1. Foreword

1.1 General Instructions

This guide will help you to use the Central Chain safely, properly and profitably. When you follow the instructions in this guide, you will

- increase the reliability and service life of the Central Chain and the system,
- avoid dangers,
- reduce repairs and down times.

This guide must

- be available at all times at the place of use,
- be read and followed by everyone who works on the Central Chain.

The Central Chain has been constructed according to the highest manufacturing standards and in compliance with the recognized safety rules. However, improper handling or use for other than intended purpose may lead to danger to the life and limb of the user or third parties and/or impair the bucket elevator or other tangible assets.
Spare parts must fulfill the technical requirements specified by RUD-Kettenfabrik. This is guaranteed in the case of original spare parts as they are subject to continuous quality control in compliance with DIN ISO 9001 / EN 29001. Third party spare parts may, under certain circumstances, change the specified design characteristics of the system and lead to serious defects that are no longer the responsibility of RUD-Kettenfabrik.
Maintenance and installation work should only be carried out in a clean environment, to avoid contamination of mating surfaces. Any major overall or repair of the complete chain assembly should only be carried out by the manufacturer.
This guide has been drawn up with the greatest possible care. However, if you would like further information, please contact:

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1.2. Intended Use

- The Central Chain serves as a traction mechanism in bucket elevators for conveying bulk materials vertically.
- In stationary operation, the permitted power transfer through the Central Chain when conveying a specific material at a specific speed and with an appropriate distance between axes is specified in the order to RUD and in the confirmation of order by RUD. Any other use or a use going beyond the intended use – for example higher conveying capacities or speeds, conveying other materials, or use under unapproved operating conditions – shall be regarded as use for other than the intended purpose.
- Usage for the intended purpose also includes complying with this fitting and operating guide, and complying with the inspection and maintenance specifications.

The manufacturer shall not be liable for damage resulting from usage for other than the intended purpose. The user shall bear the risk alone.

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2. Description of the RUD Central Chain RU System

The RUD Central Chain is a bushed plate link chain with floating pins. The main parts (figure 1) are:

- Inner link **1**,
- Outer plates **2**,
- Pins **3**
- Brackets **4** for attaching buckets.

The Central Chain is supplied packed as pre-assembled chain strands of 3 double link pitches. The brackets for attaching buckets and the bucket mounting bolts are supplied packed in separate boxes.

