TUBUS TR-HD
Profile Dampers

Compact powerhouse in solid material

Radial damping, heavy duty version

Energy capacity 405 Nm/cycle to 11,840 Nm/cycle

Maximum stroke 12 mm to 44 mm

TR-HD

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

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Manual

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.

Safety information

WARNING

If TUBUS profile dampers 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 profile damper. Secure moving masses against inadvertent starting with suitable safety precautions before installing the profile damper.

Intended use

ACE profile dampers are an alternative product to the hydraulic end position damper. They are used wherever moving masses do not have to be accurately stopped and the energy does not have to be completely absorbed. The reversible profile dampers are intended for emergency stop and continuous uses. The TUBUS profile dampers of the TR-HD range are designed for force absorption in an radial direction.

Description and function

The TR-HD profile dampers of the ACE TUBUS series are maintenance-free, ready-to-install damping elements made from a co-polyester elastomer. Like the TR standard model, they are radially loaded, yet, thanks to their solid design, offer higher force and energy capacity with a smaller damping path. Various material hardness ratings mean that different damping characteristic curves can be attained. The energy absorption is between 43 % and 72 %.

A structural change in the production process of these damping elements creates a defined preloading, whereby the TUBUS converts the occurring force into heat through friction.

One part of the occurring energy is therefore absorbed, whilst the other part is released again by the return of the body to its original position.

Calculation and design

In order to ensure an optimum, fault-free and durable function of the TUBUS Profile Dampers 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 profile damper(s) [m/s]
- Additionally acting propelling force, propelling power or propelling torque [N, kW, Nm]
- Number of profile dampers acting in parallel [n]
- Number of strokes or cycles per hour [1/h]

The dampers must be dimensioned in such a way that the maximum energy capacity per stroke is not exceeded during continuous duty or for emergency stop applications. The specified performance data and dimensions for the profile damper type used can be found in the performance table. The correct size of the profile dampers for emergency stop applications can be determined with the ACE online calculation programme at www.ace-ace.com. The calculations are based on dynamic loads. Where necessary we will also happily send you the respective dynamic and static characteristic curves. You can also send us the completed online form by email for checking.

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

Delivery and storage

The profile damper can become damaged when opening the packaging. Do not use cutting tools if possible.

- After delivery please check the profile dampers for any damage.
- Profile dampers can generally be stored in any position.

Maintenance and care

Profile dampers are made from one part and therefore do not need any special maintenance. Profile dampers that are not regularly operated (e.g. emergency stop devices) are checked at least once per year as part of the normal safety check of the plant. The surface is to be checked for cracks and deformations and the mounting elements checked that they are properly secured. For profile dampers that are regularly operated, these checks should take place at intervals of no more than three months.

What should be noted after a damper impact?
Profile dampers that are not regularly operated are to be checked after a damper impact.

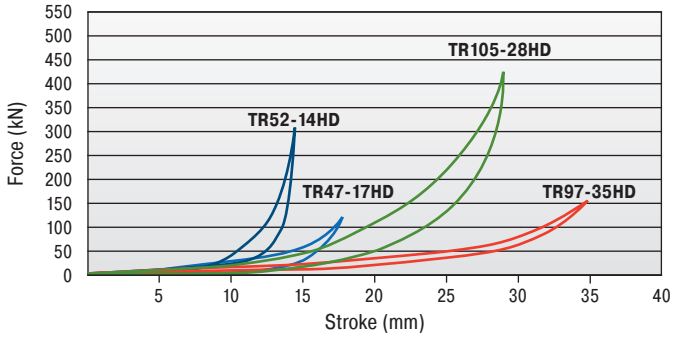
Disassembly and disposal

The profile damper is 100 % recyclable and can be discarded in household waste.

Characteristic curves

TR-HD product family

Force stroke characteristic curves (static)



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Mounting instructions and mounting accessories

WARNING

A failure of the product can lead to personal injuries and/or material damage. Use additional safety elements.

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

The profile dampers may be unsuitable for use and have an insufficient damping effect. Before installation check the correct size of the dampers using the field data, performance table (page 4) and calculations. The energy capacity per stroke during continuous duty and for emergency stop applications may not be exceeded (see performance table).

The profile 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 Q listed in the calculations may deviate from the actually occurring reacting forces, as these are based on theoretical values.

The profile dampers may be unsuitable for use as a rebound effect can occur. Note that the moving mass is not accurately braked and the energy is not completely absorbed. A limited application range is therefore to be observed for the following drive types: toothed belt drive, threaded spindle drive, drive with gears. The maximum return forces listed in the calculations may deviate from the actually occurring return forces, as these are based on theoretical values.

Exceeding or falling below the maximum or minimum temperature can lead to the destruction of the damper material and the profile damper could lose its function. Maintain the operating temperature range of -40 °C to +90 °C.

Fluids or aggressive media in the surrounding area can attack or destroy the material of the profile damper and cause it to fail. Insulate the "external materials" in the area around the profile damper. Note the chemical resistance list.

Impact velocity that is too high can lead to damage to the profile damper and failure. Note the maximum impact velocity of 5 m/s.

The profile dampers for emergency stop may be unsuitable for continued use after one impact. Profile dampers that are not regularly operated (e.g. for emergency stop devices) are to be checked after a damper impact.

Damage to the surface by other external influences can lead to an insufficient damping and to a premature failure of the profile damper. We recommend regularly checking the surface for cracks and deformations as well as checking the mounting elements are properly secured. Check emergency stop devices at least once per year and, in the case of continuous duty, at intervals of a maximum of three months.

