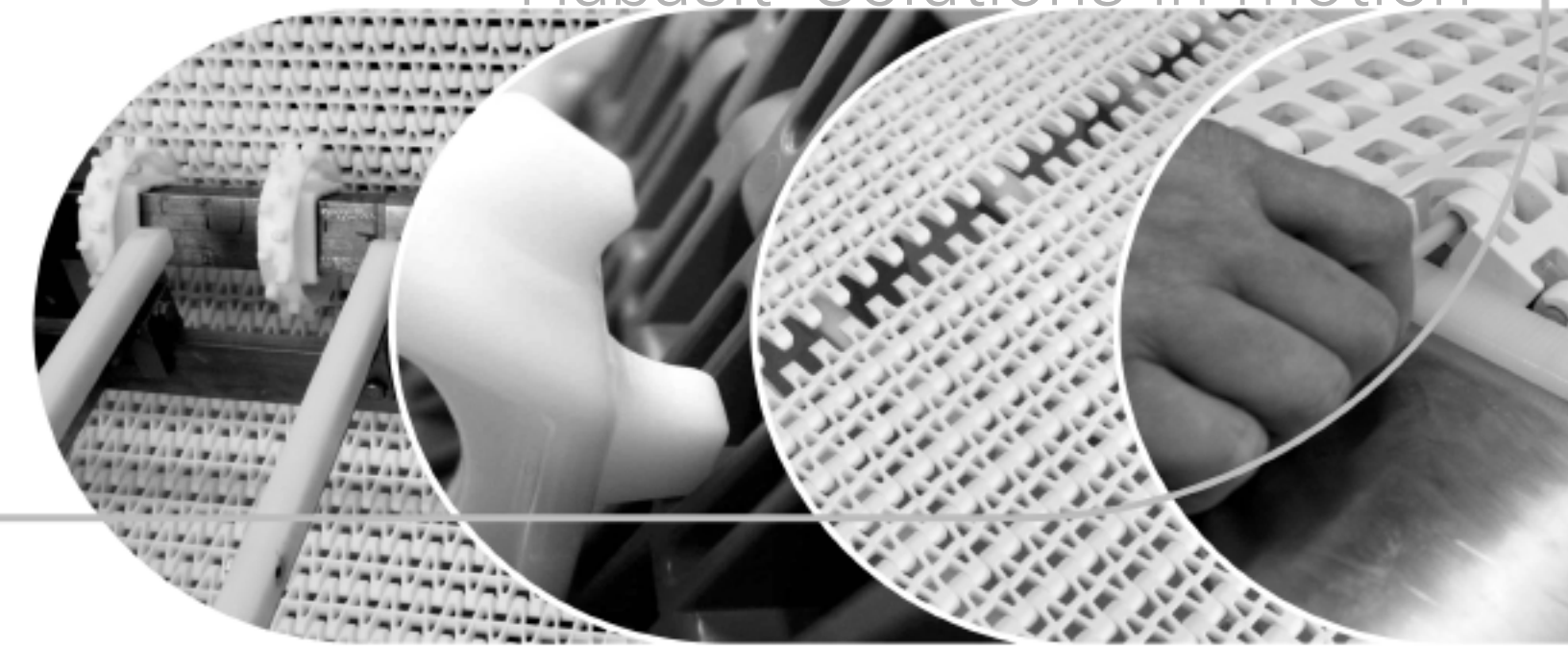
Services
6100US

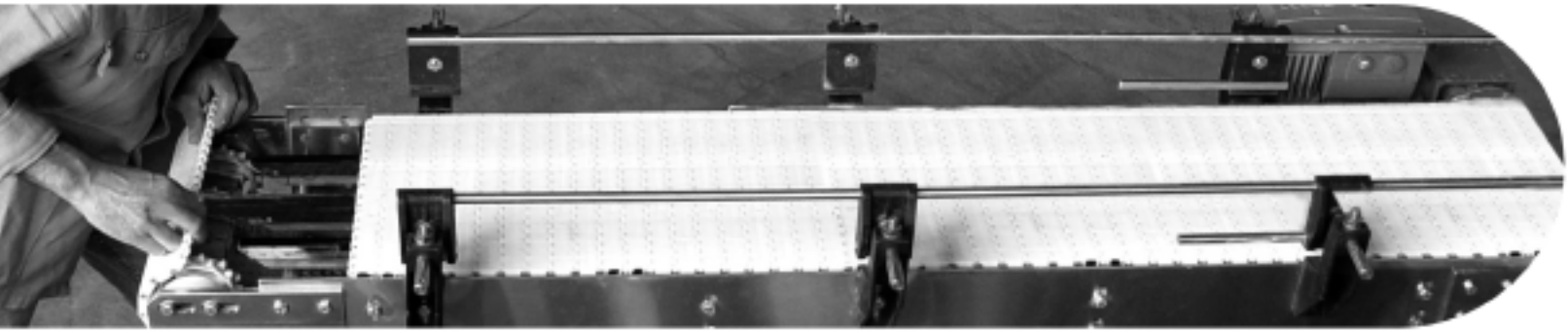
Installation Guidelines

HabasitLINK®

the smart modular belt

Habasit–Solutions in motion





Contents

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The quality management system of HBI is registered to ISO 9001:2000 by AQA International, LLC

Revised 3/04

1. Basic Installation Instructions

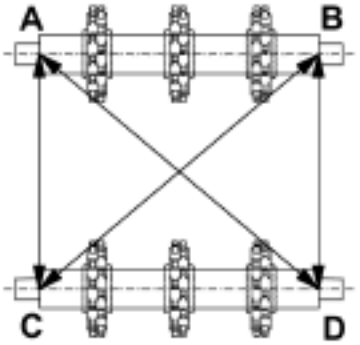
1.1 Shaft and sprocket installation

1.1.1 Shaft installation and alignment

Correct shaft alignment is important for proper belt function and improves life expectancy.
Conditions to be maintained:

- Correct belt tracking → AD = BC

If the shafts are not placed in correct relation to each other, belt mistracking can occur.



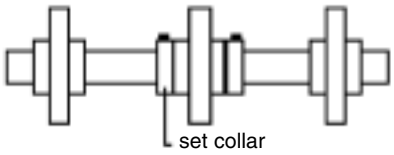
End view:
For proper belt function and sprocket engagement maintain E = F (shaft shall be horizontal)

1.1.2 Sprocket installation: General

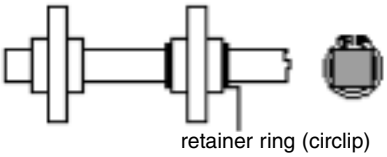
In order to allow the belt to expand/contract, only the center sprocket on each shaft is fixed. For shafts with two sprockets, the sprocket on the drive side is fixed. Various locking methods are possible:

- Set screws and set collars
  Mainly used with round shafts on key-ways
- Retainer rings
  For square shafts (no key-ways needed)
- Retaining plate
  Simple low-cost method for square shafts

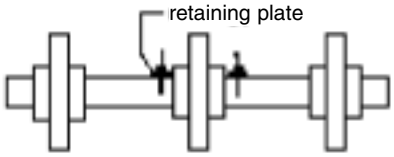
There should be a gap of at least 0.3 mm *(0.01")* between sprocket hub and retaining device. All devices must be securely fastened.



