General operating instructions

TECDOS® components

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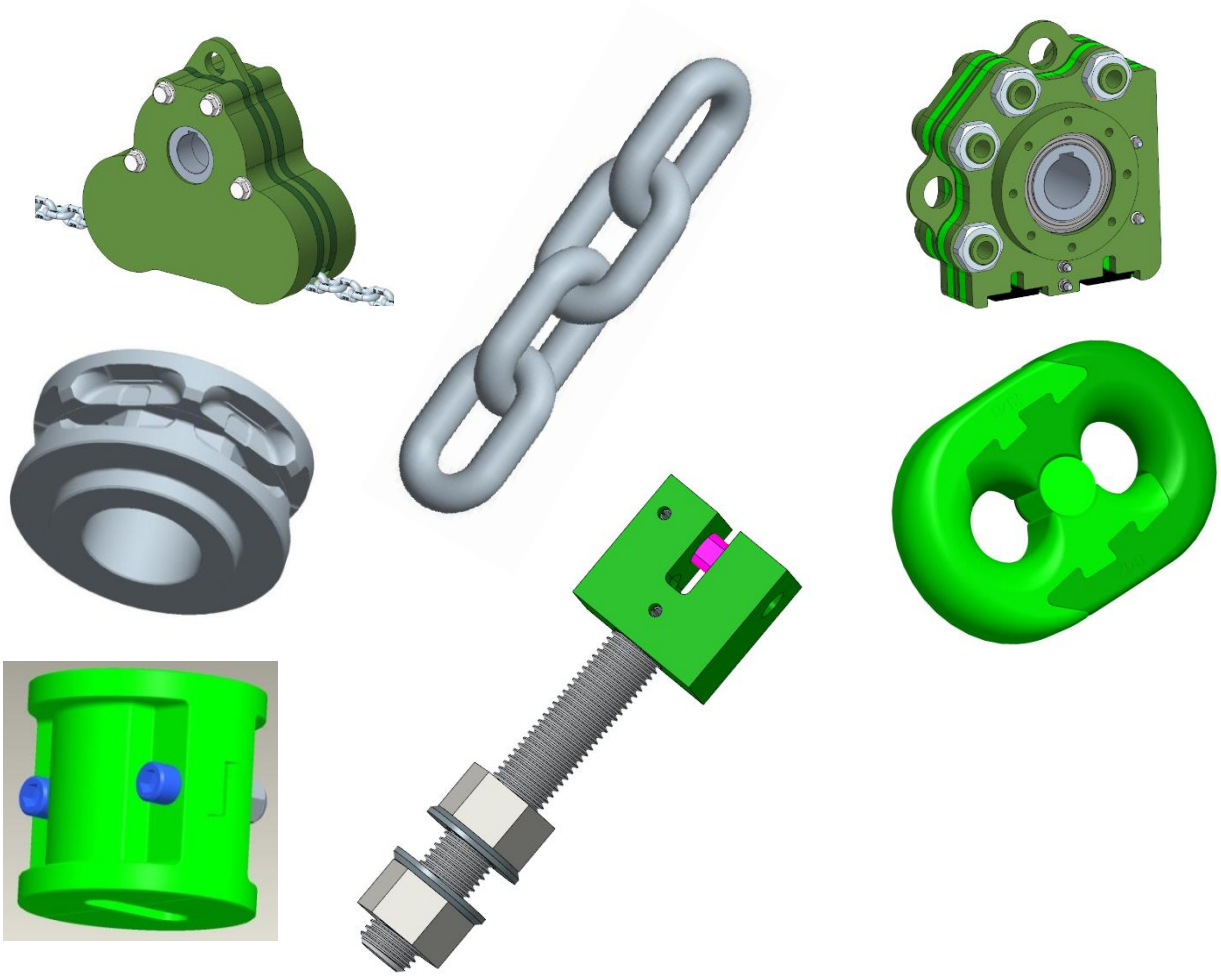


Version: February 2024

1 General safety instructions

1.1 Preliminary note

1.1.1 The TECDOS® range of drive technology products is based on a fine-tolerance, high-performance TECDOS® round steel chain.

1.1.2 The allowed operating powers for TECDOS® drive units (e.g. OMEGA, Pi, Gamma), TECDOS® components (pocket wheels, guides, chains, end fastenings, connectors) and TECDOS® chains are listed in Annex 1. The operating powers are calculated taking account of a factor of safety 5 against failure.

1.2 General information

1.2.1 This manual is part of each TECDOS® drive component/unit and provides important instructions for installing, using and servicing the relevant component. Please read this manual carefully and observe all its instructions. This manual will help you use the component safely, properly and efficiently. Failure to observe this manual may result in personal and property damages.

1.2.2 The TECDOS® drive units and TECDOS® components are incomplete machines according to the European Machinery Directive 2006/42/EC. The installation instructions contained in this manual comply with the Machinery Directive 2006/42/EC Annex VI and must be stored together with the technical documentation of the relevant TECDOS® drive units or TECDOS® components.

1.2.3 Caution! A machine in which the components supplied are attached or installed must not be commissioned until it is determined that it meets the requirements of the Machinery Directive 2006/42/EC of the European Union.

1.3 Intended use

1.3.1 The maximum allowed operating powers for TECDOS® drive units, TECDOS® components and TECDOS® chains are listed in Annex 1.

1.3.2 It is not permitted to combine them with other chains, pocket wheels or other components not approved by RUD.

1.3.3 In case of chain speed over 6 m/min the operating power must be reduced. We therefore recommend discussing the issue with the RUD Application Technology Department.

1.3.4 Caution! The allowed chain speed and chain power are defined in the technical data sheet attached to the RUD order confirmation. When configuring the TECDOS® drive units, it is necessary to consider the additional dynamic forces resulting from the chain speed. The allowed chain power and hence the allowed operating power of a RUD drive system can therefore lie below the value range specified in Annex 1 for TECDOS® units, TECDOS® components and TECDOS® chains.

1.3.5 A TECDOS® drive unit may be operated only within the following temperature range:

- With Premium chain: - 20° C … + 150° C
- With Medium chain: - 40° C … + 150° C

1.3.6 For the TECDOS® drive units (OMEGA, Pi, Gamma), the following maximum operating times must be observed:

- 4.380 h per year
- 12 h per day
- 30 min per hours
- A TECDOS® drive unit (OMEGA, PI-GAMMA) should not be operated any longer than 30 minutes at a time.

Should the actual operating times differ from these values, the operating powers or chain speed must be reduced below the maximum limits allowed. Any use that exceeds these values is considered improper.

1.3.7 Using the system as intended also entails observing this installation and operation manual, as well as the relevant inspection and maintenance procedures.

1.3.8 Caution! The manufacturer declines any liability for any damages resulting from improper use. The resulting risks shall be borne exclusively by the user.

1.4 Safety instructions

1.4.1 The bore and hub structure of the TECDOS® drive units is designed for transmitting momentum according to the chain powers defined in Annex 1. The system manufacturer must design the system based on the actual resulting powers and select the shaft-hub connection accordingly. All installation points of the chain drive provided for the application of force must be defined in such a way that the applied forces can be absorbed safely.

