

SC33 to SC45 Industrial Shock Absorbers

Piston tube design for maximum energy capacity

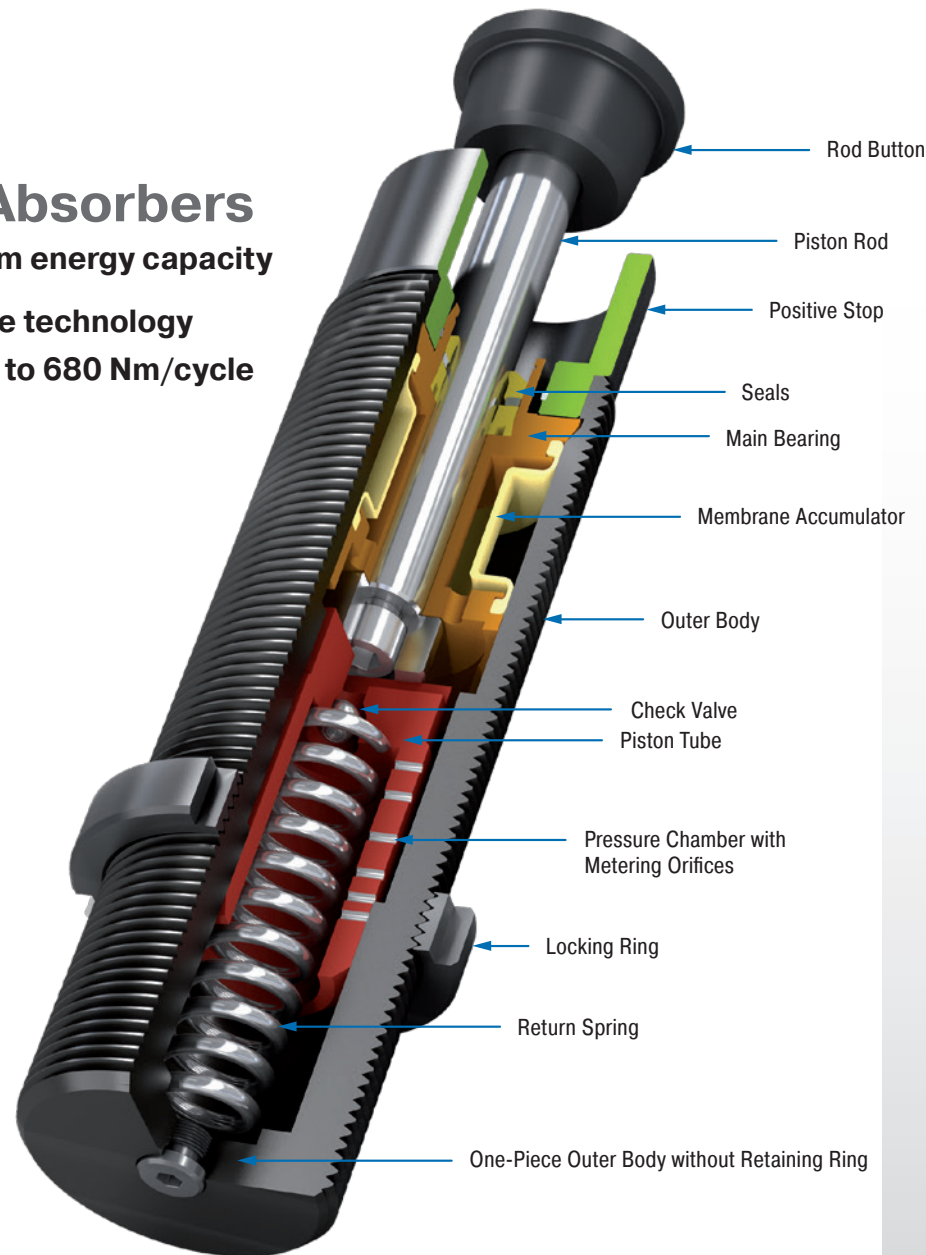
Self-compensating, piston tube technology

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.

Table of contents	Page
General instructions.....	2
Safety information	2
Intended use.....	2
Description and function.....	2
Calculation and design	2
Delivery and storage	2
Maintenance and care	2
Disassembly and disposal.....	2
Mounting instructions.....	3 - 6
Warranty	7
Expected service life	7
Technical data.....	7

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.

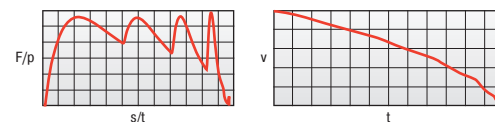
Therefore, make sure to read this manual before use.

