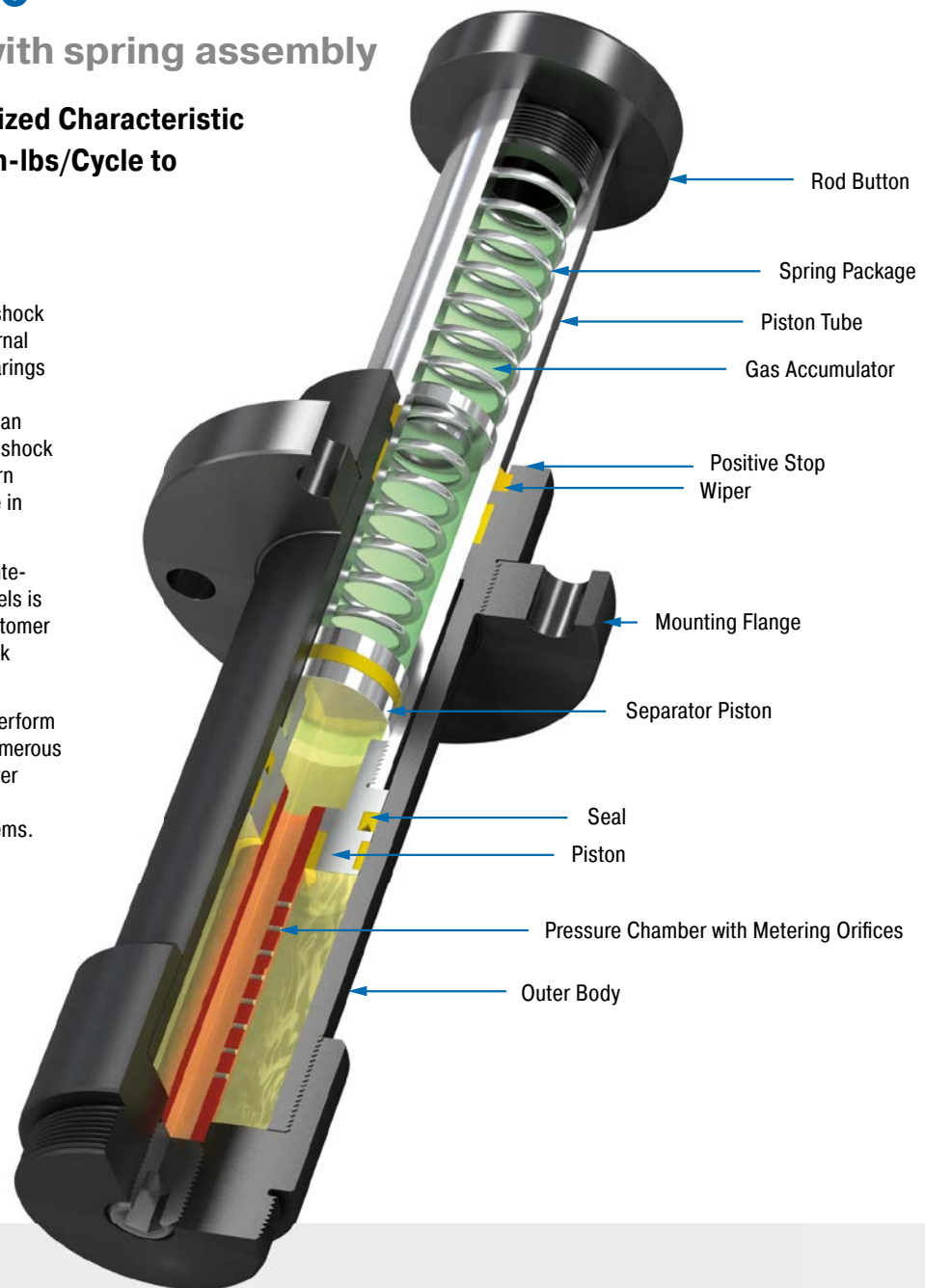
4,248,000 in-lbs/Cycle

Stroke 3.94 in to 31.50 in

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: 141,600 in-lbs/Cycle to 4,248,000 in-lbs/Cycle

Impact velocity range: 1.6 ft/sec to 15 ft/sec. Other speeds on request.