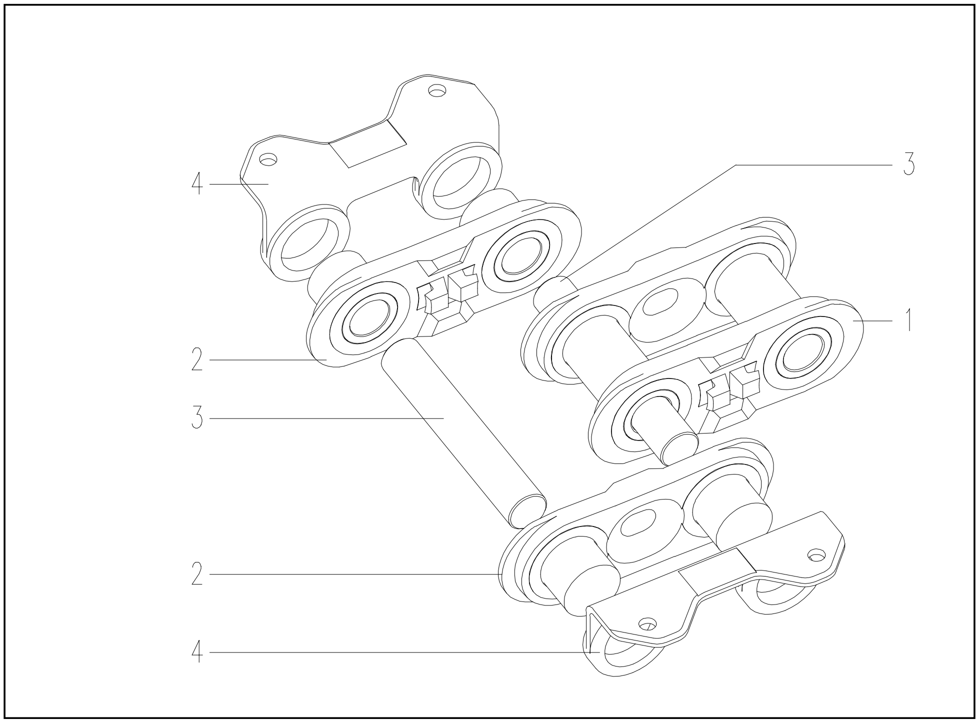


Figure 1, double link piece

3. Assembly

The chain can be assembled by fitting the individual components together without requiring the use of any other tools or equipment. The individual links are assembled in two steps. The chain strands that are to be connected are first laid out next to each other along the longitudinal axis as shown in figure 2, so that the inner link **1** of one chain strand is facing the outer plates **2** and pin of the other chain strand.

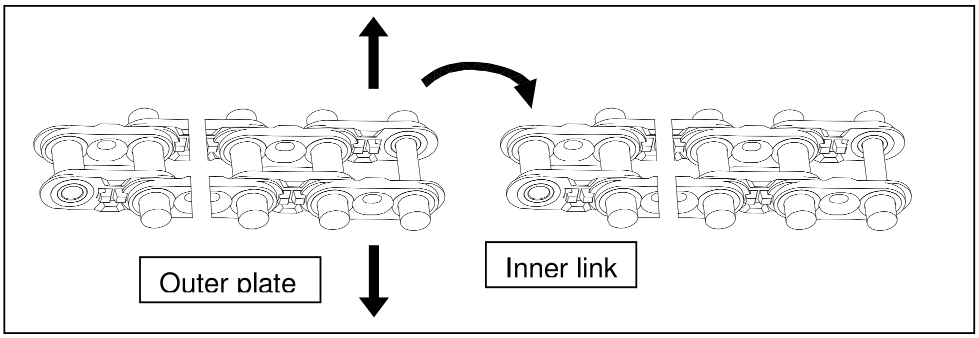
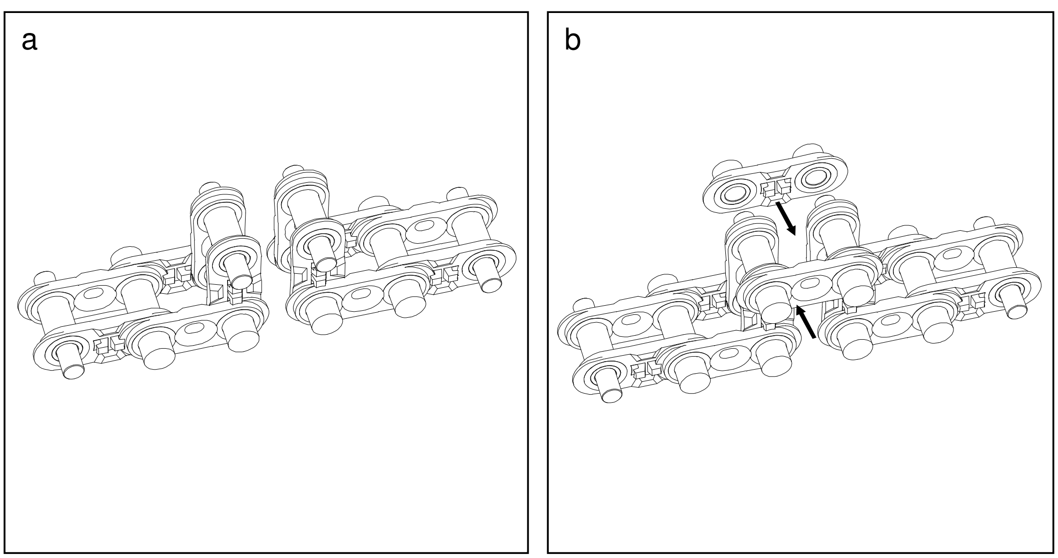