Type: Set screws and set collars



Type: Retainer rings



Type: Retaining plate

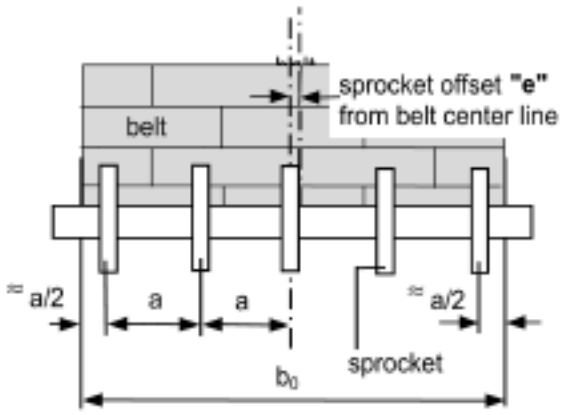
1. Basic Installation Instructions

1.1.3 Positioning and spacing of sprockets

The sprockets must be evenly distributed over the belt width.

The number of sprockets (n) must be evaluated from the corresponding table of the Product Data Sheet. For sprocket spacing, see illustration and table.

The center tracking sprocket must be installed either in the middle of the belt or offset. The middle sprockets of 0.5" belts are always in the belt center. For other belt pitches, the offset value “e” is established as follows:



Divide the belt width by the link increment (see formulas in table). The result will be either an even or an odd number. These numbers are the criteria for offset or no offset, see table below.

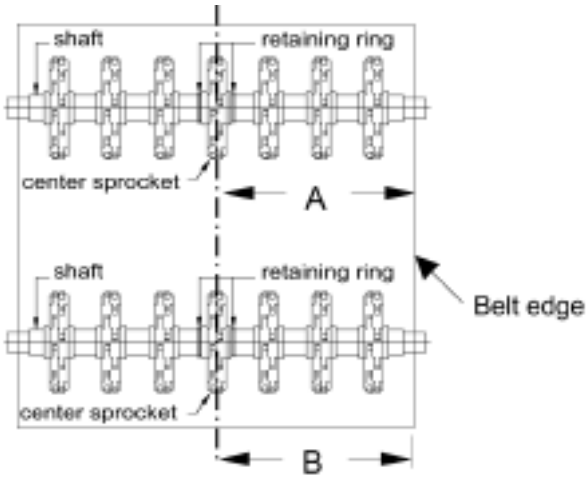
Belt pitches	Sprocket distances a	Formula	Result of formula	offset “e” mm	Remarks
0.5"	multiple of 16.66 mm			0	no offset for all belt widths
1"	multiple of 16.66 mm	$\frac{b_0}{16.66}$	equal number (2, 4, 6...)	8.3	offset to the right or left side
			odd number (3, 5, 7...)	0	no offset
2"	multiple of 18.75 mm	$\frac{b_0}{18.75}$	equal number (2, 4, 6...)	0	no offset (all standard width uncut)
			odd number (3, 5, 7...)	9.4	offset to the right or left side
radius belt M2540	multiple of 16.66mm	$\frac{b_0}{16.66}$	equal number (2, 4, 6...)	4.2	offset **to the right** in running direction*
			odd number (3, 5, 7...)	4.2	offset **to the left** in running direction*
radius belt M2543	multiple of 16.66	$\frac{b_0}{16.66}$	equal number (2, 4, 6...)	4.2	offset **to the left** in running direction*
			odd number (3, 5, 7...)	4.2	offset **to the right** in running direction*
radius belt M3840	multiple of 25mm	$\frac{b_0}{25}$	equal number (2, 4, 6...)	6.3	offset **to the left** in running direction*
			odd number (3, 5, 7...)	6.3	offset **to the right** in running direction*

*For definition of running direction, refer to 2.1.

1. Basic Installation Instructions

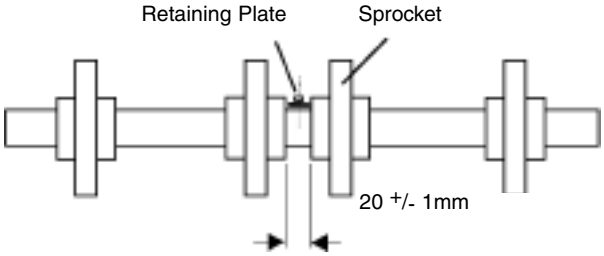
1.1.4 Tracking

For proper belt tracking and straight belt run it is important to install the fixed sprockets perfectly aligned. A and B must be equal



Tracking of M5010, M5011, M5013, M5014

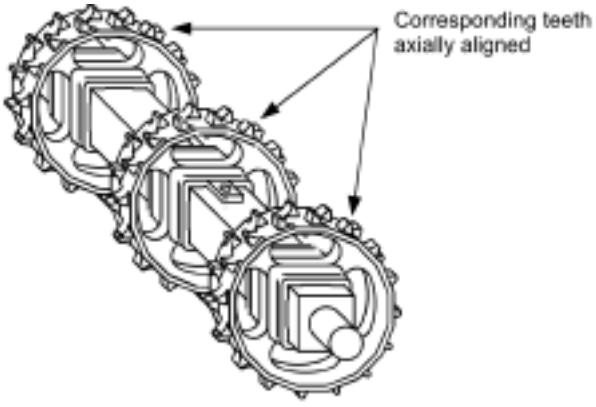
The molded standard sprockets are for tracking the belt, leaving some transversal clearance (approx. ± 2.5 mm/*0.10"*). This is of advantage in food applications with very critical cleaning requirements, e.g., in the meat industry. For other applications, it might be desirable to reduce this clearance in order to provide accurate tracking performance. The most common way to do this is to fix the two center sprockets instead of only one. These two sprockets are both located on the shaft at a fixed distance by one center fixing plate of 20 mm *(0.79")* width.

