

SCS33 to SCS64 Safety Shock Absorbers

Industry design with high energy capacity

Self-compensating or optimised characteristic

Energy capacity 310 Nm/cycle to 18,000 Nm/cycle

Stroke 23.1 mm to 150 mm

SCS33EU

SCS45EU

SCS64EU

The identification numbers listed are the respective standard units of the corresponding shock absorber series. Special types can have deviating identification numbers.

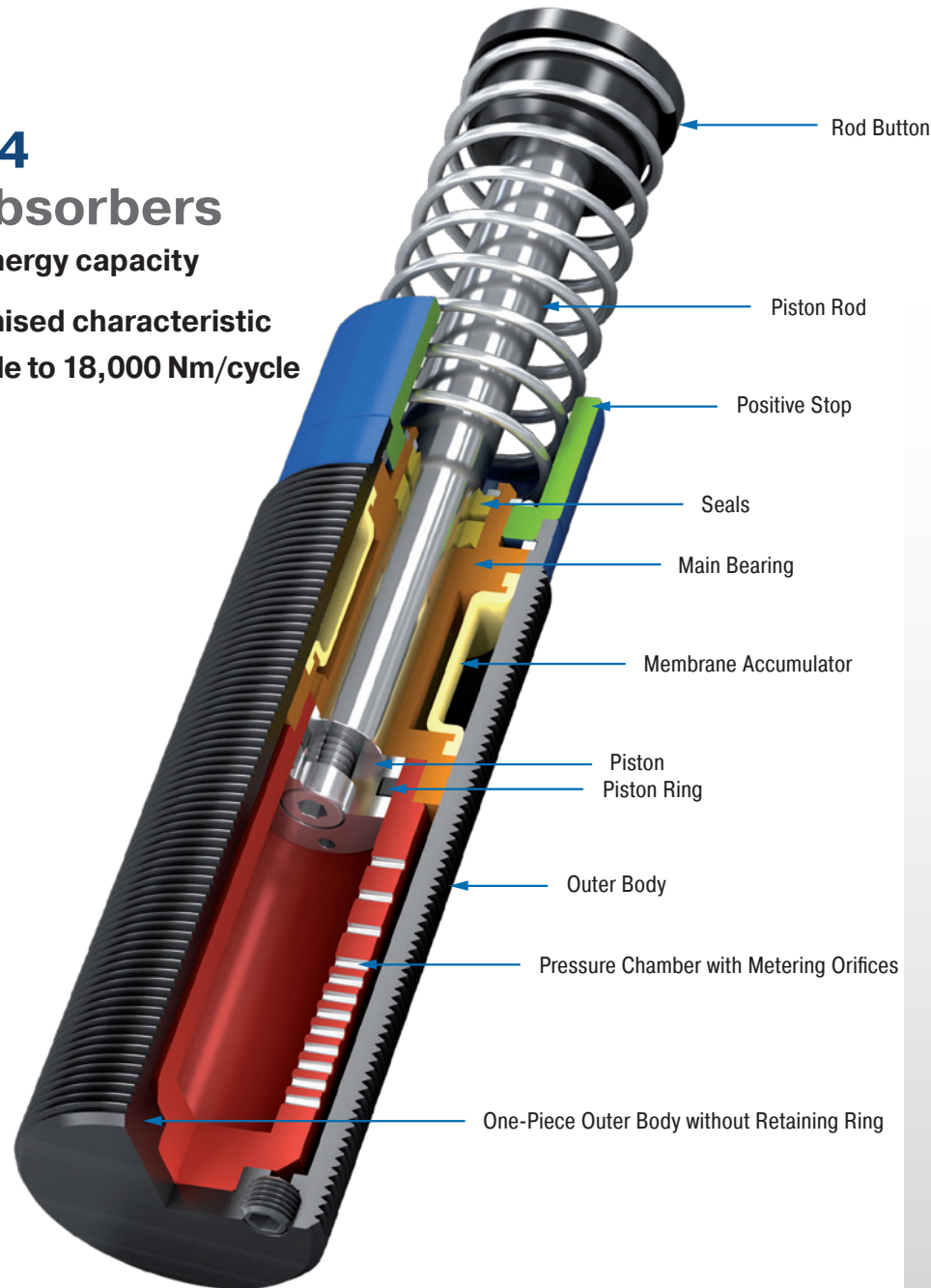


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General instructions

This manual is for the disruption-free use of the product types listed on page 1; its compliance is a prerequisite for the fulfilment of any warranty claims.