Reacting force: At max. capacity rating = 42,000 lbs to 157,000 lbs

Operating temperature range: 10 °F to 150 °F. 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)

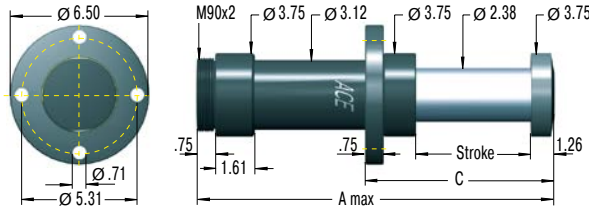
Filling pressure: Approx. 8 psi to 16 psi. Rod return by integrated nitrogen accumulator combined with additional return spring.

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.

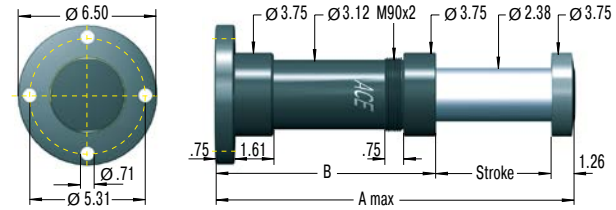
On request: Special oils, special flanges, additional corrosion protection etc.

EB63-F Front Flange



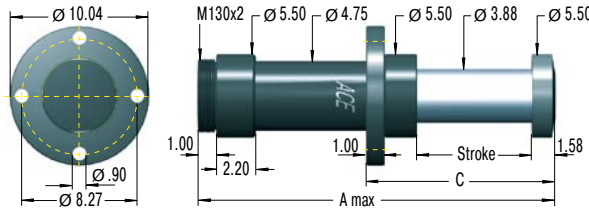
Reacting force: at max. capacity rating = **42,000 lbs max.**

EB63-R Rear Flange



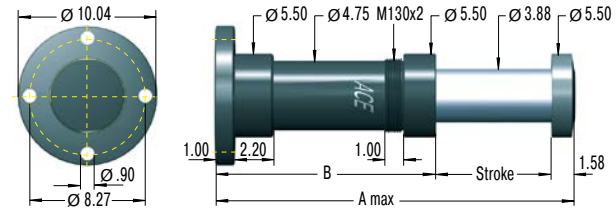
Reacting force: at max. capacity rating = **42,000 lbs max.**

EB100-F Front Flange



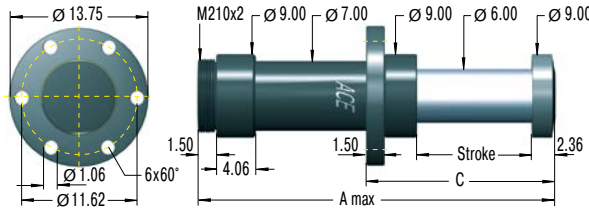
Reacting force: at max. capacity rating = **105,000 lbs max.**

EB100-R Rear Flange



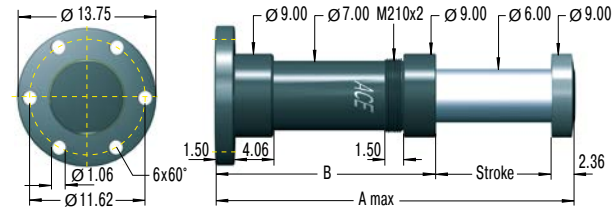
Reacting force: at max. capacity rating = **105,000 lbs max.**

