Technical Systems MARKET LEADER IN FEED CONVEYING	Title:	Work Instruction – Chain unlinking, linking and tensioning

APPROVAL FOR IMPLEMENTATION

Drafted by:	*Reviewed and approved by:*	*Reviewed and approved by:*
(sign)	(sign)	(sign)

Name	Megan Ockhuis	Date	10/09/2026	Name	Edmund Esau	Date	10/09/2026	Name	Alberto Louw	Date	10/09/2026

AMENDMENTS

Rev. No:	*Effective Date*	*Details of Amendments/Changes*
00	01/06/2017	New document for implementation
01	01/07/2020	Amendment 3.6 – Not recommended: Links to be removed (single drive) – circuit length 300 & 330
02	03/10/2025	Amendments to Sections 1 and 2. Section 1: Updated wording. Section 2: Updated all figures.
03	20/11/2025	3.9 added
04	07/09/2026	Amendments to 3.4 – Clarified how to identify when the slack has been taken up. Amendments to 3.6 – Link removal: Table 1 was updated to reflect the link removal values for 12m/min circuits, and then for circuits above 12m/min, for single- and dual-drive systems. The formulas in Table 2 were updated to match Table 1. Additional point added to ''Notes''. Amendments to 3.7 – Added Figure 18 and Figure 19. Amendments to 3.9 – Method A was converted to a partial (30%) loaded run. An additional note was added after Method B.

1. Purpose

The purpose of this document is to present a guideline to tension the chain by removing the suggested number of links.

SAFETY NOTE: It is advisable to wear the correct gloves and eye protection during this operation

EQUIPMENT REQUIRED:

- Chain Breaker (Figure 1) – Must be suitable for linking and unlinking the chain.
- 4 lb Hammer – Recommended for striking the chain as described in the instructions.
- Tensioning Tool (Figure 2) – Used to adjust the tension as required.

Figure 1: Chain Breaker

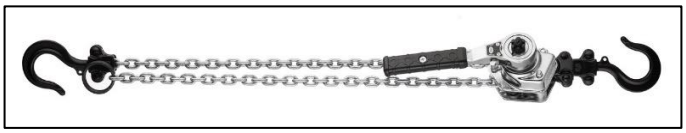

Figure 2: Tensioning Tool

2. Chain linking instruction

2.1. Chain link ''GO'' and ''NO-GO'' areas

Before linking or unlinking the chain, ensure that the linking mark is positioned on the nose of the chain (''GO'' area). Linking beyond this mark may result in premature breakage of the chain when under tension. Refer to Figure 3 and Figure 4

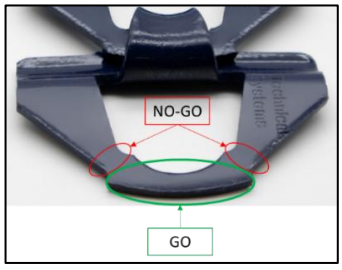

Figure 3: NO-GO & GO Areas Marked

Figure 4: Suitable mark in the ''GO'' area

2.2. Linking Procedure

Figure 5 to Figure 10 shows the important steps on how to link the feeder chain.

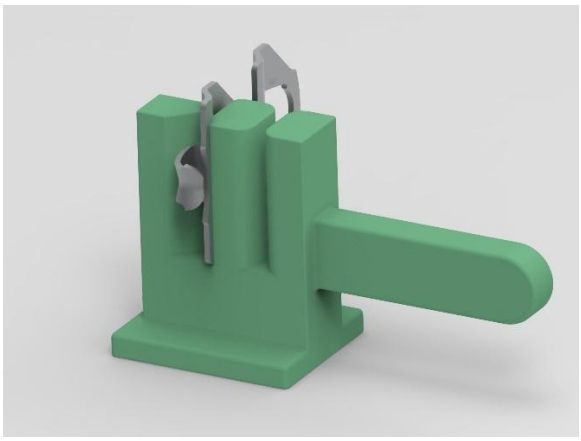

Figure 5: Place the knuckle end of the chain into the chain breaker with the knuckle protruding.