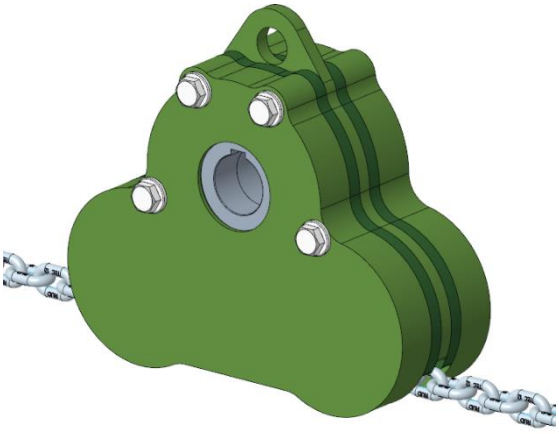
1.4.2 All TECDOS® drive units are state-of-the-art products manufactured in accordance with the relevant recognized safety regulations and ensure safe operations. Nevertheless, if the equipment is not properly handled and is not used in accordance with the instructions, danger to the body and life of the user or to third parties, or damage to the system other property may arise.

1.4.3 The following points must be absolutely observed:

- Installation, disassembly, repair and maintenance operations, as well as any measurements of wear, may be performed exclusively by expert and duly trained technicians acquainted with the manual.
- Before starting any maintenance operations, inform the operators of the system and appoint supervisory personnel.
- Perform any maintenance and installation operations only with main switch disconnected.
- Secure the machine against unintentional restart.
- For installation and disassembly, lock the chain/TECDOS® drive unit or any system and system part connected to the chain to prevent them from moving. If during installation and disassembly operations the chain drive is exposed to a side load, it may be set in motion and cause fatal injuries.
- Secure the work area against falling loads and transported items.
- Never stand under suspended loads.
- Welding, flame-cutting or grinding operations may be performed exclusively if they are explicitly approved. Before welding, flame-cutting or grinding, clean the system and its surrounding area from any dust and flammable substances and make sure that the room is sufficiently ventilated. Possible risk of fire and explosion.
- Unless otherwise specified, as a general rule the components must not be assembled or disassembled with live equipment.
- When performing installation operations above head-height, use the relevant platforms and climbing aids as required by the applicable safety standards.
- Wear personal protective equipment.
- When working at significant heights, wear fall protection devices.
- Avoid any potentially hazardous operations.
- In case of malfunctions, immediately stop and secure the system.
- Fix immediately any fault.
- In addition to this manual, observe and enforce all general legal or otherwise binding standards concerning accident prevention and environment protection.

1.5 Copyright

2 TECDOS® drive unit OMEGA



2.1 Installation and operation manual

2.1.1 The working chain to be pulled in must be aligned before it is threaded into the TECDOS® OMEGA housing so that the chain does not run against the housing when twisted and block the chain drive. We recommend laying out and aligning the working chain over its full length in front of the housing before pulling it in.

2.1.2 The chain must never be retracted using the drive motor, as this can cause the chain to become taut inside the housing.

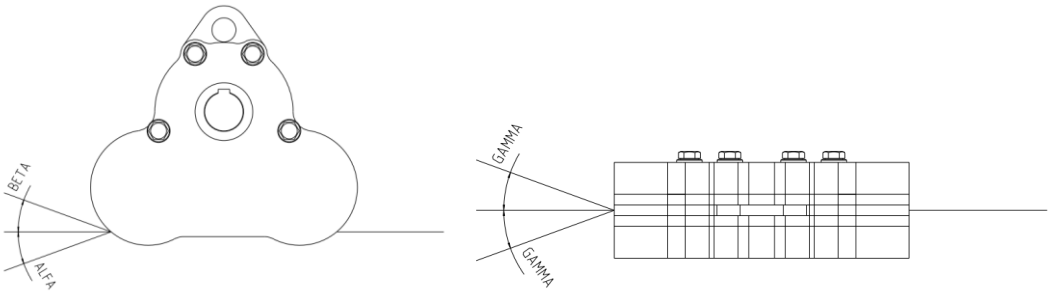
2.1.3 During installation, the TECDOS® OMEGA must be aligned so that the chain can run in and out at right angles to the wheel axis. The chain must not run in and out at the side of the housing.

2.1.4 It must be ensured that any mounting plate on the underside of the housing does not obstruct the inlet and outlet of the chain, whereby the OMEGA housing can be installed in any position.

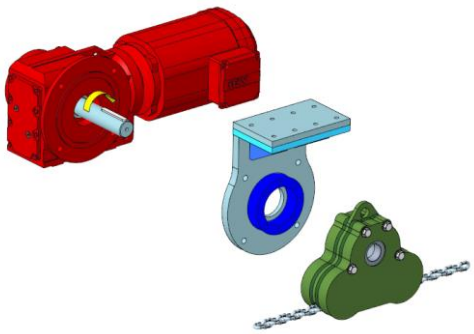
2.1.5 Before being used for the first time, the entire length of the non-loaded chain should be lubricated with a penetrative lubricant. Make sure that all chain inter-link joints are lubricated, included the hidden ones in the TECDOS® OMEGA housing. Do not overlook any chain link, as this leads to premature wear. Lubrication should only be omitted if there are abrasive substances in the working environment which could be deposited in the lubricant, and so create an abrasive effect which would increase chain wear.

2.1.6 The chain must be tensioned using the TECDOS® end fastenings. During this operation, make sure that the chain is not twisted.

2.1.7 The chain may run in and out at a maximum angle of 20° at the ALFA angle, the BETA angle must not deviate from 0°. The GAMMA angle must not deviate from 0°.



2.1.8 When installing the motor, make sure that the drive shaft is not tilted and that the shaft, bore, key and slot are not damaged.



To align the feather key, release the motor brake and turn the drive shaft to the required position, or position the drive wheel in the TECDOS® OMEGA housing by pulling on the chain so that the motor shaft can be installed.

2.1.9 Before the TECDOS® OMEGA is moved by the motor, make sure that the chain is tensioned and does not risk kinking in the TECDOS® OMEGA housing.

2.1.10 Make sure that the dirt on the chain does not prevent the chain links from moving properly.

2.1.11 The TECDOS® OMEGA can be used without limitations in a temperature range from -20°C to +150°C. In case of operations at lower or higher temperatures, it is necessary to contact RUD.

2.1.12 The TECDOS® OMEGA must not be brought into contact with aggressive chemicals, acids or their vapours.

2.1.13 As a general rule, no welding operations may be performed on the TECDOS® OMEGA.

2.1.14 Conversions or modifications to the TECDOS® OMEGA are not permitted.

2.1.15 The surrounding and operating area of the TECDOS® OMEGA must be protected with suitable guards that must prevent operators from reaching into the chain drive during operations.

2.1.16 Any components fixed to the chain (e.g. connectors, shackles, attachments, screw-links etc.) must not run into or against the TECDOS® OMEGA housing. If any such components are fixed to the chain, it is necessary to employ suitable protections in order to prevent them from running into or against the housing. Otherwise, the chain could jam and even break.

2.1.17 In addition to this installation manual referring to the TECDOS® OMEGA, it is also necessary to observe the instructions specified in the installation manuals of the TECDOS® chain and TECDOS® pocket wheel.