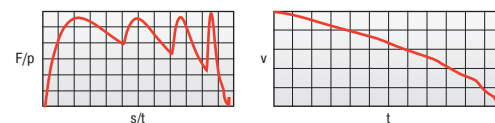
Therefore, make sure to read this manual before use.

Please always maintain the specified limits from the performance table (technical data). Take into account the predominant environmental conditions and restrictions.

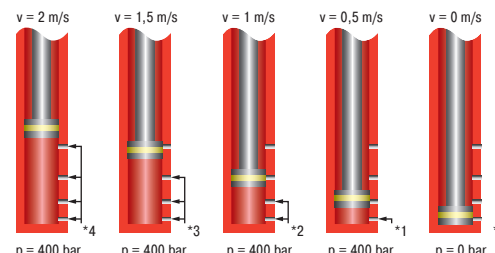
Note the regulations of the trade association, TÜV or corresponding national, international and European regulations. Installation and commissioning only according to mounting instructions.

shock absorber and therefore the correct selection of the right metering orifice pattern or the right hardness level of the shock absorber.

General Function



F = Force (N) p = Internal pressure (bar) s = Stroke (m)
t = Deceleration time (s) v = Velocity (m/s)



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

Safety information

WARNING

- ! If ACE safety shock absorbers are used where a failure of the product could lead to personal injuries and/or material damage, additional safety elements must be implemented.
- ! Free-moving masses can lead to injuries by crushing during installation of the shock absorber. Secure moving masses against inadvertent starting with suitable safety precautions before installing the shock absorbers.

Intended 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.

Description and function

The ACE safety shock absorbers SCS33 to SCS64 are maintenance-free, ready-to-install hydraulic components with numerous metering orifices. During the slowing down process the moving mass moves with kinetic energy and, if necessary, an additional drive energy in the axial direction of the piston rod with a defined impact velocity against the rod end button of the shock absorber. Alternatively, numerous shock absorbers can also be used in parallel. During the initiated slowing down process the piston rod is pushed into the shock absorber. The hydraulic oil located before the piston is displaced through all metering orifices at the same time. The number of effective metering openings reduces in proportion to the driven stroke. The retraction speed reduces. The dynamic pressure applied in front of the piston corresponds to the counterforce applied by the shock absorber and remains approximately constant over the entire stroke. A requirement for a constant rate of deceleration is the correct calculation of the safety

Calculation and design

In order to ensure an optimum, fault-free and durable function of the safety shock absorbers they must be correctly dimensioned and designed. The following parameters must be known and used in the calculation:

- Moving mass [kg]
- Impact velocity of the mass into the shock absorber(s) [m/s]
- Additionally acting propelling force, propelling power or propelling torque [N, kW, Nm]
- Number of shock absorbers acting in parallel [n]
- Number of strokes or cycles per hour [1/h]

The correct size of the safety shock absorbers can be determined with the ACE online calculation programme at www.ace-ace.de. You can also send us the completed online form via e-mail for checking.

Or make use of our free calculation service by phoning:
T +49 (0)2173 - 9226-20.

WARNING

- ! The dampers must be dimensioned in such a way that the calculated values do not exceed the maximum values of the respective performance table (technical data):
W_j [Nm/cycle]
Effective weight me
Max. side load angle [°]
- ! The calculation and design of the suitable safety shock absorber should be undertaken by or checked by ACE.
- ! For a correct damping design the safety shock absorber must represent the only braking system in an emergency stop.

Delivery and storage

- After delivery please check the shock absorber for any damage.
- The shock absorber can become damaged if it falls. Carefully remove shock absorber from the packaging.
- Shock absorbers can generally be stored in any position.
- Storage in the original packaging is preferred.
- Always store shock absorbers in a dry place in order to avoid oxidation.
- The recommended maximum storage time is three years.