Figure 2

The outer plates **2** can be removed from the pin by turning them to an angle of 90°. The pin located in the inner link remains in the inner link bush for further assembly. The freed pin is inserted into the inner link bush of the other inner link. In the next assembly step, the two inner links are arranged at an angle of 90° (figure 3a) and the two outer plates are pushed onto the projecting ends of the pins (figure 3b). The chains are then pulled out along their longitudinal axis (figure 3c). In so doing, ensure that the locking lugs and locking pins all engage with the plate lugs of the inner links and outer plates (figure 3d).



Figures 3 a, b

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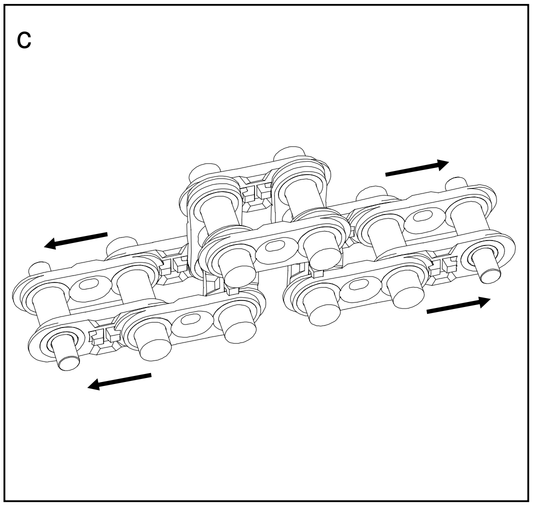

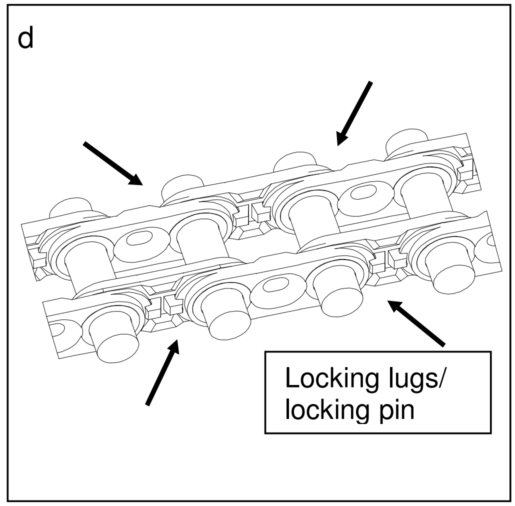

Figures 3 c, d

Caution! **The locking lugs and the locking pins on the plates must securely engage with the inner links 1 and the outer plates 2 (figure 3d)! When assembling the chain, make sure that the components are clean.**

The open, pre-assembled chain, which has not yet been closed to form an endless chain strand, is then drawn into the bucket elevator and the ends are connected to form an endless chain. Completion of the assembly is then continued. The ends of the chain are connected inside the bucket elevator, preferably near the tension wheel, as this is where there is the most space available for assembly. The tension wheel of the tensioning unit is raised to the upper dead center for this purpose. The chain is now closed to form an endless chain strand in a similar way to the above-mentioned assembly steps, but the chain strand is now vertical.