2.2 Maintenance and Care

2.2.1 Maintenance

2.2.1.1 Normally, TECDOS® OMEGA do not require any special maintenance.

2.2.1.2 However, the TECDOS® OMEGA, the TECDOS® chain and all related components should be serviced at least once a year or in case they generate unusual noises.

2.2.1.3 In case of 1,500 operating hours or more per year, the TECDOS® OMEGA should be checked / serviced every six months. After no more than 6,000 operating hours, the TECDOS® OMEGA should be completely disassembled for inspection. Clean all parts, replace any worn-out parts and then carefully assemble the TECDOS® OMEGA. While doing so, grease all bearing parts.

2.2.1.4 Should the chain present signs of wear, check the TECDOS® OMEGA. We recommend disassembling it and checking the guides.

2.2.2 Regular monitoring

2.2.2.1 Before every use, the TECDOS® CHAIN should be visually checked to detect any evident damages or signs of wear. If any damages are detected, have a qualified person check the system.

2.2.2.2 Overall, the TECDOS® pocket wheels installed in the TECDOS® OMEGA allow for 2-3 chain changes. Any further use will depend on the condition of the TECDOS® pocket wheels, to be visually checked after disassembling the TECDOS® OMEGA. The components must be checked also after damage events or other peculiar events. Any detected faults must be immediately fixed by replacing the relevant component. If the pocket wheels are replaced, we recommend replacing the guide sheets and (if necessary) the bearings as well.

2.2.3 Test criteria

3.3.3.1 Please observe and check the following points before each start-up, as well as after assembly and after peculiar events at regular intervals:

- No missing parts in the TECDOS® OMEGA
- Check screw connections for firm seating
- Check the bearings for any damage.
- The pocket wheels with chain must rotate smoothly
- Mechanical damages such as ruptures or deformations, especially in chain inlet and outlet points on the guide.
- Deformation of the component due to overload
- Wear of the insertion sheets or scraper
- Incipient crackings or other damages

2.2.4 Replacement state

2.2.4.1 When one of the following conditions obtain, it is necessary to replace some components of the TECDOS® OMEGA or the entire TECDOS® OMEGA:

- Wear of the insertion sheets or scraper, with a depth greater than $\mathbf{t_{max}}$ as specified in table 3 of Annex 3.
- Incipient crackings on the infeed sheet in the chain inlet and outlet points.
- Incipient crackings on the fastening points of the TECDOS® OMEGA.

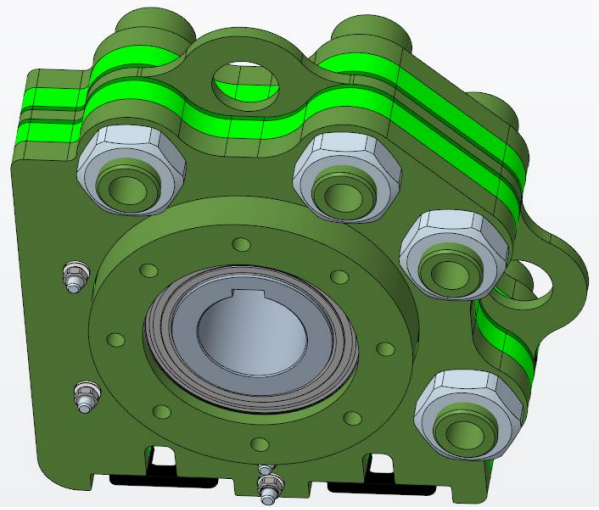
2.2.4.2 When one of the following conditions obtains, it is necessary to replace the TECDOS® OMEGA sliding bearings:

- Stiff or noisy bearings
- In case of uneven wear in the two halves of the housing.
- In case of replacement of the wheels.
- In case of consumption of the sliding layer of plastic bearings.

2.2.4.3 If it is necessary to replace a TECDOS® pocket wheel, it is always also necessary to install a new TECDOS® chain.

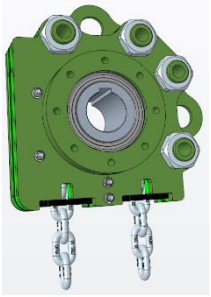
2.2.4.4 As a general rule, the TECDOS® chains and/or TECDOS® pocket wheels must be replaced in case any damages are detected which may directly or indirectly undermine the safety or the proper functioning of the system

3 TECDOS® drive unit PI-GAMMA

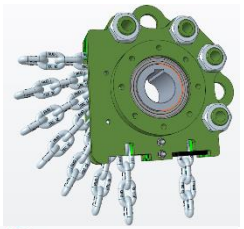


3.1 Design variants

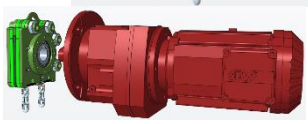
3.1.1 The TECDOS® drive units in the version TECDOS® PI are provided with a 180° chain wrap on the TECDOS® pocket wheel.



3.1.2 The TECDOS® drive units in the version TECDOS® GAMMA are provided with a variable 90°-180° chain wrap on the TECDOS® pocket wheel.



3.1.3 Both unit versions are available with and without flange support for fixing the motor.



3.1.4 Depending on the chain speed, on the relevant load and on the environmental conditions, the TECDOS® drive units are available with roller bearing or with sliding bearings.

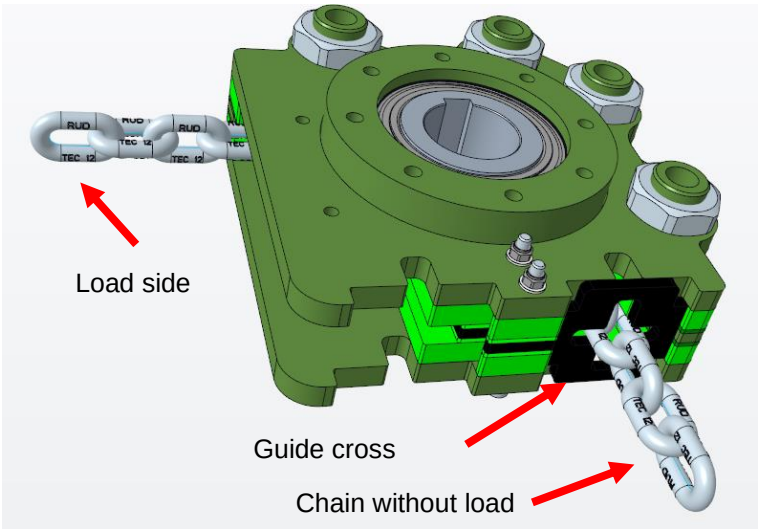
3.2 Installation and operation manual

3.2.1 In addition to this installation manual referring to the TECDOS® drive unit, it is also necessary to observe the instructions specified in the installation manuals of the TECDOS® chain and TECDOS® pocket wheel.

3.2.2 The TECDOS® drive units must be installed in such a way that wheels and chain may run smoothly. The rotation of the elements must not be prevented nor blocked.

3.2.3 The chain must be inserted manually before the motor can be flange-mounted.

3.2.4 If you are using TECDOS® drive units in the version “TECDOS® Gamma” provided with a variable 90°-180° chain wrap, make sure that the incoming chain section without load runs through the guide cross of both infeed sheets. Only here is it possible to realign a twisted chain, thus making sure that it can be properly inserted into the wheel. The chain without load must never enter the unit side without guide cross!