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)

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.

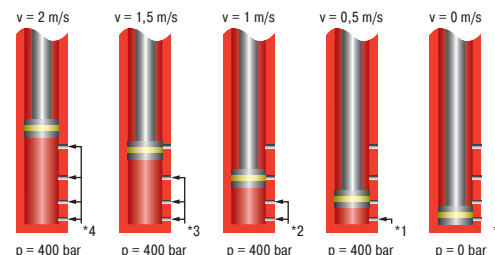
Intended use

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



* 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. 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]
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.

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

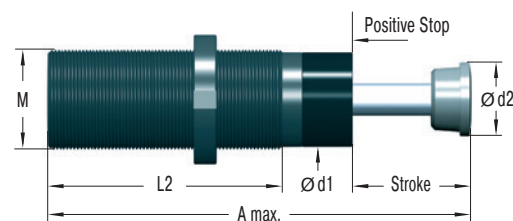
- After installation, start a test run of the moving mass at reduced operating speed to begin with.

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

	Stroke mm	A max. mm	d1 mm	d2 mm	L2 mm	M
TYPES						
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 ₃ Nm/cycle	W ₄ Nm/h	¹ me min. kg	¹ 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

¹ The effective weight range limits can be raised or lowered on request.

² If side load angle is higher contact ACE.

WARNING



Temperature effect: The W₃ 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.

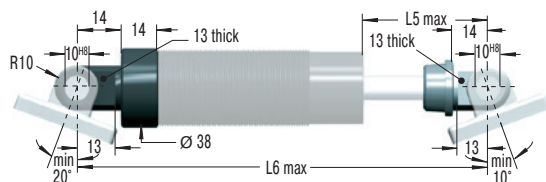
When using accessory parts and mounting elements also note the mounting instructions for accessories delivered separately.

Mounting Foot mounting kit

If the permissible 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.

C33

Clevis Mounting Kit

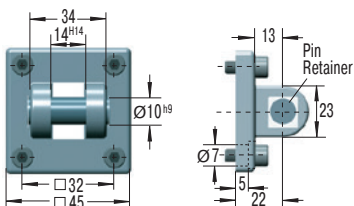


Dimensions

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

SF33

Clevis Flange



SF33 = flange + 4 screws M6x20, DIN 912

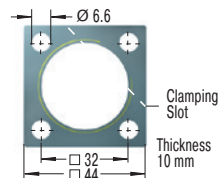
Torque max.: 7.5 Nm

Secure with pin or use additional bar.

Due to limited force capacity the respective ability should be reviewed by ACE.

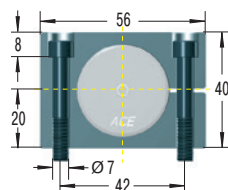
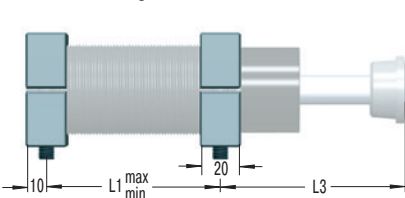
QF33

Square Flange



S33

Side Foot Mounting Kit

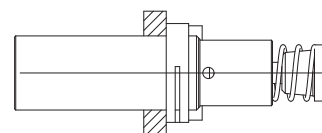


Dimensions

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

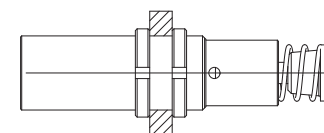
Mounting types

Mounting with Square Flange QF



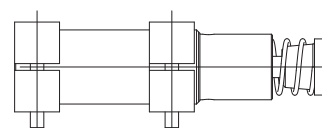
If mounted with 4 bolts
Torque max.: 11 Nm
Clamping torque: > 90 Nm

Mounting of damper in borehole with two locking rings



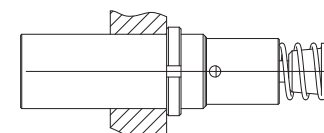
Torque: 80 Nm
Note: We recommend gluing the locknut with Loctite 243.

Mounting with Foot Mount S



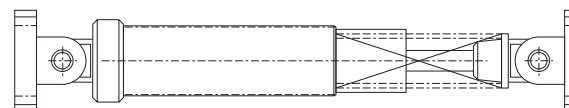
S33 = 2 flange + 4 bolts M6x50, DIN 912 Strength class 12.9
Because of the thread pitch the fixing holes for the second foot mount should only be drilled and tapped after the first foot mount has been fixed in position.
Torque: 17.4 Nm (bolt)

Screwing the damper into a threaded hole with additional locking ring



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

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, DIN 912
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

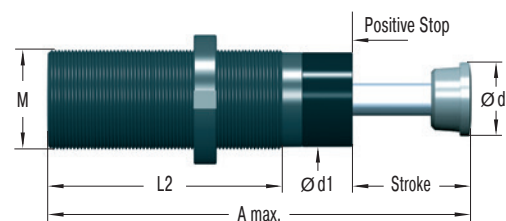
- After installation, start a test run of the moving mass at reduced operating speed to begin with.