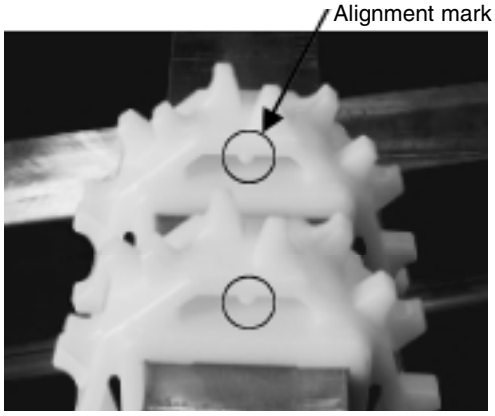


Distance of Sprocket Hubs (for M5010/-11/-13/-14)

1.1.5 Sprocket alignment on the shafts

While installing the sprockets on the shafts, it is important to make sure that the teeth of all sprockets are correctly aligned. For this purpose, the sprockets are normally provided with an alignment mark (see illustration right side below). If the number of sprocket teeth is a multiple of 4, any radial orientation of the sprocket on the shaft is possible.





1. Basic Installation Instructions

1.2 Support structure

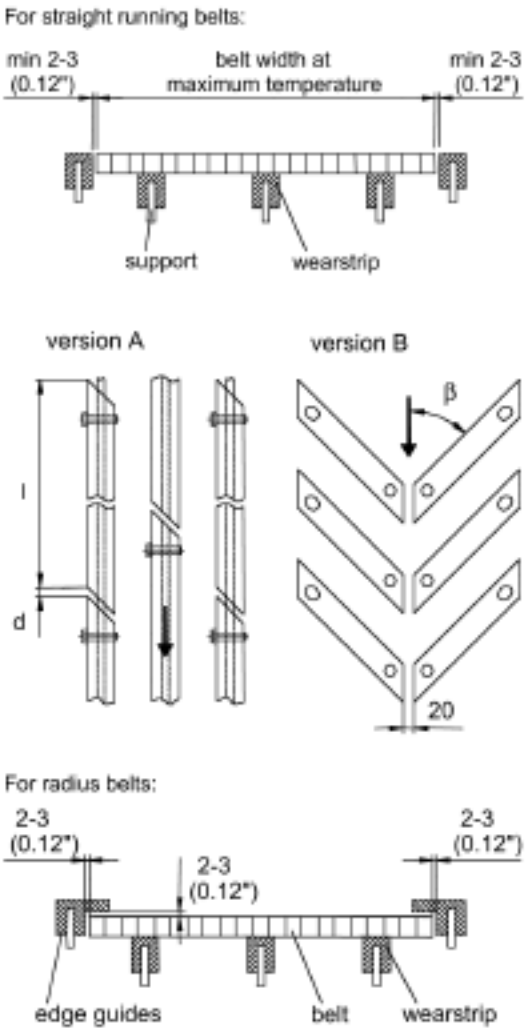
1.2.1. Wearstrip Installation: Basics

The supports consist of strips made from high-density polyethylene, other suitable low-wearing plastics, or metal (see Engineering Guidelines). Supports must be level and symmetrical. High spots or catch points can force the belt to "track" (shift to one side or the other).

1.2.2 Wearstrip arrangement

A The parallel wearstrip arrangement. This is the most economic method. For reduced belt wear, the parallel wear strip segments may be arranged alternating offset instead of in-line or as serpentine strip.

B The V-shaped arrangement of wearstrips (Chevron or Herringbone type). This provides equal distribution of load and wear over the total belt width. The max. distances between the wearstrips must be 100 mm *(4")* for 2" belts and 50 mm *(2")* for 1"/0.5" belts. Max. angle β =45 °.



For the **proposed number of wearstrips, see Product Data Sheet.** For both versions A and B, it is important to allow for thermal expansion or contraction of the strips. Formula to calculate the necessary clearance d:

$$d\ \Delta l = l/1000 \bullet \alpha \bullet (T - 20\ °C)\ [mm]$$

l = length at installation temperature (20 °C) [mm]
T = max. operation temperature [°C]

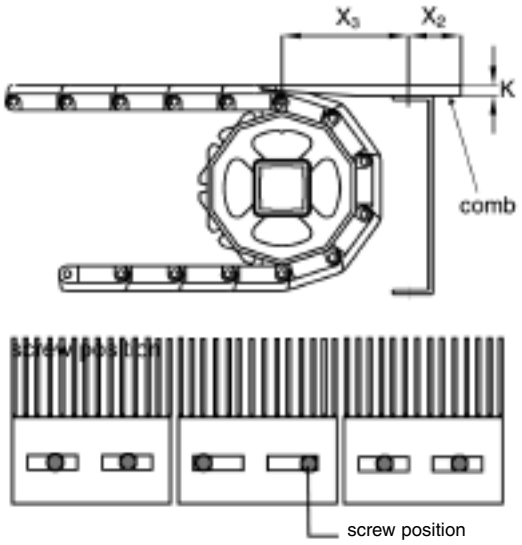
Material	Coeff. of linear thermal expansion α [mm/m • °C]	
	-73 – +30 °C *-100 – +86 °F*	+31 – +100 °C *+87 – +210 °F*
UHMW /HDPE	0.14	0.20
PA6, PA6.6	0.12	0.12
PA6.6 prelubricated	0.06	0.06

1. Basic Installation Instructions

1.2.3. Finger plate and dead plate installation

Finger plate (comb)

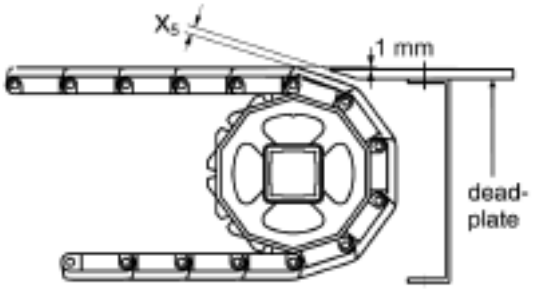
For main dimensions and instructions for finger plates, see Product Data Sheet. The plates are provided with slots. Special bushings and screws are delivered with the plates that allow free lateral movement for compensation of thermal expansion or contraction of the belt. For belt width up to 300 mm, the plates can be firmly fixed.



	M5031 Finger plate		M2531 Finger plate	
	mm	*inch*	mm	*inch*
X_2	50	*2*	50	*2*
X_3	100 – 110	*4 – 4.3*	80 – 90	*3.2 – 3.5*
K	10	*0.4*	10	*0.4*

Dead plates for product transfer

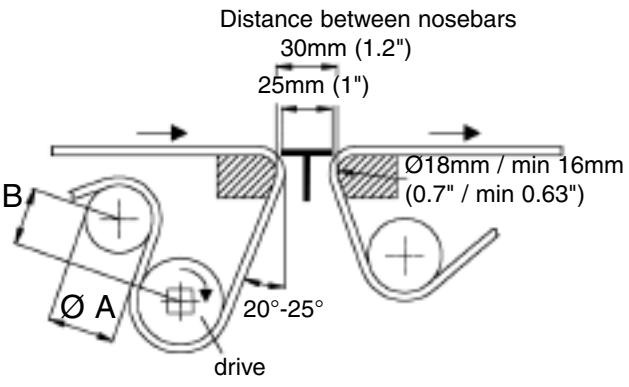
Dead plates are used for product transfer at the conveyor ends of flat top and flush grid belts. The discharge end should be adjusted to 1 mm *(0.04")* below the belt surface and the infeed end 1 mm *(0.04")* above the belt surface. The gap (X_5) varies during belt movement but should be as small as possible when the belt hinge passes the edge of the plate.