3.2.5 When the chain is inserted, the TECDOS® pocket wheel must rotate smoothly in the TECDOS® drive unit. To insert the chain, lay a wire through the TECDOS® drive unit until its end comes out of the other side. Fasten the chain to one end of the wire and insert it into the housing using the wire. Gently turn the TECDOS® pocket wheel to find the position in which the chain fits into the wheel, then pull the chain out of the housing using the wire.

3.2.6 If the chain must be replaced, attach the new chain to the last chain link of the old chain with open C link and pull the chain into the housing manually or with the aid of a motor.

3.2.7 The TECDOS® drive unit can be used in a temperature range from –20°C to +150°C. In case of operations at lower or higher temperatures, it is necessary to contact RUD.

3.2.8 The TECDOS® drive unit must not come into contact with aggressive chemicals, acids or their vapours.

3.2.9 As a general rule, no welding operations may be performed on the TECDOS® drive unit.

3.2.10 The TECDOS® units may be converted or altered only after consulting RUD.

3.2.11 The area around the TECDOS® drive unit must be protected with suitable guards that must prevent operators from reaching into the chain drive during operations.

3.2.12 Any components fixed to the chain (e.g. TECDOS® lift limiters, TECDOS® connectors, shackles, attachments, screw-links etc.) must not run on the TECDOS® drive unit. If any such components are fixed to the chain, it is necessary to employ suitable protections in order prevent them from running on the TECDOS® drive unit, as in this case they could jam the chain drive.

3.2.13 The TECDOS® drive units can be operated in horizontal and vertical installation positions depending on the application

3.3 Maintenance and Care

3.3.1 Maintenance

3.3.1.1 Normally, TECDOS® drive units do not require any special maintenance.

3.3.2 Monitoring

3.3.2.1 The TECDOS® drive elements must be checked by a qualified person at regular intervals, and at least once a year, in order to make sure that they are still fully suitable. Depending on the relevant conditions of use, e.g. in case of frequent use, significant wear or corrosion, these checks may have to be run at shorter intervals. The components must be checked also after damage events or other peculiar events. Any detected faults must be immediately fixed by replacing the relevant component.

3.3.2.3 In addition to the test criteria listed below and to the replacement state criteria of the TECDOS® drive unit, it is necessary to observe also the test criteria specified in the installation manuals of the chain and of the TECDOS® pocket wheel.

3.3.2.4 Should the chain present signs of wear, check the TECDOS® drive unit. We recommend disassembling it and checking the guides.

3.3.3 Test criteria

3.3.3.1 Please observe and check the following points before each start-up, as well as after assembly and after peculiar events at regular intervals:

- No missing parts in the TECDOS® drive unit PI-GAMMA
- Check screw connections for firm seating
- Check the bearings for any damage. No grease must leak, and the bearing must run smoothly and rotate without generating much noise.
- The pocket wheels with chain must rotate smoothly
- Mechanical damages such as ruptures or deformations, especially in chain inlet and outlet points on the guide.
- Deformation of the component due to overload
- Wear of the insertion sheets of the TECDOS® chain guide or of the scraper
- Incipient crackings or other damages

3.3.4 Replacement state

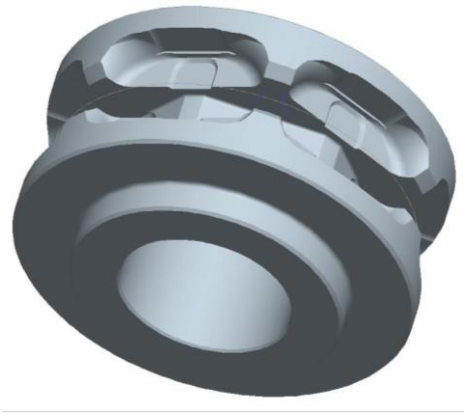
3.3.4.1 Individual components of the TECDOS® drive module or the entire TECDOS® drive module must be replaced if one of the following discard criteria is met:

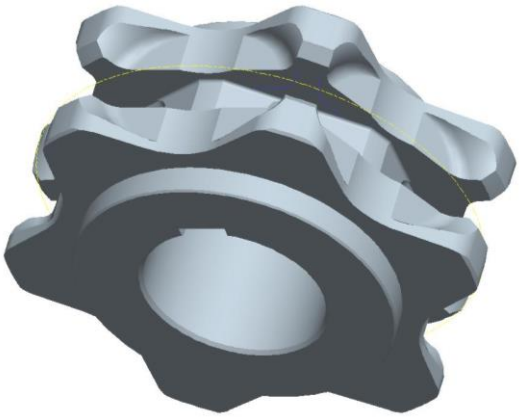
- Wear on the insert plates of the TECDOS® chain guide or the scraper with a depth greater than $\mathbf{t_{max}}$ in Table 3 in Appendix 3.
- Cracks on the inlet plate in the area of the chain inlet and outlet.
- Cracks at the attachment points of the TECDOS® drive unit.
- Stiff or noisy bearings

3.3.4.2 If it is necessary to replace a TECDOS® drive unit, it is always also necessary to install a new TECDOS® chain.

3.3.4.3 As a general rule, the TECDOS® drive unit must be replaced in case any damages are detected which may directly or indirectly undermine the safety or the proper functioning of the system.

4 TECDOS® pocket wheel





4.1 Installation and operation manual

4.1.1 TECDOS® pocket wheels must be mounted on the corresponding shafts or axles in accordance with the state of the art. The wheels must be mounted in such a way that they can be driven smoothly. The rotary movement must not be obstructed or blocked.

4.1.2 TECDOS® pocket wheels must be aligned axially so that the TECDOS® chain can run in and out at right angles to the wheel axis. The TECDOS® chain must not run sideways against the teeth of the TECDOS® pocket wheels when running in and out.

4.1. 3 The TECDOS® pocket wheels must be secured against axial displacement.

4.1.4 The wrap angle of the TECDOS® chain around the TECDOS® pocket wheel must be large enough to ensure that at least two teeth are in positive engagement with the TECDOS® chain at all times.

4.1.5 The TECDOS® pocket wheel can be used in a temperature range from -40°C to +200°C without restrictions.

4.1.6 The TECDOS® pocket wheel must not be brought into contact with aggressive chemicals, acids or their vapours.

4.1.7 In principle, no welding work may be carried out on TECDOS® pocket wheels.

4.1.8 Conversions or modifications to the TECDOS® pocket wheels are not permitted.

4.1.9 The area around the TECDOS® pocket wheel must be secured with a suitable protective device to prevent it from engaging in the chain drive during operation.

4.1.10 Components attached to the chain strand (e.g. TECDOS® locks, shackles, catches, chain connectors, etc.) must not run over the TECDOS® pocket wheel. If such components are attached to the chain, a suitable protective device must be used to ensure that these parts cannot block the chain drive or run over the TECDOS® pocket wheel.

4.2 Maintenance and care

4.2.1 Maintenance

4.2.1.1 Normally, the TECDOS® pocket wheels do not require any special maintenance. As a measure to prevent corrosion, the components may be sprayed with oil or corrosion protection spray.