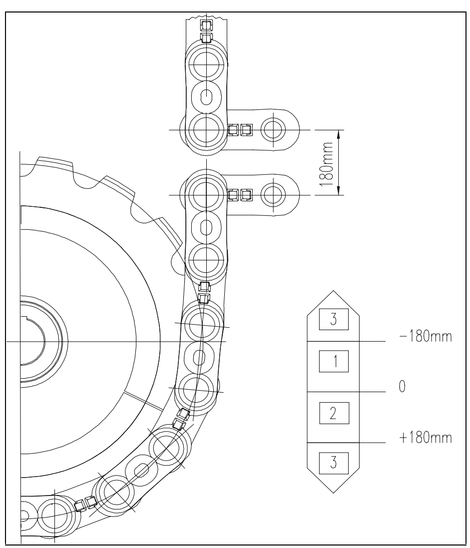

Figure 4

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In the case of bucket elevators with inadequate space for the above-mentioned assembly steps, the chain has to be closed with a chain lock (see figure 4a for RU150 and 4b for RU80 and RU200).

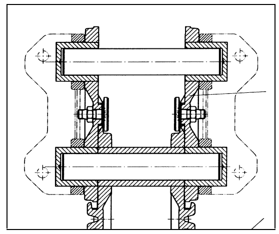
Fig. 4a

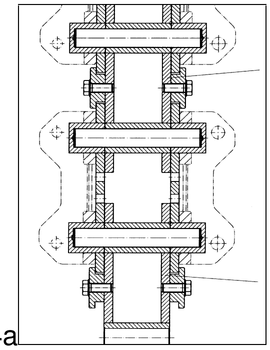
Fig. 4b

The tension wheel can be lowered again after the chain has been closed. The tension wheel will disengage by at least 180 mm. This position of the tension wheel, after the endless chain loop freely disengages and has been loaded with the take-up weight, is also the starting point for subsequent wear measurements.
The total range of adjustment of the tension wheel is subdivided into four ranges (figure 4). The normal position in relation to the distance between axes is position **0**. Range **1** is the assembly range for closing the chain. Range **2** is the tensioning range and the wear compensation range. Ranges **3** are the reserve ranges.
After fitting and closing the chain loop, the bucket attachment brackets **4** are pushed onto each pair of outer plates and buckets are bolted on (figure 5). It must be ensured that the attachment brackets are lying tightly against the outer plates before the buckets mounting bolts are fully tightened (figure 6).
Ensure that the only the correct size, length and grade of bolts and locking nuts are fitted and tightened to the correct torque setting.
The chain strand must be secured during assembly and maintenance so that any out of balance load from the mounted buckets cannot cause any movement.
The chain must not be operated without a full compliment of buckets and attachments brackets. For assembly purposes, the chain strand may be temporarily moved without mounted buckets, but only with the ancillary drive.

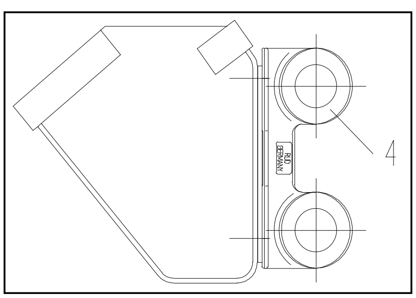

Fig. 5

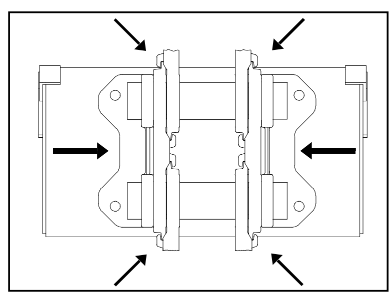
Fig. 6

The dimensions of the bucket elevator housing determine the tensioning range for the tension wheel. The lower stop for the tension wheel is of particular importance. As the chain lengthens with wear, the tension wheel gradually moves towards the lower stop of the tensioning range. The tension wheel must not be allowed to come into contact with the lower stop as this will mean that the chain is no longer loaded by the take-up weight and it may slip excessively on the drive wheel. Continuing operations with the conveyor chain in this position causes chain sag and the chain runs off the tension wheel. This state is referred to as slack chain and must be avoided as it causes excessively high dynamic loads which destroy the chain.

