

## SC33 to SC45 Industrial Shock Absorbers

Piston tube design for maximum energy capacity

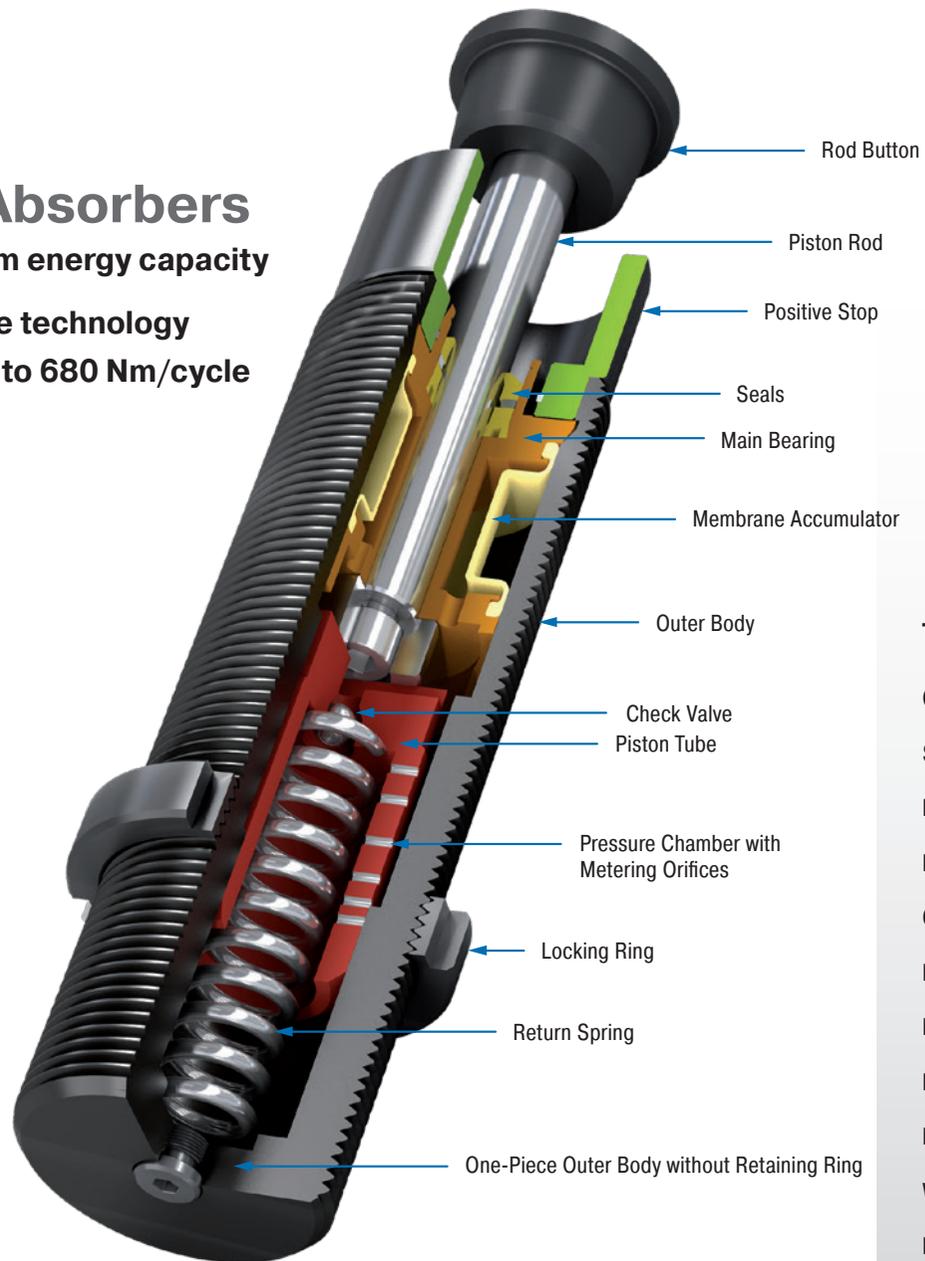
Self-compensating, piston tube technology

Energy capacity 155 Nm/cycle to 680 Nm/cycle

Stroke 23.1 mm to 48.6 mm

**SC33EUM**

**SC45EUM**



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

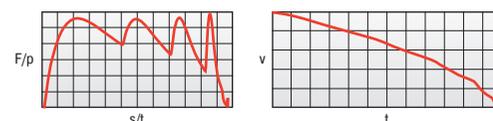
This manual is for the disruption-free use of the product types listed on page 1; its compliance is a prerequisite for the fulfilment of any warranty claims.