4.2.2 Monitoring

4.2.2.1 The TECDOS® pocket wheels must be checked by a qualified person at regular intervals, and at least once a year, in order to make sure that they are still fully suitable. Depending on the relevant conditions of use, e.g. in case of frequent use, significant wear or corrosion, these checks may have to be run at shorter intervals.

The components must be checked also after damage events or other peculiar events. Any detected faults must be immediately fixed by replacing the relevant component.

4.2.3 Test criteria

4.2.3.1 Please observe and check the following points before each start-up, as well as after assembly and after peculiar events at regular intervals:

- Completeness of the TECDOS® pocket wheel
- The pocket wheels must rotate smoothly
- Mechanical damages such as ruptures or deformations, especially in chain inlet and outlet points on the guide.
- Any mechanical damages such as ruptures on the toothed edges
- Deformation of the component due to overload
- Wear on the radii of the guides
- Wear of the toothed edges
- Incipient crackings or other damages
- Check the wheel bearings for wear and damages

4.2.4 Replacement state

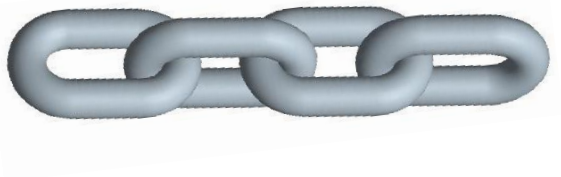
4.2.4.1 When one of the following conditions obtains, it is necessary to replace the TECDOS® pocket wheels:

- Ruptures on or wear of the toothed edges or on the seating of the chain links with a depth greater than **A** as specified in table 3 of Annex 3.
- Indentations on the tooth base radius that cause jerky movements at the chain inlet and outlet points.
- Incipient crackings on the teeth of the TECDOS® pocket wheel

4.2.4.3 If it is necessary to replace a TECDOS® chain guide or a TECDOS® pocket wheel, it is always also necessary to install a new TECDOS® chain.

4.2.4.4 As a general rule, the TECDOS® chain guides or the TECDOS® pocket wheel must be re-placed in case any damages are detected which may directly or indirectly undermine the safety or the proper functioning of the system.

5 TECDOS® high-performance chain



5.1 Installation and operation manual

5.1.1 The TECDOS® high-performance chains may be operated and deflected only with TECDOS® pocket wheels whose dimensions are perfectly suitable for the chains and their tolerances.

5.1.2 Without RUD's prior approval, TECDOS® high-performance chains cannot be guided over round deflection roller, as these generate bending stress that may lead to fatigue failures.

5.1.3 Before being used for the first time, the entire length of the non-loaded chain should be lubricated with a penetrative lubricant. Make sure that all chain inter-link joints are lubricated. Do not overlook any chain link, as this leads to premature wear. Lubrication should only be omitted if there are abrasive substances in the working environment which could be deposited in the lubricant, and so create an abrasive effect which would increase chain wear.

5.1.4 The TECDOS® chain must not be twisted between the drive and the deflection wheels, nor between the wheels and the fastening components.

5.1.5 If any connection elements are installed in the chain links, they must not enlarge them.

5.1.6. The chain links mounted in the connection elements must not be exposed to bending stress.

5.1.7 Under no circumstances must the TECDOS® chain disengage from the drive or deflection wheels. If necessary, a TECDOS® chain guide must be installed on the TECDOS® wheels.

5.1.8 The preload force of the chain should be reduced as much as possible, but it must always be greater than the friction force of the slack strand. If the TECDOS® chain is operated without preload force, it is always necessary to provide a TECDOS® chain guide on the TECDOS® wheels.

5.1.9 The TECDOS® high-performance chains can be used without limitations up to a temperature of +200°C. "*Premium"* products can be used up to a minimum temperature of -20°C, "*Medium"* products up to -40°C. In case of operations at lower or higher temperatures, it is necessary to contact RUD.

5.1.10 The TECDOS® high-performance chains of type "*Premium"* and "*Medium"* must not come into contact with aggressive chemicals, acids or their vapours.

5.1.11 The corrosion protection of coated TECDOS® high-performance chains is reduced or eliminated if they are blasted or scoured.

5.1.12 As a general rule, no welding operations may be performed on the TECDOS® high-performance chains.

5.1.13 It is forbidden to use the TECDOS® chains as earthing elements when performing electro-welding operations on the steel structure.

5.1.14 Except for chain shortening, the TECDOS® high-performance chains must not be converted or altered.

5.1.15 If the chains need to be shortened, cut off the relevant chain links with a cutting disc or bolt cropper without damaging the other chain links. Never expose to heat the other chain links that must not be cut out.

5.1.16 The TECDOS® high-performance chains must not be used as attachment chains.

5.1.17 The TECDOS® high-performance chains must not run on sharp edges and corners.

5.1.18 The TECDOS® chain must be protected with suitable guards that must prevent operators from inadvertently reaching into the chain drive during operations.

5.1.19 No external elements must block the chain drive.

5.1.20 During normal operations, the end positions may be approached to exploit the entire travel length only if an operational limit switch is mounted upstream. The chain must not hit the end stop.

5.2 Maintenance and care

5.2.1 Maintenance

5.2.1.1 The TECDOS® high-performance chains require little maintenance. In order to reduce the wear of the joints and increase the chain service life, the TECDOS® chains should be lubricated at regular intervals with a sufficiently penetrating oil along their entire length. Lubrication with oil should be avoided only in case abrasive materials are present in the work area. In this case, a dry lubricant should be used instead of oil.

5.2.1.2 When lubricating, care must be taken to ensure that the lubricant penetrates the wear-affected chain joints.

5.2.2 Monitoring

5.2.2.1 TECDOS® high-performance chains must be checked by a qualified person at regular intervals, and at least once a year, in order to make sure that they are still fully suitable. Depending on the relevant conditions of use, e.g. in case of frequent use, significant wear or corrosion, these checks may have to be run at shorter intervals. The components must be checked also after damage events or other peculiar events. Any detected faults must be immediately fixed by replacing the relevant component.

5.2.2.2 In order to assess the wear status of the TECDOS® high-performance chains, it is useful to log the results of the checks.