EB160-F Front Flange



Reacting force: at max. capacity rating = **157,000 lbs max.**

EB160-R Rear Flange



Reacting force: at max. capacity rating = **157,000 lbs max.**

Complete details required when ordering

- Moving load: W (lbs)
- Impact velocity range: v (ft/s) max.
- Creep speed: vs (ft/s)
- Motor power: HP (horsepower)
- Stall torque factor: ST (normal, 2.5)
- (Alternatively: Propelling force F (lbs))
- Number of absorbers in parallel: n

or technical data according to formulae 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 in-lbs/cycle	Effective Weight		Return Force min. lbs	Return Force max. lbs	Stroke inch	A max. inch	B inch	C inch	Side Load Angle max. °	Weight lbs
		We min. lbs	We max. lbs								
EB63-100	141,600	3,330	282,000	157	1,562	3.94	16.54	11.34	7.56	3.5	30.2
EB63-200	283,200	6,660	564,000	172	2,084	7.87	27.56	18.43	11.50	3.0	36.8
EB63-300	424,800	10,010	847,000	187	2,372	11.81	38.58	25.51	15.43	2.5	48.1
EB63-400	566,400	13,340	1,129,000	136	2,496	15.75	49.61	32.60	19.37	2.0	56.9
EB63-500	708,000	16,670	1,411,000	151	2,691	19.69	60.63	39.69	23.31	1.5	65.7
EB100-200	708,000	16,670	1,411,000	271	1,999	7.87	28.94	19.49	12.60	4.0	93.7
EB100-300	1,062,000	25,000	2,116,000	213	3,163	11.81	39.57	26.18	16.54	3.5	112.0
EB100-400	1,416,000	33,330	2,822,000	267	4,089	15.75	50.20	32.87	20.47	3.0	130.3
EB100-500	1,770,000	41,670	3,527,000	209	4,686	19.69	60.83	39.57	24.41	2.5	151.0
EB100-600	2,124,000	50,000	4,233,000	263	5,248	23.62	71.46	46.26	28.35	2.0	169.3
EB160-400	2,124,000	50,000	4,233,000	421	4,071	15.75	55.12	37.01	23.62	4	343.1
EB160-600	3,186,000	75,000	6,349,000	474	4,225	23.62	78.74	52.76	31.50	3	416.7
EB160-800	4,248,000	100,000	8,466,000	535	4,380	31.50	102.36	68.50	39.37	2	490.2

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** [lbs]
2. **Impact velocity at shock absorber** **v_D** [ft/s]
3. **Propelling force** **F** [lbs]
4. **Number of absorbers in parallel** **n**