Therefore, make sure to read this manual before use.

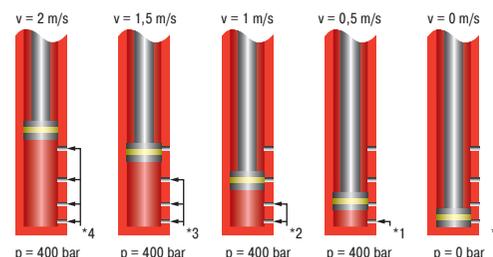
Please always maintain the specified limits from the performance table (technical data). Take into account the predominant environmental conditions and restrictions. Note the regulations of the trade association, TÜV or corresponding national, international and European regulations. Installation and commissioning only according to mounting instructions.

the entire stroke. A requirement for a constant rate of deceleration is the correct calculation of the industrial shock absorber and therefore the correct selection of the right metering orifice pattern or the right hardness level of the shock absorber. The hardnesses are graded from -5 to -8.

## 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.

## Calculation and design

In order to ensure an optimum, fault-free and durable function of the industrial 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 shock absorbers can be determined with the ACE online calculation programme at [www.ace-ace.de](http://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: +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):

$W_s$  [Nm/cycle]

$W_i$  [Nm/h]

Effective weight  $m_e$

Max. side load angle [°]

**!** For a correct damping design the shock absorber must represent the only braking system. Additional braking systems, such as a pneumatic end position damping length, must not overlap with the end position damping length by the shock absorber and must be disabled.

## Safety information

### WARNING

**!** If ACE industrial 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 industrial shock absorbers are used wherever moving masses are to be slowed down in a defined end position. The industrial shock absorbers are designed for force capacity in an axial direction. Within the permissible load limits the industrial shock absorber also acts as a stop.

## Description and function

The ACE industrial shock absorbers SC33 to SC45 are maintenance-free, ready-to-install hydraulic components with numerous metering openings.

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

## 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

Regularly check the shock absorbers for oil loss, return of the piston rod and external damage.

Shock absorbers are machine elements that are subject to continuous wear. Increased service life results in reduced damping effect. If this is no longer sufficient, the shock absorbers must be replaced or exchanged as appropriate.

## Disassembly and disposal

Take account of environmental protection (recovery of problematic substances) during disposal of the shock absorber. The SC industrial shock absorbers are filled with low temperature hydraulic oil. The corresponding data sheet is available on request.

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. Industrial shock absorbers are maintenance-free and ready to install.

**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. The maximum permissible side load angle (see table) must not be exceeded. If there is a side load angle, it generally leads to a reduction in service life. In the case of maximum permissible values being exceeded a side load adapter must be used.

**Self-compensating:** The SC range of shock absorbers is self-compensating. In a selectable range according to a table, the different effects of power, weight, temperature and speed balance out independently. The shock absorbers are divided into four hardness ranges (me min. to me max.) as standard. For types SC3325 the grading ranges from -5 to -8 and for types SC3350 from -5 to -6.

### Commissioning

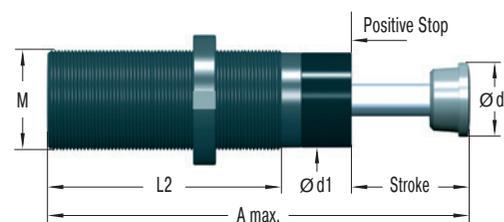
- After installation, start a test run of the moving mass at reduced operating speed to begin with.

### During the test run

- Gradually accelerate the load capacity up to the subsequent operating speed. You can find this in the calculation for your application. In the correct final setting, the piston rod of the shock absorber reaches the end position (positive stop) without a hard stop.