Edge transfer for Minipitch Belts M1220, M1233

Minipitch belts M1220 and M1233 are perfectly suitable for small idling roller diameters or "nose bars". The frame dimensioning has to follow the specifications of the illustration below.

A:	Min. backbending roller diameter	M1220	80 mm *(3.15")*
		M1233	75 mm *(3")*
B :	Min. straight belt section between drive and snub-roller		50 mm *(2")*

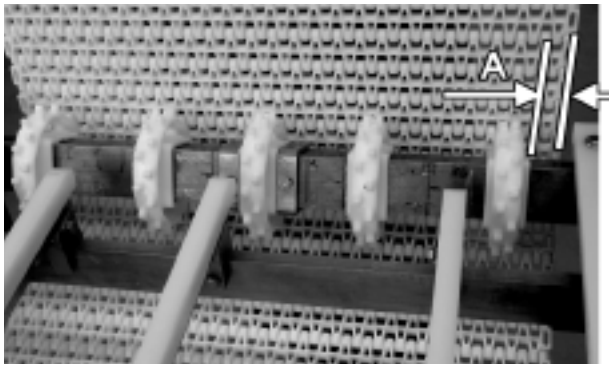


1. Basic Installation Instructions

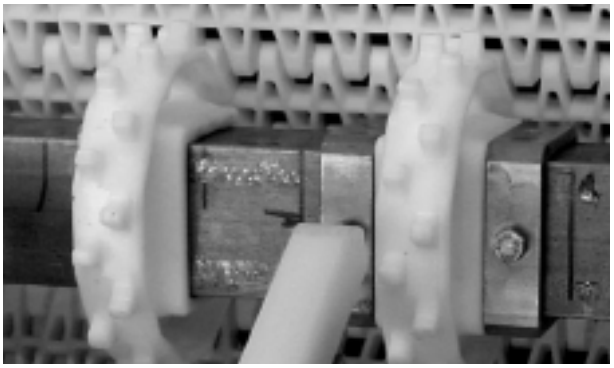
1.3 Belt Installation

1.3.1 Position belt on conveyor frame

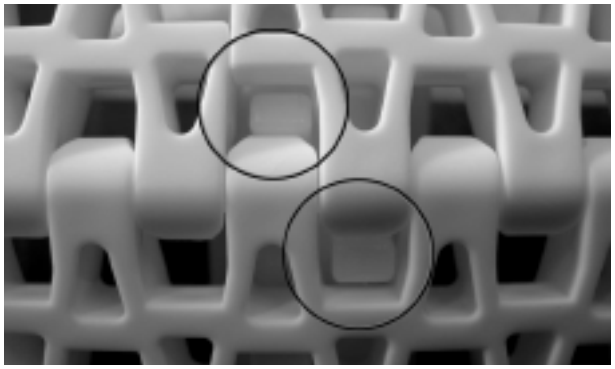
Example: 1" Flush Grid, M2533 (also: Flat Top M2520, Raised Rib M2531)



Place belt end on sprockets and position carefully.
Min. distance A of sprocket from edge: 16 mm.



Ensure that all sprocket teeth are engaging properly; center sprocket axially fixed.

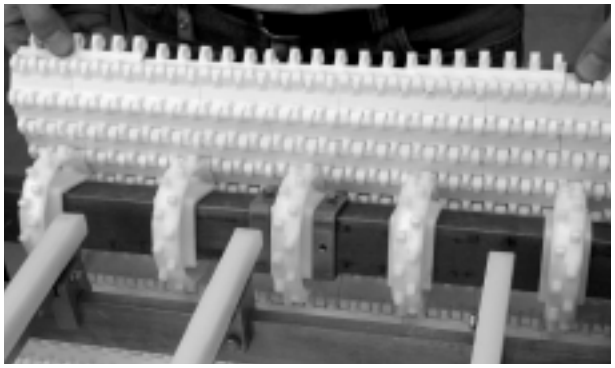


On Flush Grid belts, check the teeth engagement from the top.

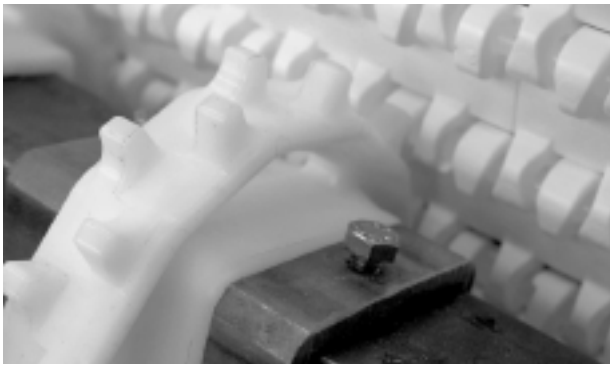
Move both belt ends until they interlink correctly.

1. Basic Installation Instructions

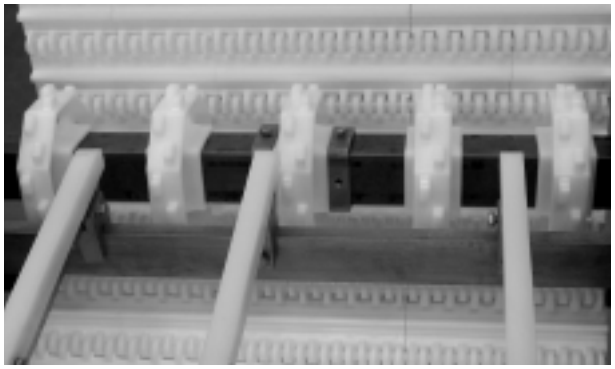
Respect the individual requirements for correct sprocket engagement for each belt style. The following types are typical (straight belts):



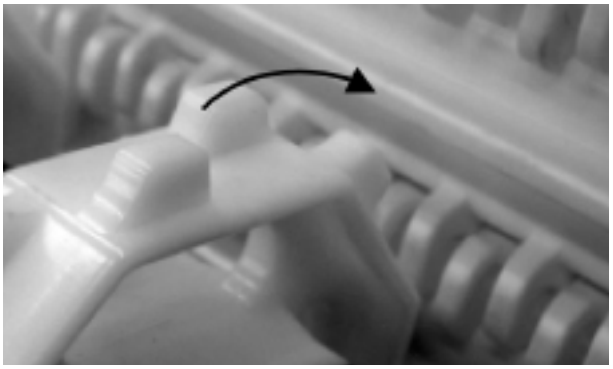
Flat Top 1" M2510 (also: M2511).