4. Wear Measurement

The lengthening of the chain can be checked by measuring the wear regularly. The chain wear is measured along the distances "a", "b_1", "b_2" und "c" at three successive chain link pitches (figure 7). Depending upon the distance between axes, some 8 to 12 longitudinal wear measurements have to be made and documented. The dimensions "X" and "Y" must also be checked and documented (see figure 8 page 7).

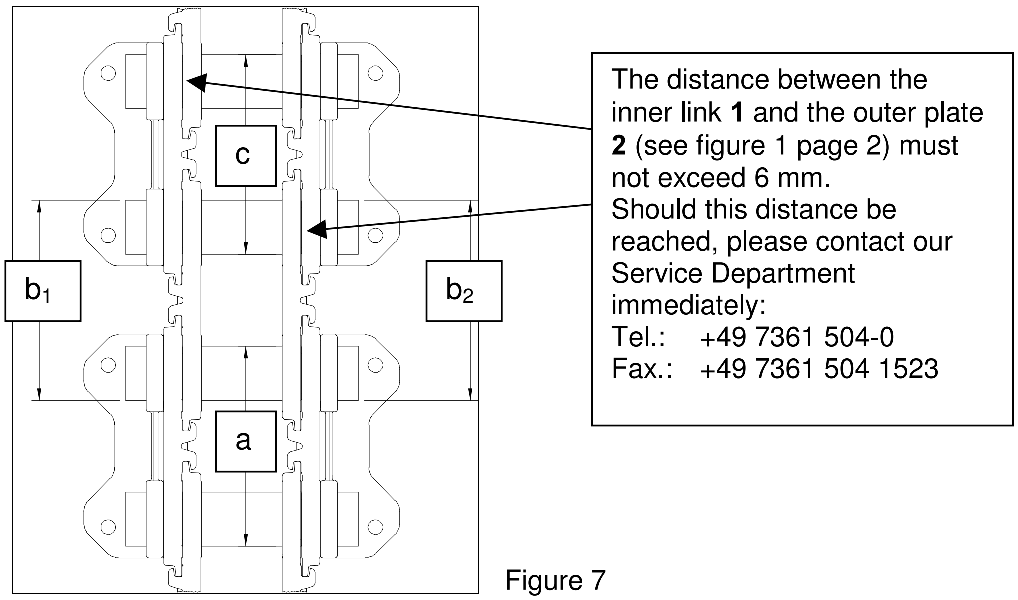

Figure 7

The inspection intervals depend upon the specific operating conditions, conveyor speed, temperature and the material conveyed.
The measuring points and the operating hours must be recorded in a table. The inspection intervals shown in table (1) are minimum recommendations.

Operating hours	**"a"**	**"b_1"**	**"b_2"**	**"c"**	**"X"**	**"Y"**
5,000						
10,000						
15,000						
18,000						
21,000						
24,000						