5.2.3 Test criteria

5.2.3.1 During the checks, the TECDOS® chain must be inspected along its entire length, including its covered parts.

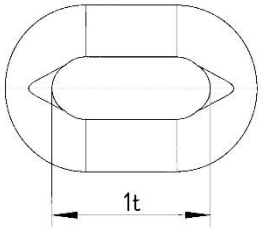
5.2.3.2 Please observe and check the following points before each start-up, as well as after assembly and after peculiar events at regular intervals:

- Mechanical damages
- Projecting edges that protrude into the chain drive
- Wear of the chain links, and especially in the internal chain link curves.
  CAUTION: The chain links must be checked with particular care in the changeover area, as these are exposed to particular stress due to dynamic vibrations.
- Plastic deformation of the chain due to overload
- Incipient crackings or other damages
- Major corrosion
- Mobility of each chain link
- Preload force of the chain

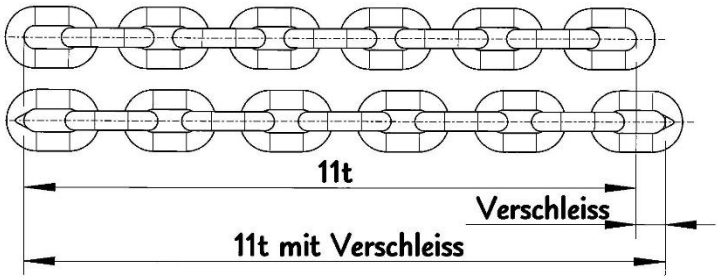
5.2.4 Replacement state

5.2.4.1 When one of the following conditions obtains, it is necessary to replace the TECDOS® high-performance chains:

- Plastic deformation of a chain link due to traction or bending force.
- When the measured wire diameter reaches the value **dmin** specified in table 3 Annex 3 in any chain link.
  The measured wire diameter dm is calculated based on two single values d1 and d2 measured at 90° from each other.
- Chain pitch ***tv*** according to table 3 in Annex 3 reached or exceeded



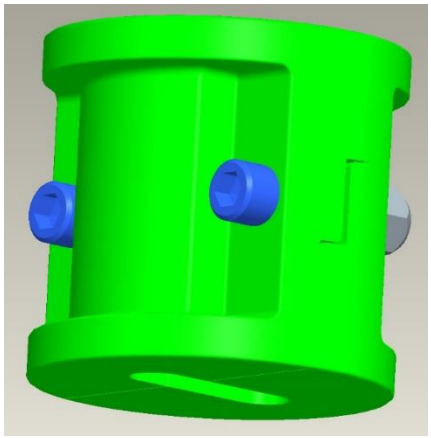
- Chain pitch ***11tv*** according to table 3 in Annex 3 reached or exceeded



- Sharp-edged grooves on the chain surface
- Incipient crackings on the chain surface
- Reduced mobility of the chain links

5.2.4.2 As a general rule, the chains must be replaced in case any damages are detected which may directly or indirectly undermine the safety or the proper functioning of the system.

6 TECDOS® lift limiter



6.1 Installation and operation manual

6.1.1 The TECDOS® lift limiter must be fixed at least at 3 chain links from the chain end.

6.1.2 If the TECDOS® lift limiter is supplied with a rubber buffer, this must be mounted between the TECDOS® lift limiter and the housing of the chain drive.

6.1.3 If the TECDOS® lift limiter is provided with a vulcanized-in disc, this must be mounted in such a way that it points towards the chain drive housing.

6.1.4 The TECDOS® lift limiter is an emergency limiter and must not be approached during normal operations.

6.1.5 The TECDOS® lift limiter must not be converted or altered.

6.2 Maintenance and Care

6.2.1 Maintenance

6.2.1.1 Normally, the TECDOS® lift limiters do not require any special maintenance.

6.2.2 Monitoring

6.2.2.2 The TECDOS® lift limiters must be checked by a qualified person at regular intervals, and at least once a year, in order to make sure that they are still fully suitable. Any detected faults must be immediately fixed by replacing the component.

6.2.3 Test criteria

6.2.3.1 Please observe and check the following points before each start-up, as well as after assembly and after peculiar events at regular intervals:

- No missing parts in the TECDOS® lift limiter.
- Check screw connections for firm seating.
- Mechanical damage such as grooves, incipient crackings or ruptures.

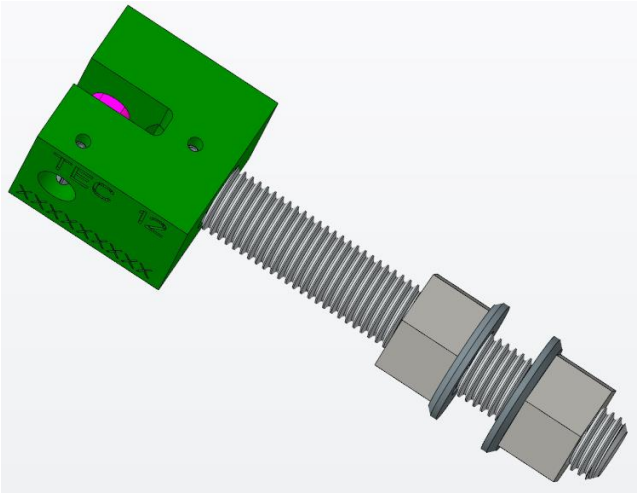
6.2.4 Replacement state

6.2.4.1 When on of the following conditions obtains, it is necessary to replace the TECDOS® lift limiter:

- Plastic deformation of the component due to incorrect traction or bending force.
- Incipient crackings or ruptures in the limiter

6.2.4.2 As a general rule, the TECDOS® lift limiter must be replaced in case any damages are detected which may directly or indirectly undermine the safety or the proper functioning of the system.

7 TECDOS® end fixing HEBG / RS-HEBG



7.1 Installation and operation manual

7.1.1 The point of installation of the TECDOS® end fixing must be designed and defined in such a way that the applied forces in the fastening component can be absorbed safely.

7.1.2 When installing the TECDOS® chain with TECDOS® end fixing, use exclusively original parts manufactured by RUD.

7.1.3 The slotted spring pin for securing the connection pin must be mounted in the fork head in such a way that its slot is visible and points forward.

7.1.4 Use the slotted spring pin only once.

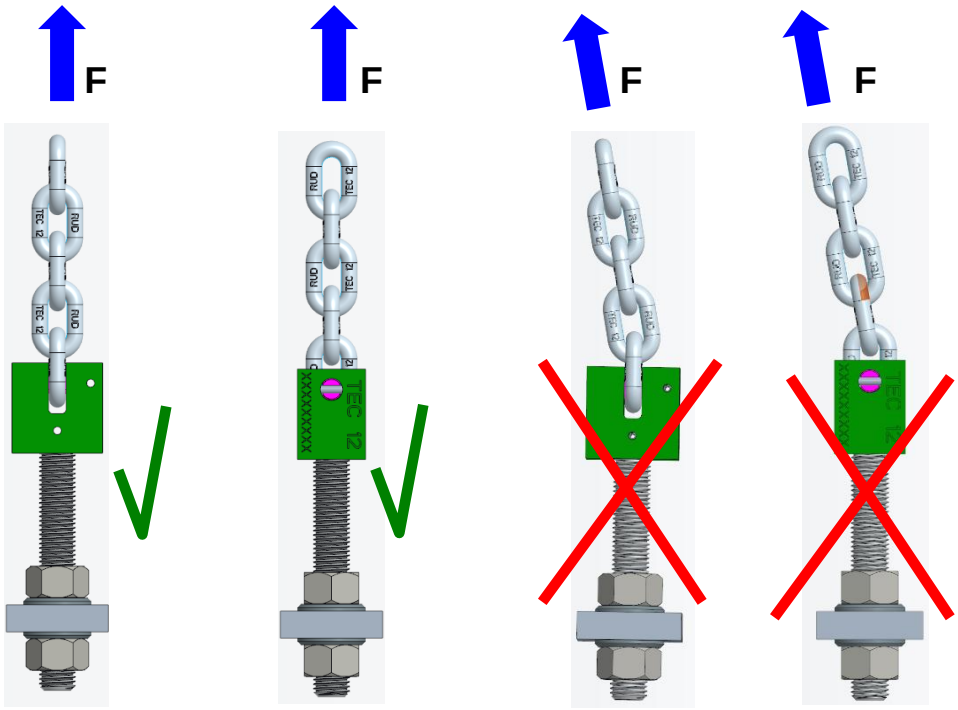
7.1.5 The TECDOS® end fixing must be aligned in such a way that the chain can be mounted without twisting.