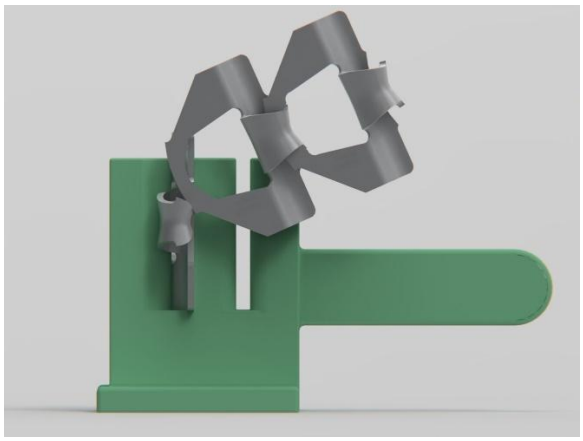

Figure 6: Place the next link next to the knuckle at the approximate angle and position as shown in the ''Go'' area.

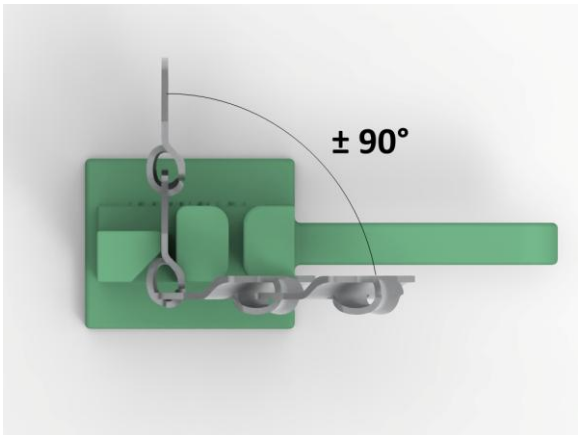

Figure 7: Ensure that it is in the correct position; bring the side of the link as close to the chain breaker as possible to get a right (90^o) angle.

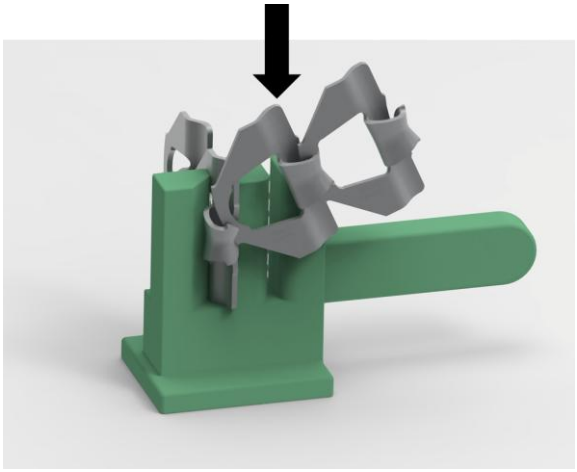

Figure 8: Using the hammer, firmly hit the corner of the chain link

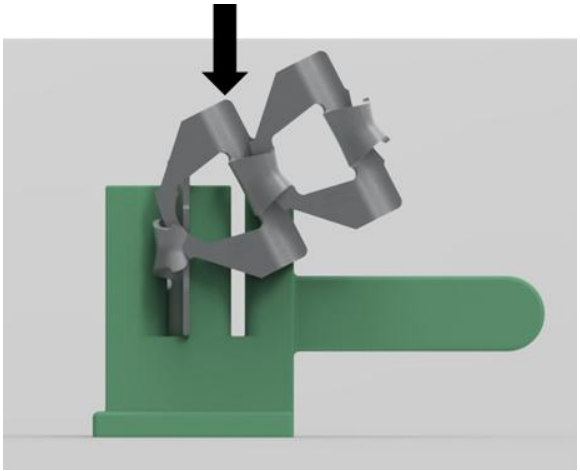

Figure 9: Continue hitting the link until it clips into the knuckle

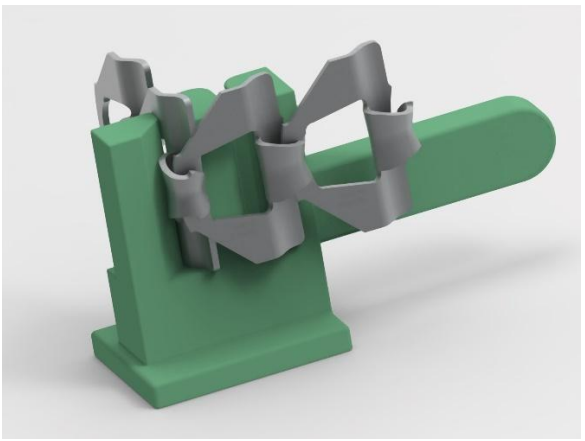

Figure 10: The link should be able to move freely. Ensure that the links were not damaged during the linking process (Refer to Section 2.3.).