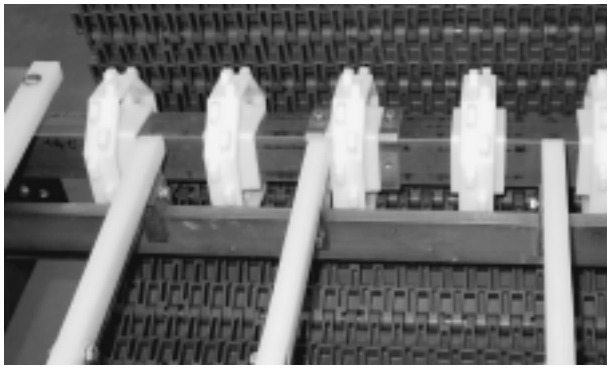
Curved faces of teeth engage on hinge (link-eyes).



Flat Top 2" M5010 (also: M5011/-13/-14).



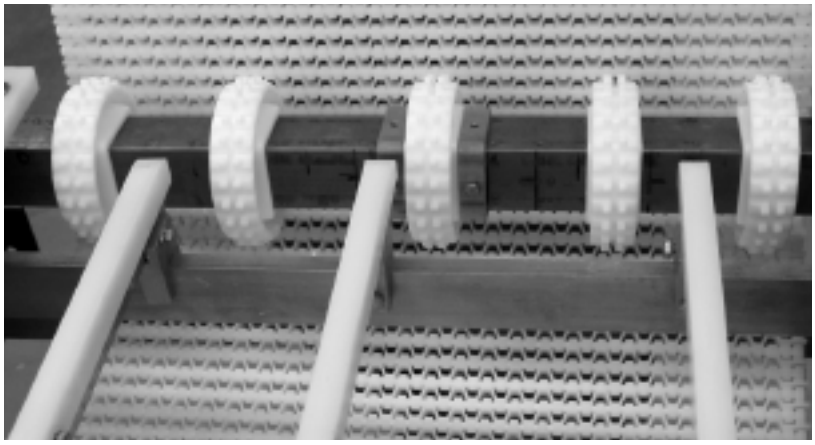
Straight faces of teeth engage on cross rib.



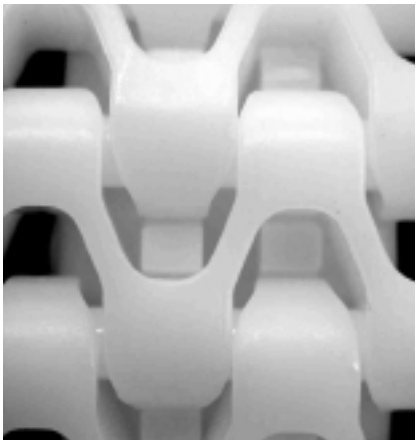
Flat Top M5020 (underside).

Straight teeth faces on cross rib, curved faces on round link ends.

1. Basic Installation Instructions



Minipitch belt M1233 (also: M1220).
Engagement of sprocket is possible in every position.



Check proper engagement from top side.

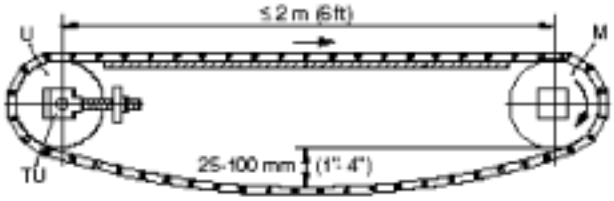
1.3.2 Belt length adjustment: Catenary sag

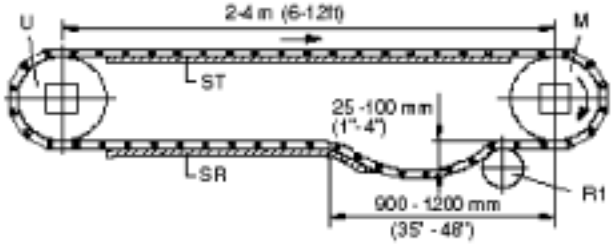
Modular belts typically change their length under varying operational conditions of temperature and load. The extra belt length is accommodated by providing an unsupported section of the return way for catenary sag.

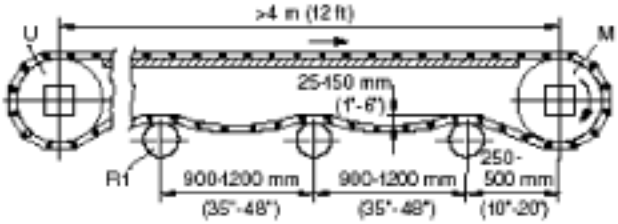
Concerning the dimension of the catenary sag, please refer to the illustrations.

If necessary, adjust belt length to achieve proper catenary sag for the belt tension. This can be accomplished by adding or removing belt rows or by adjusting a take-up, if there is one.

The illustrations show typical examples. For other cases, particularly elevators and radius belts, please refer to the Engineering Guidelines.



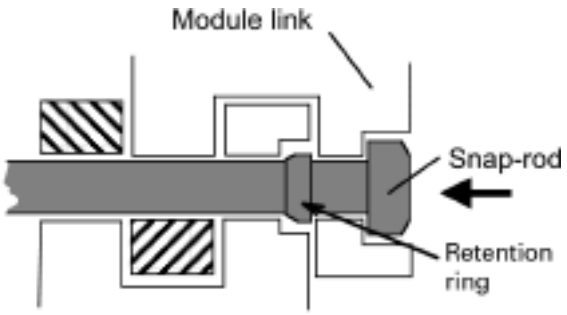




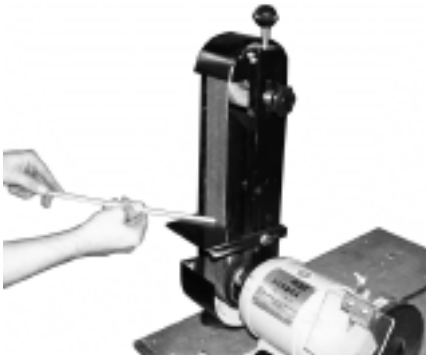
1. Basic Installation Instructions

1.3.3 Inserting pivot rod

After belt length is defined, the belt will be made endless by inserting a pivot rod.



Function of the snap-rod system.