7.1.6. The preload force should be reduced as much as possible. Apply only the preload force necessary to ensure that the chain can run smoothly at normal operating conditions. Check the chain tension on a regular basis, especially when inserting new chains or in case of long chains.

7.1.7 **Caution:** Unnecessarily high tension will reduce the service life of the system.

7.1.8 When retensioning the chain, the TECDOS® end fixing must not be twisted radially, and the chain must remain twist-free.

7.1.9 The TECDOS® end fixing must be mounted in such a way that the force is transmitted to the component along the longitudinal axis. Do not apply side forces, as these could bend the chain or the TECDOS® end fixing.



7.1.10 In case of oblique forces, the TECDOS® end fixing must be mounted on a rotatable fastening component (e.g. TECDOS® pivot piece GSW or GSB) that can be aligned along the direction of the relevant force. This ensures that only axial forces can be applied to the TECDOS® end fixing.

7.1.11 The fastening nuts used must be locked to prevent them from being inadvertently loosened (e.g. by means of glueing, positive-fit screw locking device, locknuts etc.).

7.1.12 The load capacity of the TECDOS® end fixing corresponds to that of the relevant TECDOS® chain.

7.1.13 The **TECDOS® HEBG end fixing** can be used without limitations in a temperature range from –40°C to +200°C.

7.1.14 The **TECDOS® RS-HEBG end fixing** can be used without limitations in a temperature range from –100°C to +200°C.

7.1.15 The **TECDOS® HEBG end fixing** must not come into contact with aggressive chemicals, acids or their vapours.

7.1.16 If **TECDOS® RS-HEBG end fixing** come into contact with aggressive chemicals, acids or their vapours, before using the components it is necessary to make sure that they are properly functioning and suitable for the local conditions. RUD's approval is required.

7.1.17 As a general rule, no welding operations may be performed on the TECDOS® end fixing.

7.1.18 The TECDOS® end fixing must not be converted or altered.

7.2 Maintenance and Care

7.2.1 Maintenance

7.2.1.1 Normally, the TECDOS® end fastenings do not require any special maintenance. To reduce wear, it is possible to lubricate the mounting bolt in the bore of the fork head.

7.2.1.2 As a measure to prevent corrosion, the **TECDOS® HEBG end fixing** may be sprayed with oil or corrosion protection spray.

7.2.2 Monitoring

7.2.2.1 The TECDOS® end fixing must be checked by a qualified person at regular intervals, and at least once a year, in order to make sure that they are still fully suitable. Depending on the relevant conditions of use, e.g. in case of frequent use, significant wear or corrosion, these checks may have to be run at shorter intervals. The components must be checked also after damage events or other peculiar events. Any detected faults must be immediately fixed by replacing the relevant component.

7.2.3 Test criteria

7.2.3.1 Please observe and check the following points before each start-up, as well as after assembly and after peculiar events at regular intervals:

- No missing parts in the TECDOS® end fixing
- Mechanical damages such as major grooves
- Plastic deformation
- Damaged or worn-out locking slotted spring pin
- Damaged or worn-out thread or fork head of the TECDOS® end fixing
- Incipient crackings or other damages

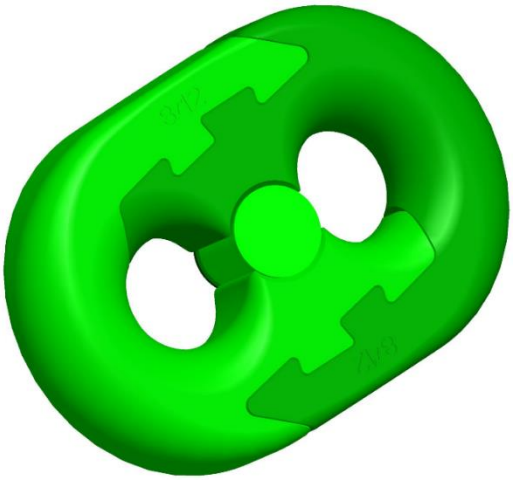
7.2.4 Replacement state

7.2.4.1 When one of the following conditions obtains, it is necessary to replace the TECDOS® end fixing:

- Grooves in areas exposed to traction
- Plastic deformation of the component or of the mounting bolt due to incorrect traction or bending force.
- Changes to the cross section due to wear greater than **A** as specified in table 2 of Annex 3, especially on the connection pin and on the pin bore.
- Incipient crackings on the thread or fork head

7.2.4.2 As a general rule, the TECDOS® end fixing must be replaced in case any damages are detected which may directly or indirectly undermine the safety or the proper functioning of the system.

8 TECDOS® connector



8.1 Installation and operation manual

8.1.1 When installing the TECDOS® chain with TECDOS® connector, use exclusively original parts manufactured by RUD.

8.1.2 Never mount the TECDOS® connector without safety bolt and lock washer. Use the lock washer only once. Use only lock washers according to the DIN 6799 standard.

8.1.3 During installation, the safety bolt must always be fully inserted and must not protrude over the outer contour of the chain link.

8.1.4 The safety bolt must always be secured with the lock washer.

8.1.5. No connection components must be installed in the TECDOS® connector.

8.1.6. The maximum operating power of the TECDOS® connector is the following:
100 kN in case of TEC 140 TECDOS® connector
200 kN in case of TEC 260 TECDOS® connector

8.1.7 The maximum chain speed allowed for the TECDOS® connector is the following:
8 m/min in case of TEC 140 TECDOS® connector
4 m/min in case of TEC 260 TECDOS® connector

8.1.8 The TECDOS® connector can be used in a temperature range from –40°C to +200°C.

8.1.9 The TECDOS® connector must not come into contact with aggressive chemicals, acids or their vapours.

8.1.10 As a general rule, no welding operations may be performed on TECDOS® connectors.

8.1.11 TECDOS® connectors must not be converted or altered.

8.2 Maintenance and Care

8.2.1 Maintenance

8.2.1.1 Normally, TECDOS® connectors do not require any special maintenance. The TECDOS® connector should always be lubricated before use.

8.2.2 Monitoring

8.2.2.1 Before every use, the TECDOS® connector should be visually checked to detect any evident damages or signs of wear. If any damages are detected, have a qualified person check the system. TECDOS® connectors must be checked by a qualified person at regular intervals, and at least once a year, in order to make sure that they are still fully suitable. Depending on the relevant conditions of use, these checks may have to be run at shorter intervals. The components must be checked also after damage events or other peculiar events. Any detected faults must be immediately fixed by replacing the relevant component.