### Mounting accessories

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



Thread UNF 1 1/4-12 (omit suffix -M from part number)

### Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
SC3325EUM	23.2	178	30	25	122	M33x1.5
SC3350EUM	48.6	254	30	25	173	M33x1.5

### Performance data

TYPES	Max. Energy Capacity		Effective Weight			Return Force min. N	Return Force max. N	Return Time s	° Side Load Angle max. °	Weight kg
	W <sub>3</sub> Nm/cycle	W <sub>4</sub> Nm/h	<sup>1</sup> me min. kg	<sup>1</sup> me max. kg	Hardness					
SC3325EUM-5	155	75,000	1,360	2,721	-5	44	89	0.75	4	0.68
SC3325EUM-6	155	75,000	2,500	5,443	-6	44	89	0.75	4	0.68
SC3325EUM-7	155	75,000	4,989	8,935	-7	44	89	0.75	4	0.68
SC3325EUM-8	155	75,000	8,618	13,607	-8	44	89	0.75	4	0.68
SC3350EUM-5	310	85,000	2,721	4,990	-5	51	125	0.90	3	0.92
SC3350EUM-6	310	85,000	4,536	9,980	-6	51	125	0.90	3	0.92

<sup>1</sup> The effective weight range limits can be raised or lowered on request.

<sup>2</sup> If side load angle is higher contact ACE.

### WARNING

-  **Temperature effect:** The W<sub>3</sub> and me values given in the performance table (see manual or catalogue) are valid for room temperature. Deviating values apply to higher temperatures.
-  **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. The maximum reacting forces listed in the calculation range may deviate from the actually occurring reacting forces, as these are based on theoretical values.**

### 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

#### SC33

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.

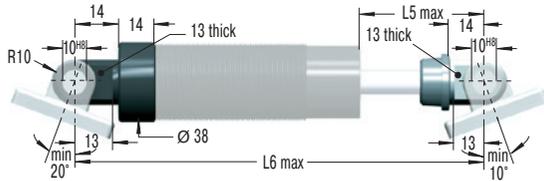
If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

mounting instructions for accessories delivered separately.

When using accessory parts and mounting elements also note the

#### C33

Clevis Mounting Kit

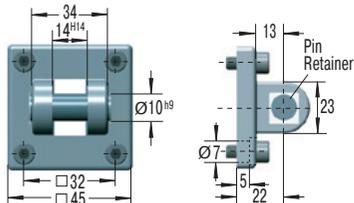


#### Dimensions

TYPES	L5 max. mm	L6 max. mm
SC3325EUM	39	208
SC3350EUM	64	283

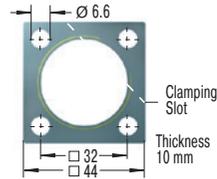
#### SF33

Clevis Flange



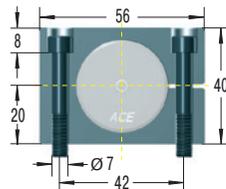
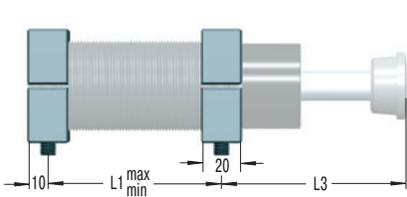
#### QF33

Square Flange



#### S33

Side Foot Mounting Kit

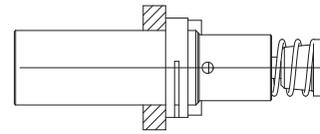


#### Dimensions

TYPES	L1 min. mm	L1 max. mm	L3 mm
SC3325EUM	40	98	66
SC3350EUM	60	153	92

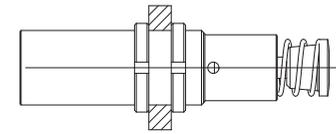
### Mounting types

#### Mounting with Square Flange QF



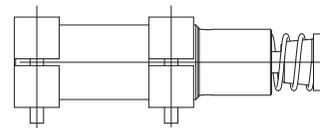
If mounted with 4 bolts  
Torque max.: 11 Nm  
Clamping torque: > 90 Nm