Maintenance and care

Safety shock absorbers are enclosed systems and therefore do not need special maintenance. Safety shock absorbers that are not regularly started up (e.g. emergency stop devices) are checked **at least once per year** as part of the normal safety check of the plant. Check that the return of the piston rod is in the initial position, the damper is not leaking and the mounting elements are properly secured. The piston rod must not exhibit any damage. For safety shock absorbers that are regularly operated, these checks should take place at intervals of no more than three months.

Disassembly and disposal

Take account of environmental protection (recovery of problematic substances) during disposal of the shock absorber. The SCS33 to SCS64 safety shock absorbers are filled with automatic transmission fluid (ATF). The corresponding data sheet is available on request.

The SCS33 to SCS64 safety shock absorbers are repairable. Faulty dampers can be sent to our service department for determination of the cause of failure.

Mounting instructions and mounting accessories

Installation instructions

Before installation and use check whether the identification number on the damper or on the packaging matches the respective designation on the delivery note.

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

Mounting: As required but always in such a way that the entire damper stroke is used. The dampers must always be mounted in such a way that the forces are introduced centrally over the piston rod in the damper. The maximum side load angle must not be exceeded. Safety dampers must not be exchanged from one installation site to another if the conformity of the throttle characteristic curve is not ensured.

Emergency stop application: After an emergency stop, check that the piston rod returns to the initial position, the damper is not leaking and the mounting elements are properly secured. Make sure that no damage has occurred to the piston rod, the body, or the mounting hardware.

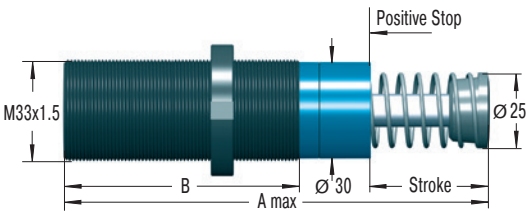
Regular start-up: Safety shock absorbers can be regularly

started up with 100 % stroke utilisation with a creep speed of 1/10 of the max. impact velocity.

Checking: A regular check should take place at an interval of no more than three months.

Commissioning

First impacts on the shock absorber should only be tried after



Performance data and dimensions									
	Max. Energy Capacity		Return Force min. N	Return Force max. N	Stroke mm	A max. mm	B mm	¹ Side Load Angle max. °	Weight kg
TYPES	W ₃ self-compensating Nm/cycle	W ₃ optimised Nm/cycle							
SCS33-25EU	310	500	45	90	23.2	138	83	3	0.51
SCS33-50EU	620	950	45	135	48.6	189	108	2	0.63

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

WARNING

- Take particular care that the customer-specific identification number at the end of the damper designation matches the number on the delivery note. The field data to be read from the type plate, such as moving mass and maximum impact velocity, must be compared with the technical design. This ensures that the damper is the right size for its use. Otherwise you risk damaging the shock absorbers and/or machine by overstressing materials.
- During installation of the dampers, moving masses can lead to injuries due to inadvertent starting. Secure moving masses against inadvertent moving.
- The dampers may be unsuitable for use and have an insufficient damping effect. Check the specific suitability of the dampers before installation.
- If operated outside of the operating temperature range, the damper can lose its function. Operating temperature range must be maintained. Do not paint dampers due to heat emission.
- Fluids, gases and dirt particles in the surrounding area can attack or destroy the seal system of the damper and cause it to fail. Protect or encapsulate piston rod and seal system from external materials in the surrounding area.
- Damage to the piston rod surface can destroy the seal system. Do not grease, oil piston rod etc. and protect against dirt particles.
- The piston rod can be torn from the damper. Do not load the piston rod with tensile stress.
- Damper can tear off upon impact. Always lay out the connection structure in such a way that the maximum occurring forces can be absorbed with sufficient safety.
- Safety shock absorber check after a damper impact. Check that the piston rod returns to the initial position, the damper is not leaking and the mounting elements are properly secured.

correctly mounting and with reduced impact velocity and – if possible – with reduced load. Differences between calculated and actual operating data can then be detected early on, and damage to the system can be avoided. If the safety dampers were selected on calculated data that does not correspond to the maximum possible load (i.e. selection based on drive power being switched off or at reduced impact velocity) 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 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. Make sure that no damage has occurred to the piston rod, the body, or the mounting hardware.