8.3 Test criteria

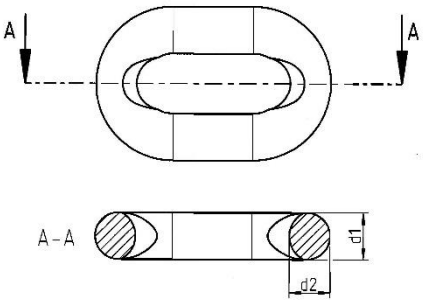
8.3.1 Please observe and check the following points before each start-up, as well as after assembly and after peculiar events at regular intervals:

- No missing parts in the TECDOS® connector
- Wear of the TECDOS® connector, especially in the internal curves of the TECDOS® connector.
- Mechanical damages such as major grooves
- Plastic deformation
- Damaged or worn-out lock washer
- Chain running smoothly in the chain drive
- Projecting edges that protrude into the chain drive

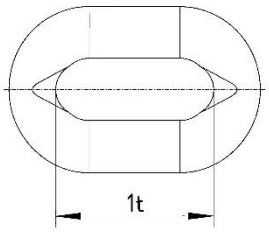
8.4 Replacement state

8.4.1 When one of the following conditions obtains, it is necessary to replace the TECDOS® connector:

- Plastic deformation of the TECDOS® connector due to traction, bending force or twisting forces.
- When the measured wire diameter reaches the value dmin specified in table 3 Annex 3 in any chain link.
  The measured wire diameter dm is calculated based on two single values d1 and d2 measured at 90° from each other.



- Chain pitch ***tv*** according to table 3 in Annex 3 reached or exceeded
- Sharp-edged grooves on the surface of the TECDOS® connector.



- Incipient crackings on the surface of the TECDOS® connector.

8.4.2 As a general rule, the connectors must be replaced in case any damages are detected which may directly or indirectly undermine the safety or the proper functioning of the system.

9 CE Declaration of Incorporation

EC Declaration of conformity

in compliance with EC Machinery Directive 2006/42/EC, appendix II A and its modifications.

Manufacturer:

RUD KETTEN
Rieger & Dietz GmbH u. Co. KG
Friedensinsel
73432 Aalen

We declare that the following stated incomplete machinery, due to its design and construction conforms to all relevant regulations of the EC machinery directive 2006/42/EC. The following incomplete machines may not be put into service until it has been determined that the machine in which these incomplete machines are to be installed complies with the requirements of the EC Machinery Directive 2006/42 / EC.

Product name:

TECDOS® drive unit OMEGA, PI und GAMA;
TECDOS® chain guide and pocket wheel;
TECDOS® high performance chain;
TECDOS® lift limiter;
TECDOS® end fixing HEBG / RS-HEBG
TECDOS® connector

Following harmonized standards have been applied:

DIN EN ISO 12100:2011-03	DIN EN 14492-1:2010-06
DIN EN 818-1:2008-12	DIN EN 818-7:2008-07

Following national standards and technical specifications habe been applied additionally:

BGR 500:2008-04	DIN 5684-1:1984-05
DIN 5684-2:1984-05	DIN 685:1981-11

The special documents about the incomplete machine according to annex VII part B have been created and can be handed over in a suitable form on request.

Authorized persons for the assembly of the conformity documents:

Klaus Pfaffeneder, RUD Ketten, 73432 Aalen

Aalen, Sept. 11, 2017

Klaus Pfaffeneder, (Prokurist)

Name, function and signature of the responsible person

Annex 1

Operating powers

Denomination	Operating power with *"Medium"* or *"Premium"* chain [KN]	Operating power with *"Extra"* chain [KN]
TEC6	6	5
TEC12	12	10
TEC 25	25	16
TEC 43	43	27
TEC 65	65	41
TEC 140	140	- -
TEC 260	260	- -

The operating power values apply to the TECDOS® drive units (Pi, Gamma, Omega) and to the other TECDOS® components accordingly.

Annex 2

Maximum screw tightening torques allowed

When installing the parts with screw connections, consider the factors affecting the tightening torques according to the VDI 2230 standard as regards the tightening procedure

Table 1: Maximum tightening torque

	For screw strength class 8.8 with overall friction value μ_{ges} = 0.14	
	Tightening torque	
Thread dimension	[Nm]	[Lbf ft]
M 6	10	7
M 8	25	18
M 10	49	35
M 12	85	62
M 14	135	98
M 16	210	152
M 20	425	307
M 22	580	420
M 24	730	528
M 27	1100	796
M 30	1450	1049
M 33	1900	1347
M 36	2450	1772

Tabelle 2: Tightening torques for TECDOS OMEGA / TECDOS PI-GAMMA

Kette/ Chain	Antrieb / Drive	Anzugsmomente entsprechend der Gewindegröße [Nm] / Tightening torques according to the thread size [Nm] *1)								
		M6	M8	M10	M12	M16	M20	M24	M27	M30
empfohlen /recommended		9	22,5	45	80	194	380	656	993	1315
zulässig / allowed		10	25	46	85	210	425	730	1100	1450
		Stückzahl x Vorspannkräfte max/min entsprechend den Gewindebedingungen unter *1) [kN] für eine Schraube Quantity x pretensioning forces max/min according to the thread conditions under *1) [kN] at one bolt								
TEC 6	Pi/ Gamma	8 x 8,75/6,15			3 x 39,88/27,87					
	Omega		8 x 16,58/11,62							
TEC 12	Pi/ Gamma		8 x 16,58/11,62		4 x 39,88/27,87					
	Omega			8 x 26,88/18,81						
TEC 25	Pi/ Gamma				8 x 39,88/27,87	4 x 75,14/52,24				
	Omega					8 x 75,14/52,24				
TEC43	Pi/ Gamma					8 x 75,14/52,24	4 x 117,6/81,76			
	Omega						8 x 117,6/81,76			
TEC 65	Pi/ Gamma					8 x 75,14/52,24			4 x 221,2/153,6	
	Omega						8 x 117,6/81,76			
TEC 140	Pi/ Gamma					24 x 75,14/52,24		8 x 169,7/118,0		
	Omega *2)						16 x 117,6/81,76	8 x 169,7/118,0		
TEC 260	Pi/ Gamma					24 x 75,14/52,24		14 x 169,7/118,0		
	Omega *2)									16/24 x 271,2/188,0

*1) Gewindebedingungen: μ=0,12-0,18; 90% der R_p 640 Mpa (Güte 8.8), galvanisch verzinkt

*1) Thread conditions: μ=0,12-0,18; 90% of Rp 640 Mpa (grade 8.8), galvanic zinc coated

*2) Omega: diese Omega haben auch eine Fußbefestigung neben der Flanschbefestigung

*2) Omega: these Omega also have a foot mounting surface beside the flange mounting surface

Annex 3

Table 3: Replacement criteria for chain, pocket wheel, chain guide

Chain size	d_{min} [mm]	t_v [mm]	$11t_v$ [mm]	A [mm]	t_{max} [mm]
TEC 6	4,7	15,7	169,2	0,5	0,8
TEC 12	6,5	21,9	238,9	0,7	1,1
TEC 25	9	29,2	314,4	0,7	1,5
TEC 43	11,7	37,9	404,4	0,7	1,9
TEC 65	14,4	47,4	505,4	0,7	2,4
TEC 140	21,2	69,5	743,0	0,7	3,5
TEC 260	28,8	93,8	1007,4	0,7	4,8