#### Mounting of damper in borehole with two locking rings



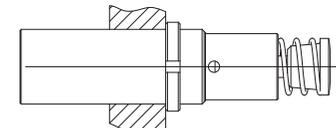
Torque: 80 Nm

#### Mounting with Foot Mount S



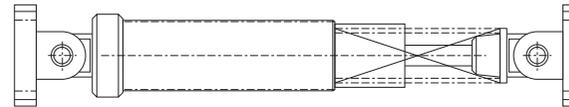
S33 = 2 flange + 4 bolts M6x40, DIN 912  
Because of the thread pitch the fixing holes for the second foot mount should only be drilled and tapped after the first foot mount has been fixed in position.  
Torque max.: 11 Nm (bolt)  
Clamping torque: 90 Nm

#### Screwing the damper into a threaded hole with additional locking ring



Torque: 80 Nm

#### Mounting with Clevis Mounting Kit C



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

SF33 = flange + 4 bolts M6x20, DIN912  
Torque max.: 7,5 Nm  
**Secure with pin or use additional bar. Due to limited force absorption, the respective suitability should be reviewed by ACE.**

## 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. Industrial shock absorbers are maintenance-free and ready to install.

**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. The maximum permissible side load angle (see table) must not be exceeded. If there is a side load angle, it generally leads to a reduction in service life. In the case of maximum permissible values being exceeded a side load adapter must be used.

**Self-compensating:** The MC range of shock absorbers is self-compensating. In a selectable range according to a table, the different effects of power, weight, temperature and speed balance out independently. The shock absorbers are divided into five hardness ranges (me min. to me max.) as standard. For types SC4525 the grading ranges from -5 to -8 and for types SC4550 from -5 to -7.

### Commissioning

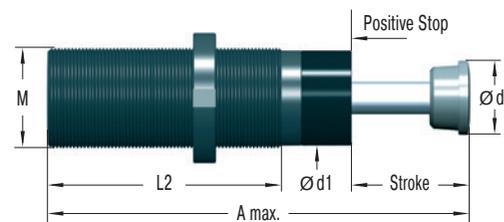
- After installation, start a test run of the moving mass at reduced operating speed to begin with.

### During the test run

- Gradually accelerate the load capacity up to the subsequent operating speed. You can find this in the calculation for your application. In the correct final setting, the piston rod of the shock absorber reaches the end position (positive stop) without a hard stop.

### Mounting accessories

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



Thread UNF 1 3/4-12 (omit suffix -M from part number)

### Dimensions

TYPES	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
SC4525EUM	23.1	189	42	35	139	M45x1.5
SC4550EUM	48.5	265	42	35	190	M45x1.5

### Performance data

TYPES	Max. Energy Capacity		Effective Weight			Return Force min. N	Return Force max. N	Return Time s	° Side Load Angle max. °	Weight kg
	W <sub>3</sub> Nm/cycle	W <sub>4</sub> Nm/h	<sup>1</sup> me min. kg	<sup>1</sup> me max. kg	Hardness					
SC4525EUM-5	340	107,000	3,400	6,800	-5	67	104	0.8	4	1.43
SC4525EUM-6	340	107,000	6,350	13,600	-6	67	104	0.8	4	1.43
SC4525EUM-7	340	107,000	12,700	22,679	-7	67	104	0.8	4	1.43
SC4525EUM-8	340	107,000	20,411	39,000	-8	67	104	0.8	4	1.43
SC4550EUM-5	680	112,000	6,800	12,246	-5	47	242	1.0	3	1.90
SC4550EUM-6	680	112,000	11,790	26,988	-6	47	242	1.0	3	1.90
SC4550EUM-7	680	112,000	25,854	44,225	-7	47	242	1.0	3	1.90

<sup>1</sup> The effective weight range limits can be raised or lowered on request.

<sup>2</sup> If side load angle is higher contact ACE.

### WARNING

-  Temperature effect: The W<sub>3</sub> and me values given in the performance table (see manual or catalogue) are valid for room temperature. Deviating values apply to higher temperatures.
-  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. The maximum reacting forces listed in the calculation range may deviate from the actually occurring reacting forces, as these are based on theoretical values.

### 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

#### SC45

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.