Mounting accessories

Information on the corresponding mounting accessories can be found on the following pages.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

Mounting instructions and mounting accessories

M33x1.5 mounting accessories
SCS33

Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.
If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

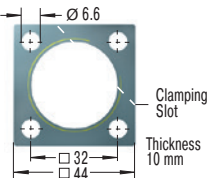
When using accessory parts and mounting elements also note the mounting instructions for accessories delivered separately.

Mounting Foot mounting kit

If the permissible reaction force of 6,800 N is exceeded, an additional support strip is required to support the damper force when foot mounting. This support strip (max. thickness 3 mm) is preferably positioned behind the rear foot flange. The slide rail prevents the fixing screws of the damper from being subjected to bending and shearing. The customer must design, manufacture and install the fixing of the support strip (welding, screw fastening, etc.) himself to ensure that it is strong enough.

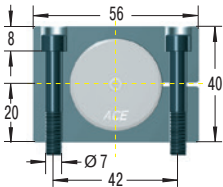
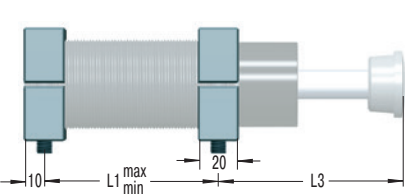
QF33

Square Flange



S33

Side Foot Mounting Kit

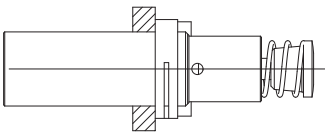


Dimensions

TYPES	L1 min. mm	L1 max. mm	L3 mm
SC33-25EU	25	60	68
SC33-50EU	32	86	93

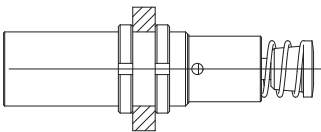
Mounting types

Mounting with Square Flange QF



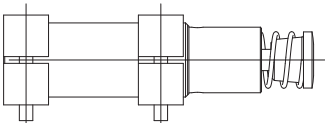
Mount with 4 bolts
Torque max.: 11 Nm
Clamping torque: > 90 Nm

Mounting of damper in borehole with two locking rings



Torque: 80 Nm
Note: We recommend gluing the locknut with Loctite 243.

Mounting with Foot Mount S



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

Mounting instructions and mounting accessories

Installation instructions

Before installation and use check whether the identification number on the damper or on the packaging matches the respective designation on the delivery note.

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

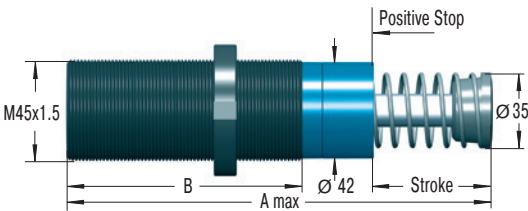
Mounting: As required but always in such a way that the entire damper stroke is used. The dampers must always be mounted in such a way that the forces are introduced centrally over the piston rod in the damper. The maximum side load angle must not be exceeded. Safety dampers must not be exchanged from one installation site to another if the conformity of the throttle characteristic curve is not ensured.

Emergency stop application: After an emergency stop, check that the piston rod returns to the initial position, the damper is not leaking and the mounting elements are properly secured. Make sure that no damage has occurred to the piston rod, the body, or the mounting hardware.

Regular start-up: Safety shock absorbers can be regularly started up with 100 % stroke utilisation with a creep speed of 1/10 of the max. impact velocity.

Checking: A regular check should take place at an interval of no more than three months.

Commissioning



Performance data and dimensions									
	Max. Energy Capacity								
TYPES	W ₃ self-compensating	W ₃ optimised	Return Force min.	Return Force max.	Stroke	A max.	B	¹ Side Load Angle max.	Weight
	Nm/cycle	Nm/cycle	N	N	mm	mm	mm	°	kg
SCS45-25EU	680	1,200	70	100	23.1	145	95	3	1.13
SCS45-50EU	1,360	2,350	70	145	48.5	195	120	2	1.36
SCS45-75EU	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.