Beveling of rod end.

Insert rod.

Gently tap its head into retaining position.

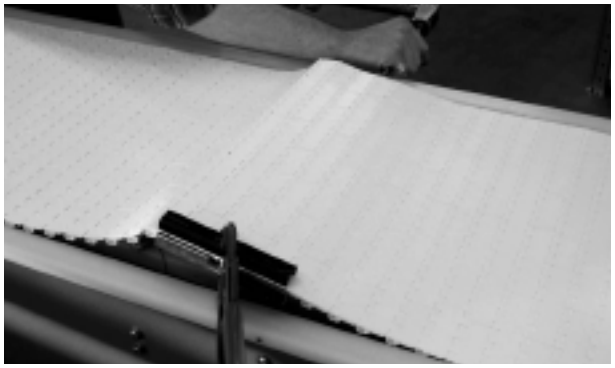
Cut protruding rod end slightly behind belt edge.

The rod ends can be more easily inserted if the free end is beveled slightly using a grinding tape or a "pencil sharpener-type" machine (see illustration).

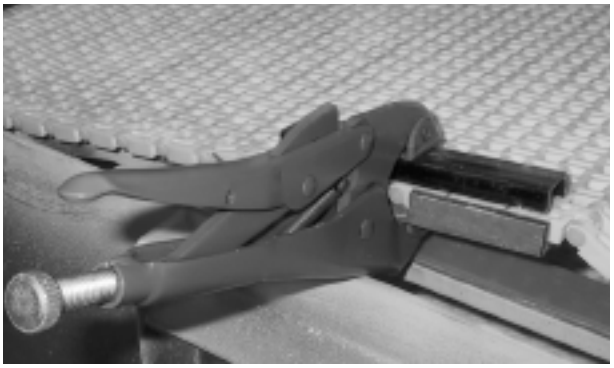
For occasional cutting and during installation on site, manual side cutter (pair of snips) is sufficient.
The length of the cut rod is finally defined after inserting the rod into the belt hinge.

1. Basic Installation Instructions

1.3.4 Removal of belt for service: Removing rod

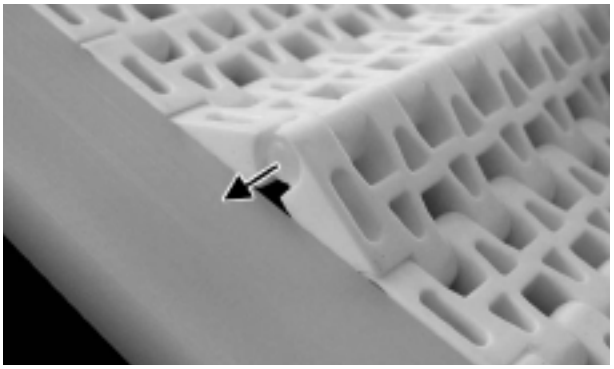


Extract rod using a punch and hammer.

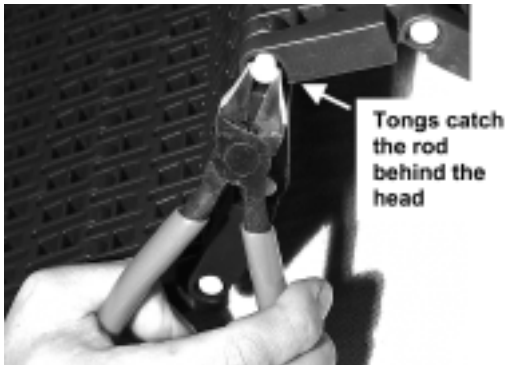


On opposite belt edge, secure the modules with help of clamp, as shown.

Punch rod out of retaining head by striking the rod end opposite to retaining head.



If no clamp is available (see 11), support module on opposite belt edge!

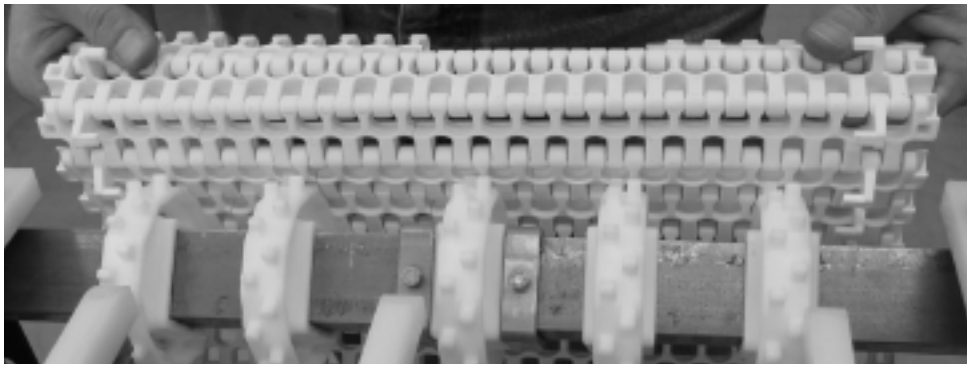


Optional: Extract the rod using a side cutter.

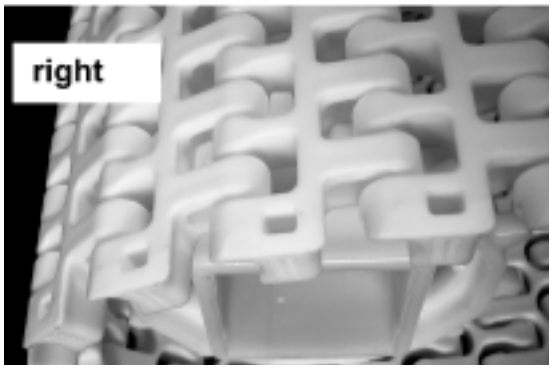
2. Radius Belts

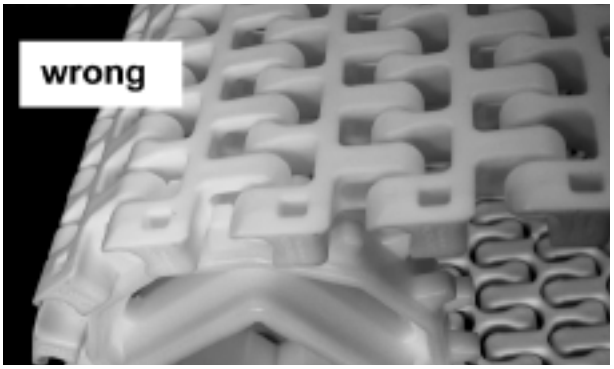
Specific requirements to be considered for installation of radius belts:

2.1 Belt installation M2540, M2543, M3840, M3843



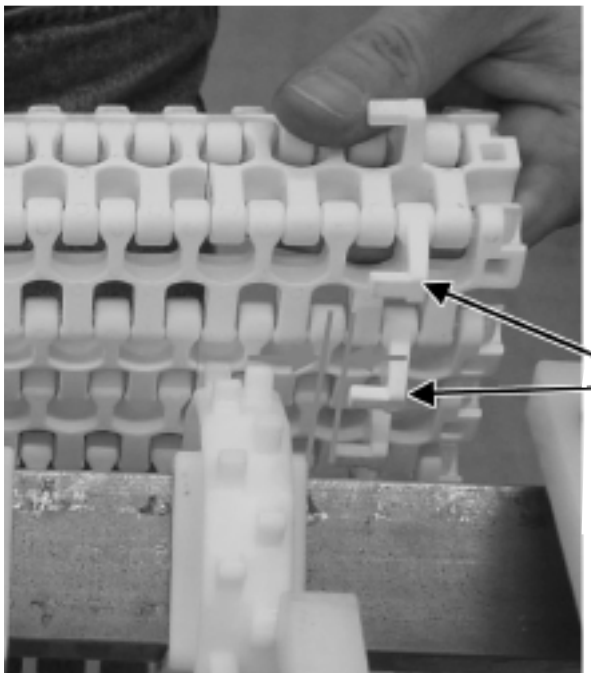
Radius belt M2540 (also: M2543, M3840).
Sprocket engages with curved tooth face on round link end.





Sprocket must be positioned at a min. distance of
16 mm from edge.

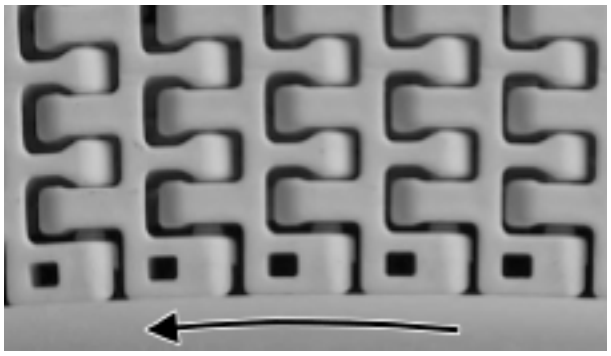
2. Radius Belts



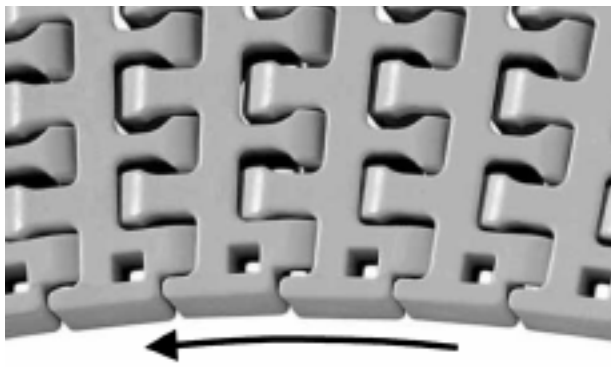
Important for radius belts:

- Maintain sufficient clearance between Hold Down Tabs (Hooks) and the sprocket.

- For radius belts with extra-short length between drive shaft and curve (< 1,5 x belt width) the distribution of the sprocket may not be equal but rather concentrated at the outer edge of the belt. Please consult the Engineering Manual or contact Habasit.



M2540



M3840

Preferred direction of movement

All Habasit radius belts may be used in both running directions (bidirectional).
The offset positioning of the sprocket (1.1.3) relates to the "recommended or preferred" running direction.The links with slots are directed forward. This direction is illustrated for the M2540 and M3840; it can be applied for M2543 accordingly.

2. Radius Belts

2.1.1 Rod insertion

In general, it is not important from which belt edge the rods are inserted. If the belt runs through only one curve, insert the rod on the outside edge of the belt.
Since the radius belts have the rod heads recessed into the belt edge, it is recommended to use a tool similar to that shown in the illustrations below.

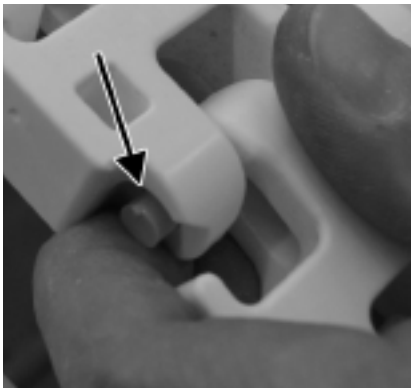
Assembly on the table:
Rod insertion using a chisel and hammer.

On the machine.

Rod head is recessed; use chisel and hammer.

2. Radius Belts

Cut the excess rod length right back to the level of the link face. This can be done more easily if you measure the belt width and precut the rod prior to insertion.



This illustration shows the max. allowable length after installation. Example: M3840.

For the removal of hinge rods, follow the same principles as for straight belts.

3. Preventive Maintenance and Troubleshooting

3.1 Maintenance and inspection

HabasitLINK® modular belts are designed to be as maintenance-free as possible. However, as with all dynamic machinery, conveyors can be exposed to impacts, abrasive conditions and wear that require attention. This guide offers you assistance in diagnosing and solving any mechanically related problem that may arise. For further assistance, call your local Habasit representative.

3.1.1 Which incidents should be reported?

- In case of belt edge damage, an immediate investigation is necessary to prevent further, more serious damage.
- Any mistracking or sprocket disengagement, as well as excessive wear, should be corrected as soon as possible. If left uncorrected, more serious damage can occur.
- Take corrective action in case of missing or damaged return rollers, shoes, or wearstrips.
- Damaged or missing belt modules should be replaced as soon as they are discovered. The belt will probably continue to operate adequately. However, this kind of damage can affect the strength integrity of the belt and contribute to further damage, and the conveyed product could also be damaged.
- Replace any rods that are protruding out of the belt (or missing rods) as soon as they are discovered.

3.1.2 Inspection after one month

After one month of operation, it is recommended that belt performance and installation be checked as follows:

- Check the catenary sag height and adjust if necessary. One or more module rows might have to be taken out in order to adjust for normal belt lengthening after start up.
- Check the belt (top and bottom), sprockets, and wearstrips for signs of wear or damage (cuts, gouges, etc.).
- Check sprockets for proper engagement with the belt and location (transversely) on the shafts.
- Check belt return system for worn or damaged rollers, shoes, or wearstrips.
- Check connecting rods for damage or excessive wear.

Investigate the cause of any accelerated wear and plan for adjustments or take corrective action in a timely manner.

A thirty-day inspection interval is recommended for maximum lifetime of the system. This will also allow you to spot any wear trends and develop a feel for the operational characteristics of your HabasitLINK® belt. Observation, timely reporting of operational problems, and regular inspection and maintenance at roughly thirty-day intervals should ensure a maximum useful lifetime.