Please mount the dampers in such a way that there is sufficient room for the max. compressed external diameter. The moving mass should have at least the same diameter so that it does not buckle or crack.

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. Profile dampers are maintenance-free and ready to install.

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

Temperature effect: The W_3 values given in the performance table are valid for room temperature in the environment. At higher temperatures the energy capacity per stroke is reduced.

Mounting: in any position, however, always in such a way that the impact surface of the profile damper is evenly loaded. A side load angle between profile damper and occurring mass is to be avoided as transverse forces can lead to tearing off or permanent deformation of the damper.

The outer diameter of the damper increases upon impact. Note the max. compressed diameter (d_1) listed in the table. The moving mass should have at least the same diameter so that the entire impact surface is loaded.

Mounting information: To mount the damper we recommend the use of original ACE mounting screws. The listed maximum torque is to be observed. Please also check the thread length (L_M) along with all further dimensions listed in the table.

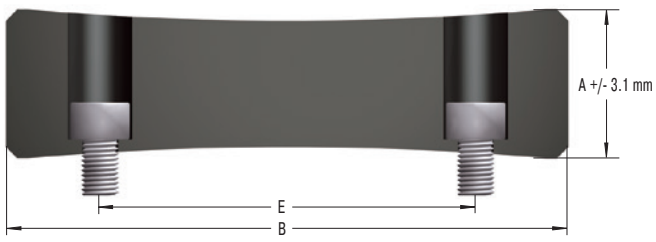
Permissible torque of mounting screw:
M10: 7 Nm
M12: 12 Nm

Note: For seawater applications please use stainless steel bolts – these are not included.

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.

TR-HD



Performance data and dimensions

TYPES	[1] W_3 Nm/cycle	Emergency stop W_3 Nm/cycle	F max. static N	Stroke max. mm	A mm	B mm	C mm	D mm	E mm	L_M mm	M	Weight kg
TR42-14HD	405	567	63,900	14	34	148	42	59	102	20	M10	0.170
TR47-12HD	857	1,200	149,600	12	31	150	47	58	102	19	M10	0.170
TR47-17HD	850	1,190	122,100	17	32	150	47	70	102	24	M10	0.180
TR52-14HD	1,634	2,288	304,500	14	29	153	52	69	102	22	M10	0.180
TR57-21HD	1,194	1,672	104,800	21	48	149	57	79	102	18	M10	0.340
TR62-15HD	1,790	2,506	245,000	15	40	153	62	77	102	16	M10	0.330
TR62-19HD	2,940	4,116	389,900	19	41	152	62	94	102	16	M10	0.360
TR63-24HD	2,061	2,885	194,400	24	46	153	63	92	102	20	M10	0.330
TR72-26HD	1,700	2,380	124,800	26	59	149	72	98	102	23	M12	0.560
TR79-20HD	2,794	3,912	289,300	20	54	153	79	98	102	24	M12	0.570
TR79-31HD	2,975	4,165	226,600	31	58	155	79	112	102	23	M12	0.560
TR85-33HD	2,526	3,536	146,100	33	71	150	85	111	102	23	M12	0.710
TR89-21HD	4,438	6,213	477,400	21	48	162	89	112	102	22	M12	0.560
TR90-37HD	3,780	5,292	240,700	37	69	155	90	128	102	23	M12	0.750
TR93-24HD	3,421	4,789	302,500	24	64	155	93	115	102	23	M12	0.790
TR97-31HD	7,738	10,833	575,200	31	63	159	97	129	102	21	M12	0.800
TR97-35HD	2,821	3,949	152,800	35	82	151	97	131	102	20	M12	1.060
TR102-44HD	4,697	6,576	254,500	44	81	156	102	147	102	22	M12	1.050
TR105-28HD	5,641	7,897	427,600	28	72	156	105	126	102	21	M12	1.000
TR117-30HD	8,457	11,840	639,100	30	66	166	117	143	102	25	M12	1.010

[1] Energy capacity per stroke during continuous duty.
All data are nominal dimensions. Tolerances are available on request.

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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 TUBUS profile dampers are machine elements that are subject to wear. The wear is largely dependent upon the respective application and its operating parameters.

When used under optimum conditions and maintaining the parameters specified in the performance table, a service life of up to 1 million load changes is to be expected.

Technical data

Energy capacity: 405 Nm/cycle to 11,840 Nm/cycle
Energy absorption: 43 % to 72 %
Dynamic force range: 78,800 N to 812,900 N
Operating temperature range: -40 °C to +90 °C
Construction size: 42 mm to 117 mm
Mounting: in any position
Material hardness rating: Shore 40D, Shore 55D
Material: Profile body: Co-polyester elastomer
Mounting screws: Socket head screws with internal hex socket, zinc-plated steel according to DIN 7984 - 8.8:
M10x30, M12x35

For seawater applications please use stainless steel bolts – these are not included.

Environment: Resistant to microbes, seawater or chemical attack. Excellent UV and ozone resistance.
Material does not absorb water or swell.

Impact velocity range: Max. 5 m/s

Torque max.:
M10: 7 Nm
M12: 12 Nm

Application field: Offshore industry, Agricultural machinery, Impact panels, Conveyor systems, Stacking units, Shipbuilding, Shovels or articulated joints for construction machinery, Transport roads, Loading and lifting equipment

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

Safety instructions: Mounting screw should additionally be secured with Loctite.

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