2.3. Chain Link Condition

When connecting a chain link, it is recommended that the link not be struck more than four (4) times. If the link requires more than four attempts to connect, or if there are any signs of excessive damage marks observed – whether from the over-striking or from the link slipping during the initial attempts – the following action is required:

- The compromised link must be immediately removed (grind out, preferably) and replaced with a new chain link.

Damage marks include, but are not limited to, the examples shown in Figure 11 and Figure 12. Do not attempt to complete the installation using a damaged or overly-struck link. This step is essential to assist in preventing premature failure and to maintain the product's performance.

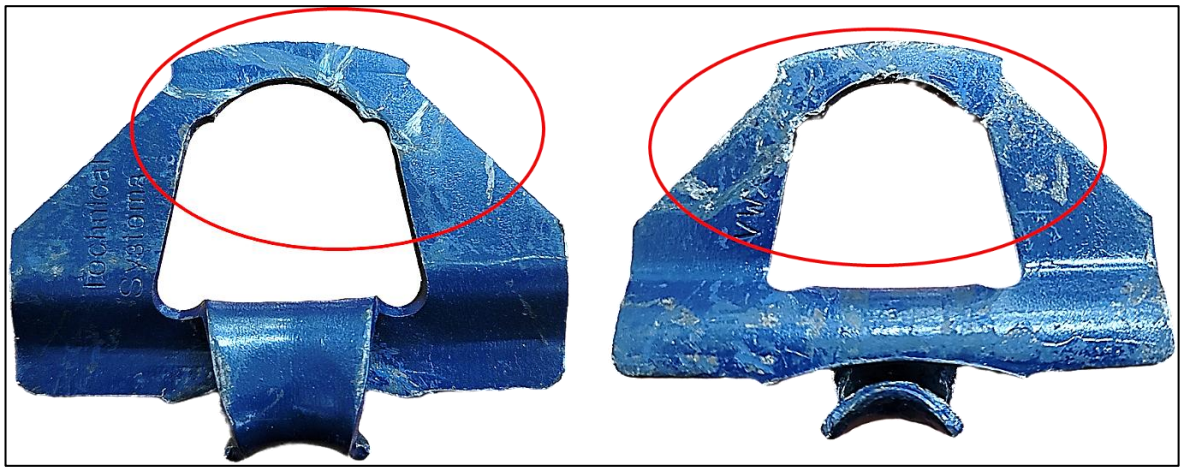

Figure 11: Excessive Linking Marks #1

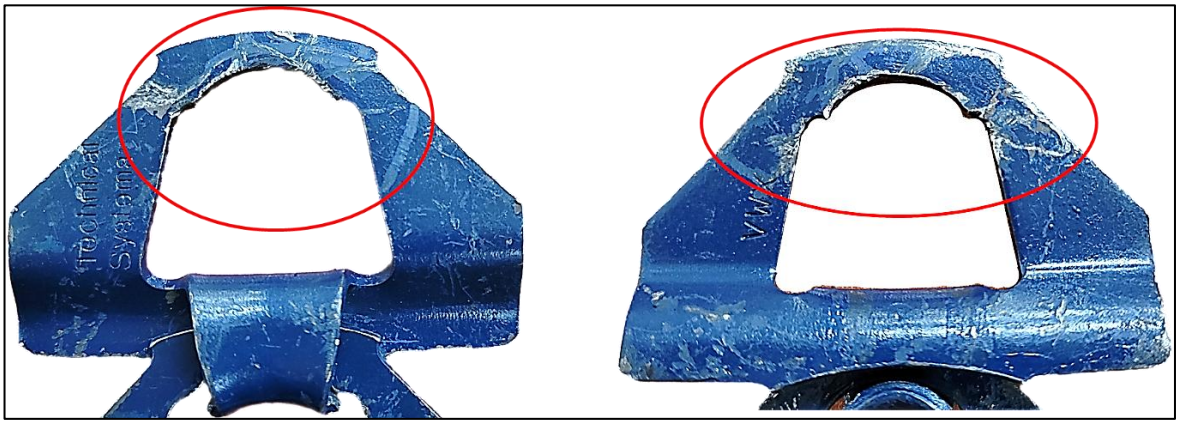

Figure 12: Excessive Linking Marks #2

3. Chain tensioning guideline

The following steps must be followed when tensioning the chain.