WARNING

- Take particular care that the customer-specific identification number at the end of the damper designation matches the number on the delivery note. The field data to be read from the type plate, such as moving mass and maximum impact velocity, must be compared with the technical design. This ensures that the damper is the right size for its use. Otherwise you risk damaging the shock absorbers and/or machine by overstressing materials.
- During installation of the dampers, moving masses can lead to injuries due to inadvertent starting. Secure moving masses against inadvertent moving.
- The dampers may be unsuitable for use and have an insufficient damping effect. Check the specific suitability of the dampers before installation.
- If operated outside of the operating temperature range, the damper can lose its function. Operating temperature range must be maintained. Do not paint dampers due to heat emission.
- Fluids, gases and dirt particles in the surrounding area can attack or destroy the seal system of the damper and cause it to fail. Protect or encapsulate piston rod and seal system from external materials in the surrounding area.
- Damage to the piston rod surface can destroy the seal system. Do not grease, oil piston rod etc. and protect against dirt particles.
- The piston rod can be torn from the damper. Do not load the piston rod with tensile stress.
- Damper can tear off upon impact. Always lay out the connection structure in such a way that the maximum occurring forces can be absorbed with sufficient safety.
- Safety shock absorber check after a damper impact. Check that the piston rod returns to the initial position, the damper is not leaking and the mounting elements are properly secured.

First impacts on the shock absorber should only be tried after correctly mounting and with reduced impact velocity and – if possible – with reduced load. Differences between calculated and actual operating data can then be detected early on, and damage to the system can be avoided. If the safety dampers were selected on calculated data that does not correspond to the maximum possible load (i.e. selection based on drive power being switched off or at reduced impact velocity) 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 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. Make sure that no damage has occurred to the piston rod, the body, or the mounting hardware.

Mounting accessories

Information on the corresponding mounting accessories can be found on the following pages.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

Mounting instructions and mounting accessories

M45x1.5 mounting accessories

SCS45

Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.

Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.

If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

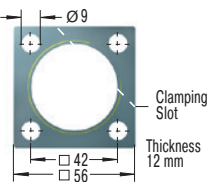
When using accessory parts and mounting elements also note the mounting instructions for accessories delivered separately.

Mounting Foot mounting kit

If the permissible reaction force of 12,400 N is exceeded, an additional support strip is required to support the damper force when foot mounting. This support strip (max. thickness 3 mm) is preferably positioned behind the rear foot flange. The slide rail prevents the fixing screws of the damper from being subjected to bending and shearing. The customer must design, manufacture and install the fixing of the support strip (welding, screw fastening, etc.) himself to ensure that it is strong enough.

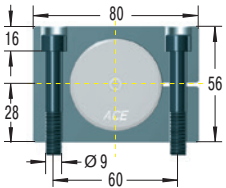
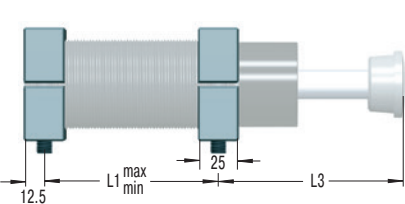
QF45

Square Flange



S45

Side Foot Mounting Kit

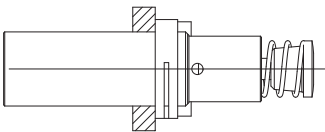


Dimensions

TYPES	L1 min.	L1 max.	L3
	mm	mm	mm
SCS45-25EU	32	66	66
SCS45-50EU	40	92	91
SCS45-75EU	50	118	116

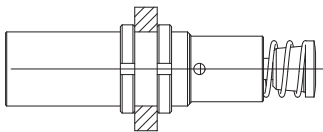
Mounting types

Mounting with Square Flange QF



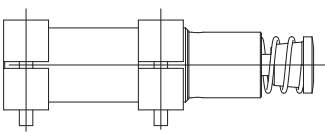
Mount with 4 bolts
Torque max.: 27 Nm
Clamping torque: > 200 Nm

Mounting of damper in borehole with two locking rings



Torque: 235 Nm
Note: We recommend gluing the locknut with Loctite 243.

Mounting with Foot Mount S



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

Mounting instructions and mounting accessories

Installation instructions

Before installation and use check whether the identification number on the damper or on the packaging matches the respective designation on the delivery note.