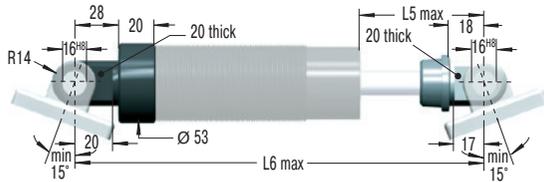
If you have any questions, please phone +49 (0)2173 - 9226-20 for free advice.

mounting instructions for accessories delivered separately.

When using accessory parts and mounting elements also note the

#### C45

Clevis Mounting Kit

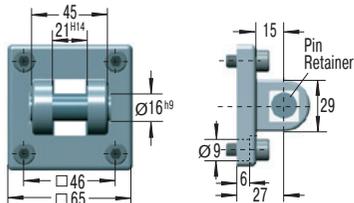


#### Dimensions

TYPES	L5 max.	L6 max.
	mm	mm
SC4525EUM	68	244
SC4550EUM	93	320

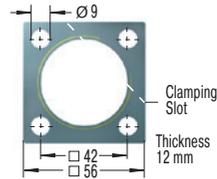
#### SF45

Clevis Flange



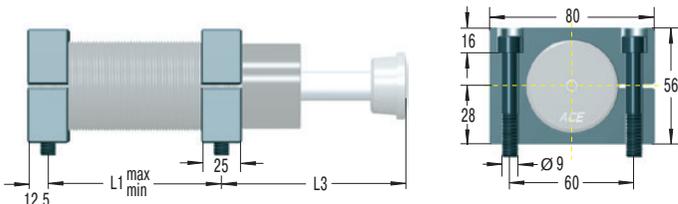
#### QF45

Square Flange



#### S45

Side Foot Mounting Kit

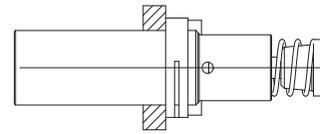


#### Dimensions

TYPES	L1 min.	L1 max.	L3
	mm	mm	mm
SC4525EUM	50	112	62.5
SC4550EUM	64	162	87.5

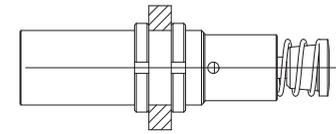
### Mounting types

#### Mounting with Square Flange QF



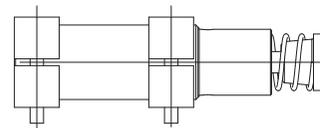
If mounted with 4 bolts  
Torque max.: 27 Nm  
Clamping torque: > 200 Nm

#### Mounting of damper in borehole with two locking rings



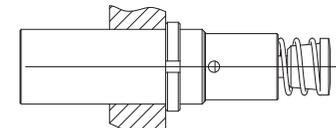
Torque: 235 Nm

#### Mounting with Foot Mount S



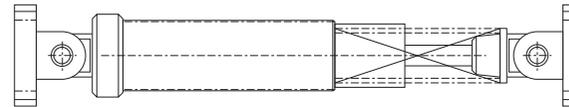
S45 = 2 flange + 4 bolts M8x50, DIN 912  
Because of the thread pitch the fixing holes for the second foot mount should only be drilled and tapped after the first foot mount has been fixed in position.  
Torque max.: 27 Nm (bolt)  
Clamping torque: 350 Nm

#### Screwing the damper into a threaded hole with additional locking ring



Torque: 235 Nm

#### Mounting with Clevis Mounting Kit C



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

SF45 = flange + 4 bolts M8x20, DIN912  
Torque max.: 7,5 Nm  
**Secure with pin or use additional bar. Due to limited force absorption, the respective suitability should be reviewed by ACE.**

### 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 industrial shock absorbers are machine elements that are subject to wear. Wear parts such as seals, pressure chambers and pistons are excluded from the general warranty. The wear of seals is largely dependent upon the operating conditions and the respective application and its operating parameters.

In general with this model of industrial shock absorber with grooved ring wiper seal system an average service life of three to five million load changes can be expected. Adverse environmental and operating conditions can significantly reduce the expected service life.

### Technical data

**Energy capacity:** 155 Nm/cycle to 680 Nm/cycle

**Impact velocity range:** 0.02 m/s to 0.46 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

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

**Permissible torque of locknut:**

SC33: 80 Nm

SC45: 235 Nm

**Damping medium:** Low temperature hydraulic oil

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

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

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

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