3.1 Assemble the required number of 10 m chain lengths to form the desired circuit length, e.g. assemble twenty-five 10 m chain lengths for a 250 m circuit.

3.2 Note that due to tolerances and manufacturing procedures, the exact length of a 10 m chain segment will vary between 10 m and 10.042 m (236 ± 2 links). i.e. if twenty-five 10 m chain lengths were used to construct a 250 m circuit, there may, in the worst-case scenario, be up to 1.05 m or 25 extra links in the circuit.

3.3 The chain must be placed in the circuit trough and the 2 ends brought together at the **circuit junction**. Refer to Figure 13.

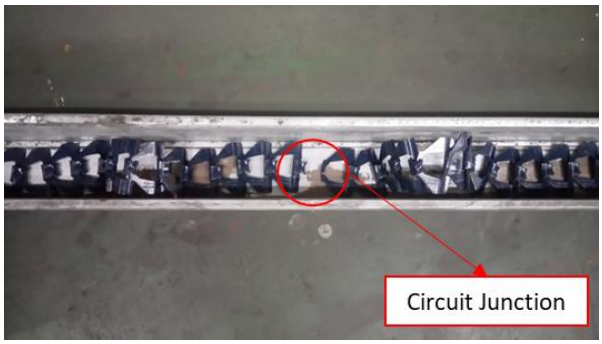

Figure 13

3.4 A tensioning device must be used to pull the chain through the circuit and remove all slack before the actual tensioning process begins (neutral position). The chain must be pulled until it is properly seated throughout the circuit, with the links correctly engaged and no loose sections remaining. When all the slack has been taken up, there will be a firm resistance on the tensioning lever. Refer to Figure 14 and Figure 15.

Figure 14

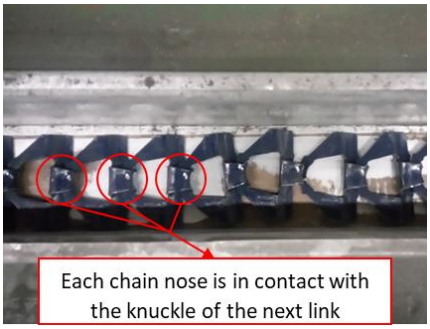

Figure 15

3.5 Any **overlapping links** at the **circuit junction** must be removed so that the entire chain is in the neutral tensioning position. Once the links are removed, the 2 ends of the circuit should touch or be within 1 link's distance of each other at the circuit junction. Refer to Figure 16 and Figure 17.

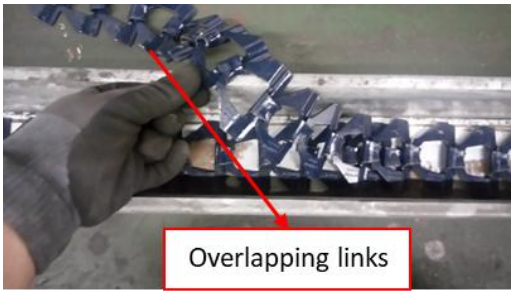

Figure 16

Figure 17

*Once the **overlapping links** are removed, the chain can be tensioned by removing a number of links based on the circuit length.*

3.6 Table 1 gives the number of links based on the circuit length and speed. These values are based on industry standards.

Table 1: Link Removal based on circuit length

Circuit Lengths		Single Drive (Link Removal)		Dual Drive (Link Removal)	
Total Length (m)	**Row Length (m)**	**12m/min Circuits**	**Above 12m/min Circuits**	**12m/min Circuits**	**Above 12m/min Circuits**
90	43	7	10	3	6
120	58	10	13	4	8
150	73	13	17	6	10
180	88	15	20	7	12
210	103	18	24	8	14
240	118	21	28	9	16
270	133	23	31	10	17
300	148	*Not Recommended*	*Not Recommended*	11	19
330	163	*Not Recommended*	*Not Recommended*	12	21
360	178	*Not Recommended*	*Not Recommended*	13	23
390	193	*Not Recommended*	*Not Recommended*	14	25

Alternatively, the following formula, as per industry standards, may be used to calculate the length of chain that needs to be removed:

Table 2: Formulas for Table 1

Description		Formula
Single Drive (Link Removal)	**12m/min Circuits**	$\frac{Total\ Length\ (m)\ \times 0.003749}{0.0424}$
	Above 12m/min Circuits	$(Total\ Length\ (m) \times 0.027812) + (''12m/\ min\ Circuits''\ \text{link removal})$
Dual Drive (Link Removal)	**12m/min Circuits**	$Total\ Length\ (m) \times 0.03691$
	Above 12m/min Circuits	$Total\ Length\ (m) \times 0.064722$

Notes:

- The circuit includes 4 corners of 90° each
- This is a guideline and should not be taken as 100% accurate; tensioning will vary for different circuit set-ups
- The calculations above were made on the assumption that within the Dual Drive circuit the drive units are opposite one another.

3.7 Once the recommended links are removed, the circuit should be tested for tension issues. During the testing, the chain should not rise in front of the sprocket. If this happens, it means that the chain is **under-tensioned.** The chain should always remain parallel to the trough. If the chain is angled towards the inside of the circuit, it means that the chain is **over-tensioned.** Refer to Figure 18 and Figure 19.

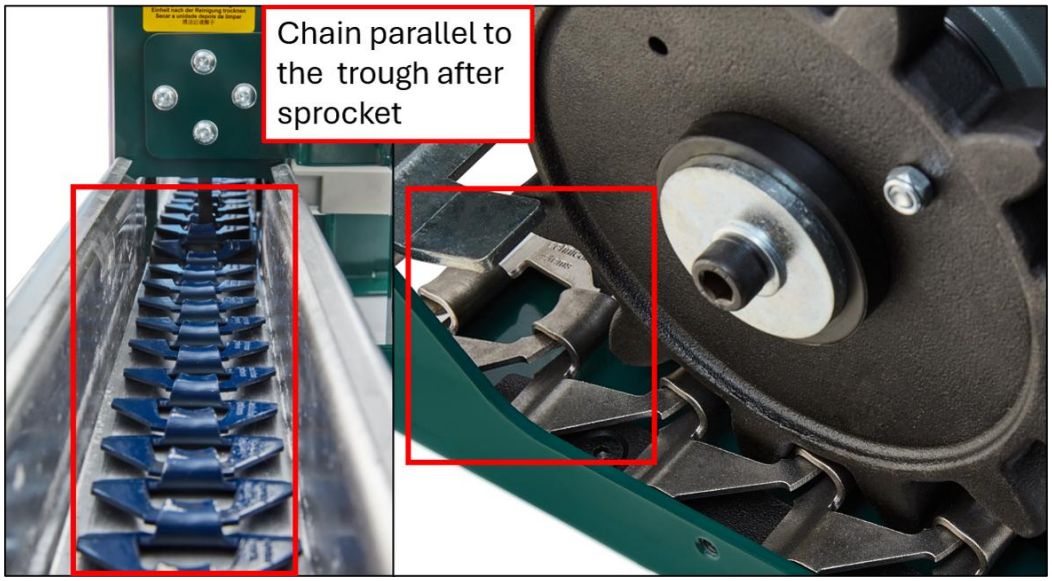

Figure 18: No Lift after sprocket

Figure 19: Lifting after sprocket - Under tension

3.8 The above tests will determine whether more links need to be removed or added to the circuit to achieve the desired tension.

3.9 Following the initial setup and tensioning confirmation, a mandatory run-in period is required to allow the chain to settle to the correct tension. This can be done using Method A or Method B:

- **Method A: Partial Loaded Run-In (30% Loaded)** Run the installed circuit with a 30% feed load for thirty (30) minutes (it is important to inspect the circuit during this phase for any obstruction and/or over-tensioning that could affect the performance of the system as a whole.), then power down the system completely to let the chain settle in a static state. Inspect the links for slack or misalignment, and apply final tension adjustments (if necessary) before putting the system into full operation.

- **Method B: Operational Run-In (Loaded):** Operate the circuit under full operational load for a period of one (1) week. Afterwards, inspect tension and apply adjustments if required. The feed level will affect the tension if the troughs are run at maximum capacity. As it is heavier and more force is added to the chain, it is expected that 1 to 2 extra links may (if necessary) need to be removed to achieve the correct working tension.

- It is important to note that with the adjustments being made to the tension of the circuit, the circuit should maintain optimal tension and not be over-tensioned.

3.10 The circuit should be **inspected every 6 months** for tension issues