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

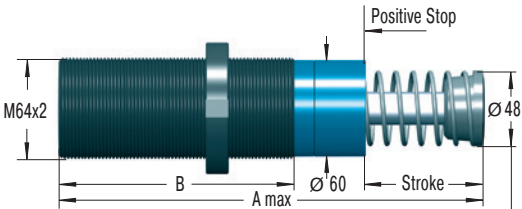
Mounting: As required but always in such a way that the entire damper stroke is used. The dampers must always be mounted in such a way that the forces are introduced centrally over the piston rod in the damper. The maximum side load angle must not be exceeded. Safety dampers must not be exchanged from one installation site to another if the conformity of the throttle characteristic curve is not ensured.

Emergency stop application: After an emergency stop, check that the piston rod returns to the initial position, the damper is not leaking and the mounting elements are properly secured. Make sure that no damage has occurred to the piston rod, the body, or the mounting hardware.

Regular start-up: Safety shock absorbers can be regularly started up with 100 % stroke utilisation with a creep speed of 1/10 of the max. impact velocity.

Checking: A regular check should take place at an interval of no more than three months.

Commissioning



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

Performance data and dimensions

TYPES	Max. Energy Capacity		Return Force min. N	Return Force max. N	Stroke mm	A max. mm	B mm	¹ Side Load Angle max. °	Weight kg
	W _s self-compensating	W _s optimised							
	Nm/cycle	Nm/cycle							
SCS64-50EU	3,400	6,000	90	155	48.6	225	140	3	2.90
SCS64-100EU	6,800	12,000	105	270	99.4	326	191	2	3.70
SCS64-150EU	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.

First impacts on the shock absorber should only be tried after correctly mounting and with reduced impact velocity and – if possible – with reduced load. Differences between calculated and actual operating data can then be detected early on, and damage to the system can be avoided. If the safety dampers were selected on calculated data that does not correspond to the maximum possible load (i.e. selection based on drive power being switched off or at reduced impact velocity) 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 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. Make sure that no damage has occurred to the piston rod, the body, or the mounting hardware.

Mounting accessories

Information on the corresponding mounting accessories can be found on the following pages.

Packaging disposal

Please dispose of the transportation packaging in an environmentally-friendly manner. Recycling packaging materials saves raw materials and reduces waste. The packaging materials do not contain any prohibited materials.

WARNING

Take particular care that the customer-specific identification number at the end of the damper designation matches the number on the delivery note. The field data to be read from the type plate, such as moving mass and maximum impact velocity, must be compared with the technical design. This ensures that the damper is the right size for its use. Otherwise you risk damaging the shock absorbers and/or machine by overstressing materials.

During installation of the dampers, moving masses can lead to injuries due to inadvertent starting. Secure moving masses against inadvertent moving.

The dampers may be unsuitable for use and have an insufficient damping effect. Check the specific suitability of the dampers before installation.

If operated outside of the operating temperature range, the damper can lose its function. Operating temperature range must be maintained. Do not paint dampers due to heat emission.

Fluids, gases and dirt particles in the surrounding area can attack or destroy the seal system of the damper and cause it to fail. Protect or encapsulate piston rod and seal system from external materials in the surrounding area.

Damage to the piston rod surface can destroy the seal system. Do not grease, oil piston rod etc. and protect against dirt particles.

The piston rod can be torn from the damper. Do not load the piston rod with tensile stress.

Damper can tear off upon impact. Always lay out the connection structure in such a way that the maximum occurring forces can be absorbed with sufficient safety.

Safety shock absorber check after a damper impact. Check that the piston rod returns to the initial position, the damper is not leaking and the mounting elements are properly secured.

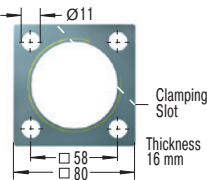
Mounting instructions and mounting accessories

M64x2 mounting accessories
SCS64

Before installation check whether the identification number on the packaging matches the respective designation on the delivery note.
Note the dimensioning for mounting when using accessory parts. Bolts for fitting of accessories are not included.
If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

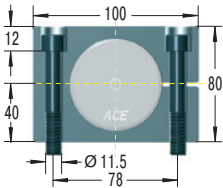
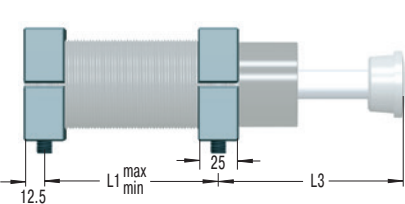
QF64

Square Flange



S64

Side Foot Mounting Kit



Dimensions			
	L1 min.	L1 max.	L3
TYPES	mm	mm	mm
SCS64-50EU	50	112	100
SCS64-100EU	64	162	152
SCS64-150EU	80	212	226

When using accessory parts and mounting elements also note the mounting instructions for accessories delivered separately.