Key to symbols used

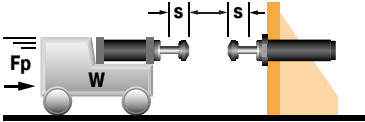
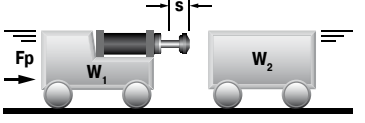
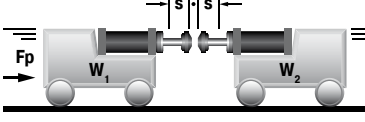
E ₁	Kinetic energy per cycle	in-lbs	² v _D	Impact velocity at shock absorber	ft/s
E ₂	Propelling force energy per cycle	in-lbs	F	Propelling force	lbs
E ₃	Total energy per cycle (E ₁ + E ₂)	in-lbs	c	Cycles per hour	1/hr
¹ E ₄	Total energy per hour (E ₃ · x)	in-lbs/hr	s	Shock absorber stroke	in
We	Effective weight	lbs	Q	Reaction force	lbs
W	Weight to be decelerated	lbs	t	Deceleration time	s
n	Number of shock absorbers (in parallel)		a	Deceleration	ft/s ²
² v	Velocity at impact	ft/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 	$E_1 = 0.093 \cdot W \cdot v^2$ $E_2 = F \cdot s$ $E_3 = E_1 + E_2$ $v_D = v \cdot 0.5$ $We = E_3 / (0.186 \cdot v_D^2)$	<table border="0"> <tr> <td>W = 2000 lbs</td> <td>E₁ = 0.093 · 2000 · 5²</td> <td>=</td> <td>4650 in-lb</td> </tr> <tr> <td>F = 500 lbs</td> <td>E₂ = 500 · 1.91</td> <td>=</td> <td>955 in-lb</td> </tr> <tr> <td>v = 5 ft/s</td> <td>E₃ = 4650 + 955</td> <td>=</td> <td>5605 in-lb</td> </tr> <tr> <td>s = 1.91 in (chosen)</td> <td>E₄ = 5605 · 20</td> <td>=</td> <td>112100 in-lb/hr</td> </tr> <tr> <td></td> <td>v_D = 5 · 0.5</td> <td>=</td> <td>2.5 ft/s</td> </tr> <tr> <td></td> <td>We = 5605 / (0.186 · 2.5²)</td> <td>=</td> <td>4194 lbs</td> </tr> </table> <p>Chosen from capacity chart: Model SCS45-50 self-compensating</p>	W = 2000 lbs	E₁ = 0.093 · 2000 · 5²	=	4650 in-lb	F = 500 lbs	E₂ = 500 · 1.91	=	955 in-lb	v = 5 ft/s	E₃ = 4650 + 955	=	5605 in-lb	s = 1.91 in (chosen)	E₄ = 5605 · 20	=	112100 in-lb/hr		v_D = 5 · 0.5	=	2.5 ft/s		We = 5605 / (0.186 · 2.5²)	=	4194 lbs				
W = 2000 lbs	E₁ = 0.093 · 2000 · 5²	=	4650 in-lb																											
F = 500 lbs	E₂ = 500 · 1.91	=	955 in-lb																											
v = 5 ft/s	E₃ = 4650 + 955	=	5605 in-lb																											
s = 1.91 in (chosen)	E₄ = 5605 · 20	=	112100 in-lb/hr																											
	v_D = 5 · 0.5	=	2.5 ft/s																											
	We = 5605 / (0.186 · 2.5²)	=	4194 lbs																											
20 Wagon against wagon 	$E_1 = \frac{0.186 (W_1 \cdot W_2)}{(W_1 + W_2) \cdot (v_1 + v_2)^2}$ $E_2 = F \cdot s$ $E_3 = E_1 + E_2$ $E_4 = E_3 \cdot c$ $v_D = (v_1 + v_2) / 2$ $We = E_3 / (0.186 \cdot v_D^2)$	<table border="0"> <tr> <td>W = 4000 lbs</td> <td>E₁ = 0.186 (4000 · 8000)</td> <td>=</td> <td>5079 in-lb</td> </tr> <tr> <td>v₁ = 2 ft/s</td> <td>4000 + 8000 · (2 + 1.2)</td> <td>=</td> <td>2910 in-lb</td> </tr> <tr> <td>c = 30 /hr</td> <td>E₂ = 1000 · 2.91</td> <td>=</td> <td>7989 in-lb</td> </tr> <tr> <td>W₂ = 8000 lbs</td> <td>E₃ = 5079 + 2910</td> <td>=</td> <td>1.6 ft/s</td> </tr> <tr> <td>v₂ = 1.2 ft/s</td> <td>v_D = 2 + 1.2</td> <td>=</td> <td>4194 lbs</td> </tr> <tr> <td>F = 1000 lbs</td> <td>We = 7989 / (0.186 · 3.2²)</td> <td>=</td> <td></td> </tr> <tr> <td>s = 1.91 in (chosen)</td> <td></td> <td></td> <td></td> </tr> </table> <p>Chosen from capacity chart: Model SCS45-75 self-compensating</p>	W = 4000 lbs	E₁ = 0.186 (4000 · 8000)	=	5079 in-lb	v ₁ = 2 ft/s	4000 + 8000 · (2 + 1.2)	=	2910 in-lb	c = 30 /hr	E₂ = 1000 · 2.91	=	7989 in-lb	W ₂ = 8000 lbs	E₃ = 5079 + 2910	=	1.6 ft/s	v ₂ = 1.2 ft/s	v_D = 2 + 1.2	=	4194 lbs	F = 1000 lbs	We = 7989 / (0.186 · 3.2²)	=		s = 1.91 in (chosen)			