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 ₃ Nm/cycle	W ₄ Nm/h	¹ me min. kg	¹ 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

¹ The effective weight range limits can be raised or lowered on request.

² If side load angle is higher contact ACE.

WARNING

- ⚠ Temperature effect: The W₃ 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.

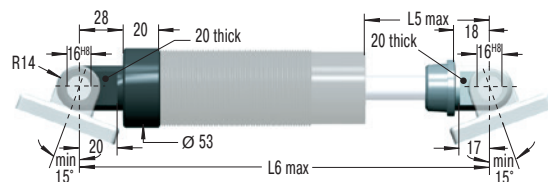
When using accessory parts and mounting elements also note the mounting instructions for accessories delivered separately.

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.

C45

Clevis Mounting Kit

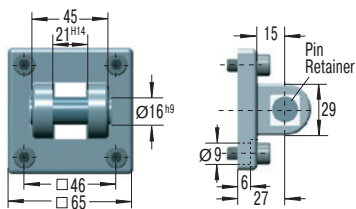


Dimensions

TYPES	L5 max. mm	L6 max. mm
MC, MA, ML4525EUM	43	200
MC, MA, ML4550EUM	68	250
MC, MA4575EUM	93	301

SF45

Clevis Flange



SF45 = flange + 4 screws M8x20, DIN 912

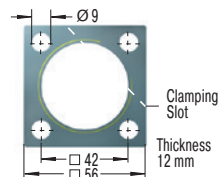
Torque max.: 7.5 Nm

Secure with pin or use additional bar.

Due to limited force capacity the respective ability should be reviewed by ACE.

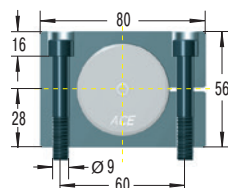
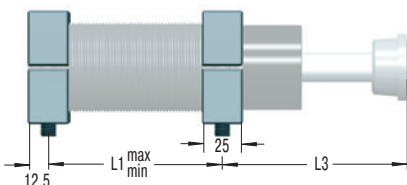
QF45

Square Flange



S45

Side Foot Mounting Kit

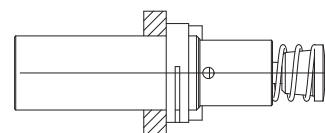


Dimensions

TYPES	L1 min. mm	L1 max. mm	L3 mm
MC, MA, ML4525EUM	32	66	66
MC, MA, ML4550EUM	40	92	91
MC, MA4575EUM	50	118	116

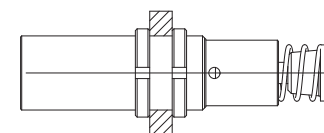
Mounting types

Mounting with Square Flange QF



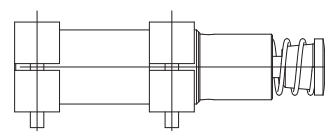
If mounted with 4 bolts
Torque max.: 27 Nm
Clamping torque: > 200 Nm

Mounting of damper in borehole with two locking rings



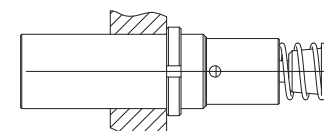
Torque: 235 Nm
Note: We recommend gluing the locknut with Loctite 243.

Mounting with Foot Mount S



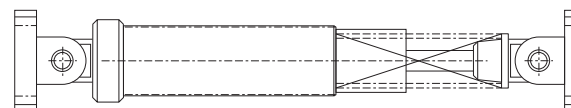
S45 = 2 flange + 4 bolts M8x60, DIN 912 Strength class 12.9
Because of the thread pitch the fixing holes for the second foot mount should only be drilled and tapped after the first foot mount has been fixed in position.
Torque: 42.2 Nm (bolt)

Screwing the damper into a threaded hole with additional locking ring



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

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, DIN 912
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.

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 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

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
Accessories: Steel with black oxide finish or nitride hardened

Permissible torque of locknut:

SC33: 80 Nm

SC45: 235 Nm

Note: We recommend gluing the locknut with Loctite 243.

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.