Mounting Foot mounting kit

If the permissible reaction force of 19,500 N is exceeded, an additional support strip is required to support the damper force when foot mounting. This support strip (max. thickness 3 mm) is preferably positioned behind the rear foot flange. The slide rail prevents the fixing screws of the damper from being subjected to bending and shearing. The customer must design, manufacture and install the fixing of the support strip (welding, screw fastening, etc.) himself to ensure that it is strong enough.

Mounting types

Mounting with Square Flange QF Mount with 4 bolts Torque max.: 50 Nm Clamping torque: > 210 Nm	Mounting of damper in borehole with two locking rings Torque: 250 Nm Note: We recommend gluing the locknut with Loctite 243.
Mounting with Foot Mount S S64 = 2 flange + 4 bolts M10x80, DIN 912 Because of the thread pitch the fixing holes for the second foot mount should only be drilled and tapped after the first foot mount has been fixed in position. Torque max.: 50 Nm (bolt) Clamping torque: 350 Nm	

Manual

Warranty

Fundamentally, all modifications to the product by third parties lead to exclusion from the warranty.

Obvious defects must be reported to the vendor in writing immediately after delivery, no later than one week, but in any case before processing or installation, otherwise the assertion of a warranty claim is excluded. A timely dispatch is sufficient to keep the term.

The vendor is to be given an opportunity to check on site. If the complaint is justified the vendor offers warranty by repair or replacement at its own discretion. If the rectification fails, the buyer may choose to demand reduction of payment or cancellation of the contract. If there is only a minor lack of conformity, particularly with only minor defects, the buyer nevertheless has a right of withdrawal.

If, after failed rectification, the buyer chooses to cancel the contract due to a defect of title or material defect, they are not entitled to additionally claim for damages.

If, after failed fulfilment, the buyer chooses compensation, the goods remain with the buyer, if this is reasonable. The compensation is limited to the difference between the purchase price and the value of the defective item. This does not apply if the vendor maliciously causes the breach of contract.

The quality of the goods is only considered as agreed upon with the product description of the vendor. Public statements, claims or advertising of the manufacturer do not represent an additional contractual specification of quality of the goods.

If the buyer receives defective mounting instructions, the buyer is only obligated to deliver defect-free mounting instructions and only if the defect to the mounting instructions prevents proper mounting.

The warranty period is two years and begins upon completion. Exchange and return of custom products are fundamentally excluded. The factory conditions of the manufacturing factory apply to parts not manufactured and processed by the vendor, which can be viewed by the orderer at the vendor at any time. Construction and installation parts are delivered according to the present standard of engineering.

Service life

In general, safety dampers are machine elements that are designed for emergency stop applications.

Safety shock absorbers can be started up with 100 % stroke utilisation with a creep speed of 1/10 of the maximum impact velocity.

Starting at creep speed subjects the sealing elements of the safety dampers to wear. The wear of seals is largely dependent upon the operating conditions and the respective application and its operating parameters.

Technical data

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

Impact velocity range: 0.02 m/s to 5 m/s (depending on type and calculation of effective weight). 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
Piston rod seal: NBR
Rod end button: Steel hardened and corrosion-resistant coating
Return spring: Zinc plated or plastic-coated steel;
Accessories: Steel corrosion-resistant coating

Permissible torque of locknut:

SCS33: 80 Nm

SCS45: 235 Nm

SCS64: 250 Nm

Note: We recommend gluing the locknut with Loctite 243.

Damping medium: Automatic Transmission Fluid (ATF)

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

Note: The damper can be retracted at creep speed. No dynamic pressure builds up and there is no damping effect.

On request: Special oils, special flanges etc.