W = 4000 lbs	E₁ = 0.186 (4000 · 8000)	=	5079 in-lb																											
v ₁ = 2 ft/s	4000 + 8000 · (2 + 1.2)	=	2910 in-lb																											
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W ₂ = 8000 lbs	E₃ = 5079 + 2910	=	1.6 ft/s																											
v ₂ = 1.2 ft/s	v_D = 2 + 1.2	=	4194 lbs																											
F = 1000 lbs	We = 7989 / (0.186 · 3.2²)	=																												
s = 1.91 in (chosen)																														
21 Wagon against wagon 2 shock absorbers 	$E_1 = \frac{0.093 (W_1 \cdot W_2)}{(W_1 + W_2) \cdot (v_1 + v_2)^2}$ $E_2 = F \cdot s$ $E_3 = E_1 + E_2$ $E_4 = E_3 \cdot c$ $v = (v_1 + v_2) / 2$ $We = E_3 / (0.186 \cdot v_D^2)$	<table border="0"> <tr> <td>W = 4000 lbs</td> <td>E₁ = 0.093 (4000 · 8000)</td> <td>=</td> <td>2540 in-lb</td> </tr> <tr> <td>v₁ = 2 ft/s</td> <td>(4000+8000) · (2+1.2)²</td> <td>=</td> <td>1910 in-lb</td> </tr> <tr> <td>c = 30 /hr</td> <td>E₂ = 1000 · 1.91</td> <td>=</td> <td>4450 in-lb</td> </tr> <tr> <td>W₂ = 8000 lbs</td> <td>E₃ = 2540 + 1910</td> <td>=</td> <td>1.6 ft/s</td> </tr> <tr> <td>v₂ = 1.2 ft/s</td> <td>v_D = (2 + 1.2) / 2</td> <td>=</td> <td>9346 lbs</td> </tr> <tr> <td>F = 1000 lbs</td> <td>We = 4450 / (0.186 · 1.6²)</td> <td>=</td> <td></td> </tr> <tr> <td>s = 1.91 in (chosen)</td> <td></td> <td></td> <td></td> </tr> </table> <p>Chosen from capacity chart: Model SCS45-50 self-compensating</p>	W = 4000 lbs	E₁ = 0.093 (4000 · 8000)	=	2540 in-lb	v ₁ = 2 ft/s	(4000+8000) · (2+1.2)²	=	1910 in-lb	c = 30 /hr	E₂ = 1000 · 1.91	=	4450 in-lb	W ₂ = 8000 lbs	E₃ = 2540 + 1910	=	1.6 ft/s	v ₂ = 1.2 ft/s	v_D = (2 + 1.2) / 2	=	9346 lbs	F = 1000 lbs	We = 4450 / (0.186 · 1.6²)	=		s = 1.91 in (chosen)			
W = 4000 lbs	E₁ = 0.093 (4000 · 8000)	=	2540 in-lb																											
v ₁ = 2 ft/s	(4000+8000) · (2+1.2)²	=	1910 in-lb																											
c = 30 /hr	E₂ = 1000 · 1.91	=	4450 in-lb																											
W ₂ = 8000 lbs	E₃ = 2540 + 1910	=	1.6 ft/s																											
v ₂ = 1.2 ft/s	v_D = (2 + 1.2) / 2	=	9346 lbs																											
F = 1000 lbs	We = 4450 / (0.186 · 1.6²)	=																												
s = 1.91 in (chosen)																														

Application Examples

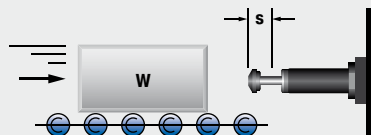
SCS45

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 SCS45-50. If the turntables malfunction the safety shock absorbers decelerate the loads before expensive damage can occur to the granite measuring tables.



Optimally protected turntable



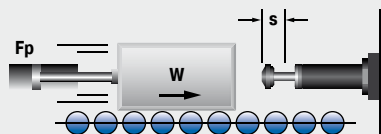
SCS33, SCS45

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 16.5 f/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