For further assistance, please contact your Habasit representative.

3. Preventive Maintenance and Troubleshooting

3.1.3 Cleaning

In order to avoid contamination, build-up of material, or abrasion from carried products, frequent cleaning is recommended. Such contamination can cause increased wear of the modular belt, sprockets, and wearstrips. Thorough and regular cleaning is therefore very important.

Conveyors that sit idle for a long time before start-up should be covered to prevent accumulation of dirt and debris on chain and tracks.

Recommended cleaning frequency:

1. Food lines: These lines should be cleaned very frequently and in accordance with local requirements or regulations to obtain maximum hygiene and performance. For cleaning procedures please follow OEM instructions.

2. Non-food lines: For cleaning procedures please follow OEM instructions.

General guidelines for cleaning solutions:

Recommended pH of 4-10.
Avoid chlorine and iodine.
With POM and PA, avoid strong acids such as hydrochloric acid, sulfuric acid, phosphoric acid, etc. For quick reference concerning chemical resistance, see to HabasitLINK® Engineering Manual.

3.2 Wear measurements

Normal belt and sprocket wear

The lifetime of a belt and sprocket is influenced by many factors, such as environmental conditions, contact with chemical agents, maintenance, etc. Good knowledge of the operation and environment is important to ensure a better lifetime prediction and a longer lifetime. For the correct belt and sprocket selection and methods to ensure appropriate belt life, refer to the Habasit Engineering Guidelines.

Belt and sprockets need to be replaced before excessive wear affects proper driving performance and sprocket engagement.

3. Preventive Maintenance and Troubleshooting

3.3 What to do if. . .

⇒ Tracking problems

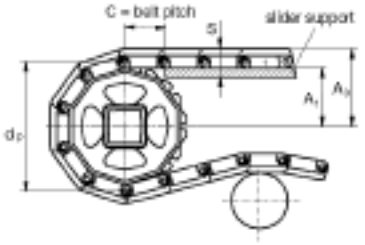
Possible cause	Proposed measures
Sprockets are not "timed" correctly	If the total number of teeth are not divisible by 4, the sprockets must be "timed" by alignment of the timing marks.
Sprockets on drive and idle shaft misaligned; locked sprocket on drive or idle has incorrectly placed or is loose	The center sprocket on the drive and idle shafts must be aligned and engaging the belt. Check the retaining devices to ensure the sprockets are secured.
Conveyor frame not level and square	Check and adjust if necessary
Drive and Idle shafts are not level and square with each other	Check and adjust if necessary to ensure that drive and idle shafts are level and square
Mis-splice in belt	Inspect belt for a mis-splice.

⇒ Sprocket engagement fails

Possible cause	Proposed measures
Incorrect "A" and "C" dimensions (see Design Guide).	Check to see that the shaft is adjusted to provide for the recommended "A" and "C" dimensions (see separate Design Guide).
Sprockets not timed correctly	If the total number of teeth are not divisible by 4, the sprockets must be "timed" by alignment of the timing marks.
Insufficient belt tension	Check to see that there is sufficient length for catenary sag located at the recommended area (see page 11).
Arc of contact too small	Min. arc of contact between belt and sprocket approx 150°. In critical cases, increase the arc of contact to ≥ 180° by installation of support roller (see page 11).

⇒ Excessive sprocket wear

Possible cause	Proposed measures
Abrasive material	Improve cleaning or add protective shields to reduce the amount of abrasive material contacting the belt and sprockets. Call Habasit for abrasion-resistant sprockets.
Incorrect number of sprockets	Check to see if the minimum number of recommended sprockets is used. Too few sprockets will cause premature sprocket wear.
Sprockets not timed correctly	If the total number of teeth are not divisible by 4, the sprockets must be "timed" by alignment of the timing marks.
Incorrect "A" and "C" dimensions	Check to see that the shaft is adjusted to provide for the recommended "A" and "C" dimensions (see separate design guide).
Locked sprocket on drive or idle has incorrect placement or is loose (sprockets misaligned)	The center sprocket on the drive and idle shafts must be aligned and must engage with the belt. Check the retaining devices to ensure the sprockets are secured.
High belt speed	High belt speeds will increase the wear, especially on conveyors with short centerline distances. Reduce belt speed if possible.
High belt tension	High belt tension will increase belt wear. Check to ensure that recommended catenary sag is present.



3. Preventive Maintenance and Troubleshooting

⇒ Excessive belt wear

Possible cause	Proposed measures
Abrasive material	Improve cleaning or add protective shields to reduce the amount of abrasive material contacting the belt and sprockets
Incorrect belt material	Check material specifications to ensure that the optimal material is used. Call Habasit for a recommendation.
Incorrect wearstrip material	Check material specifications to ensure that the optimal material is used. Call Habasit for a recommendation
Incorrect wearstrip placement	Correct the placement of wearstrips. Call Habasit for a recommendation.
Method of product loading	Reduce the distance that product is deposited on the belt. If product sliding occurs, refer to material specifications.
High belt speed	High belt speeds will increase the wear, especially on conveyors with short centerline distances. Reduce belt speed, if possible.
High belt tension	High belt tension will increase belt wear. Check to ensure that the recommended catenary sag is present.

⇒ Belt stretching and excessive catenary sag

Possible cause	Proposed measures
Abrasive material	Improve cleaning or add protective shields to reduce the amount of abrasive material contacting the belt and sprockets.
Incorrect tension	Adjust
Incorrect belt/rod material	Check the material combinations used and call to confirm the correct material application.
High temperatures	High temperatures cause the belt to elongate by a large percentage. Check that the catenary sag is long enough to compensate for the elongation. It might be necessary to install a gravity or pneumatic tensioning device.

⇒ Pivot rod (hinge pin) migrating out of belt

Possible cause	Proposed measures
Rods not headed on both ends (first generation up to end 2000)	Replace rod and secure its ends with soldering gun (fuse rod head).
Rods not properly seated in snap-in position (second generation after Jan 2001)	Check if rod head and/or edge module is damaged; if necessary replace. Reinstall properly.
Rod elongates due to high load and/or high temperature	Shorten rod and reinstall or replace by new and shorter rod.

4. Product Liability, Application Considerations

The proper selection and application of Habasit products, including the related area of product safety, is the responsibility of the customer. All indications /information are recommendations and believed to be reliable, but no representations, guarantees, or warranties of any kind are made as to their accuracy or suitability for particular applications. The data provided herein are based on laboratory work with small-scale test equipment running under standard conditions and do not necessarily match product performance in industrial use. New knowledge and experiences can lead to modifications and changes within a short time without prior notice.

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