Table 1

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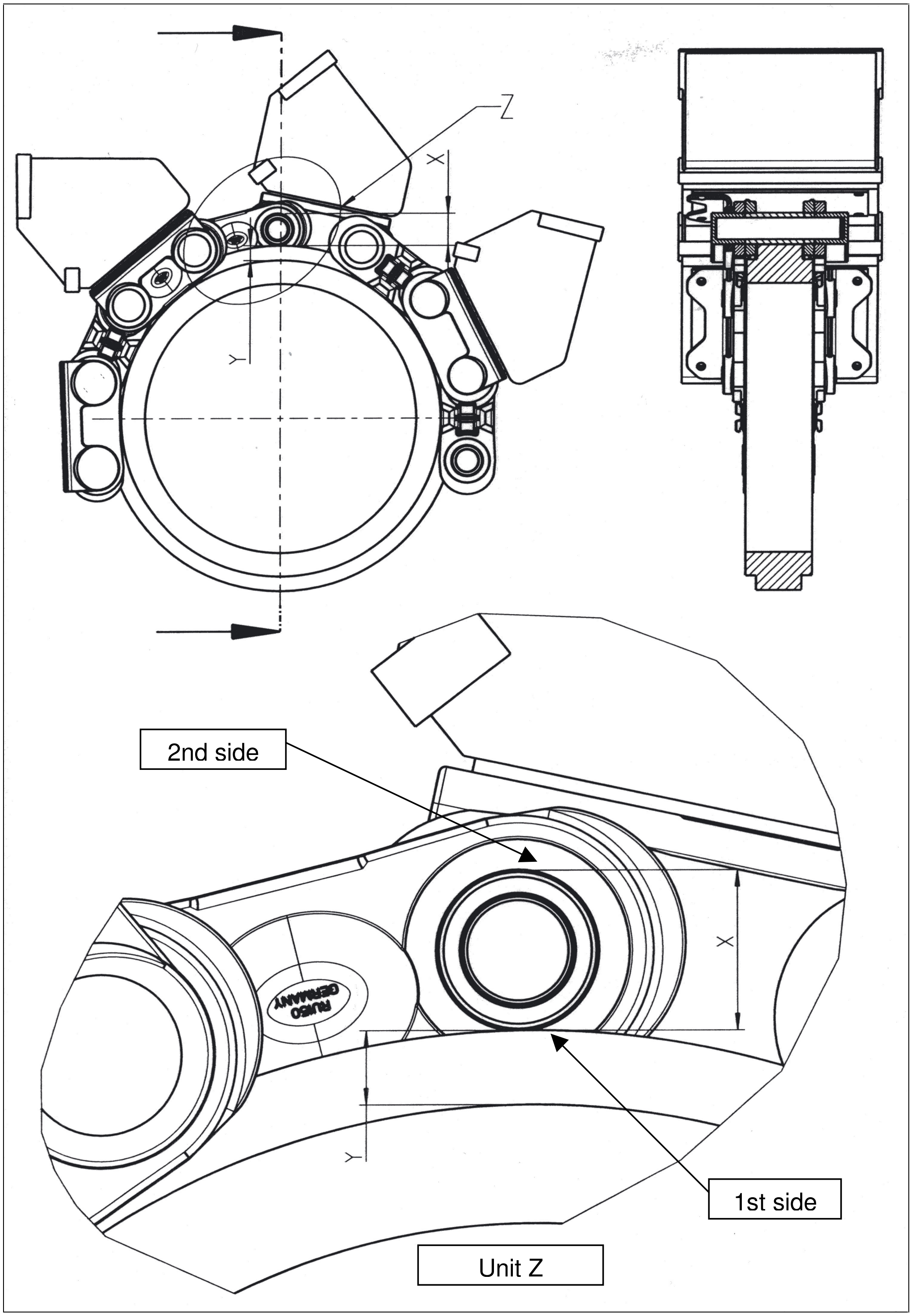

Figure 8

The chain has worn-out when one of the dimensions "a", "b_1", "b_2" or "c" exceeds the corresponding length stated in table 2. The chain should be turned if the dimension "X" on the running surface of the first side of the bush (see figure 8 page 7) is less than that stated in table 2. In this case, new drive segments must be fitted because experience has shown that their running surfaces have also worn out (dimension "Y"). If the longitudinal wear is about two percent, the gear tooth flank play must also be checked to see whether it is still in good working order for further operation. New toothed segments must be fitted if the gear tooth flank play has been used up. After the chain has been turned, it may be operated until the bush dimension of the running surface on the second side has reached the dimensions stated in table 2. The time for changing the chain can be approximately determined in advance from these measurements.

The chain is ready to be discarded when either the maximum longitudinal wear or the maximum wear on the bush has been reached.

RU System	Max. chain elongation "a, c" [mm]	Max. chain elongation "b_1, b_2" [mm]	Max. bush wear "X“ on 1st side [mm]	Max. bush wear "X“ on 2nd side [mm]
RU 80	240	240	51.5	49.5
RU 150	256	256	64	61.5
RU 200	286	251	75	72.5

Table 2