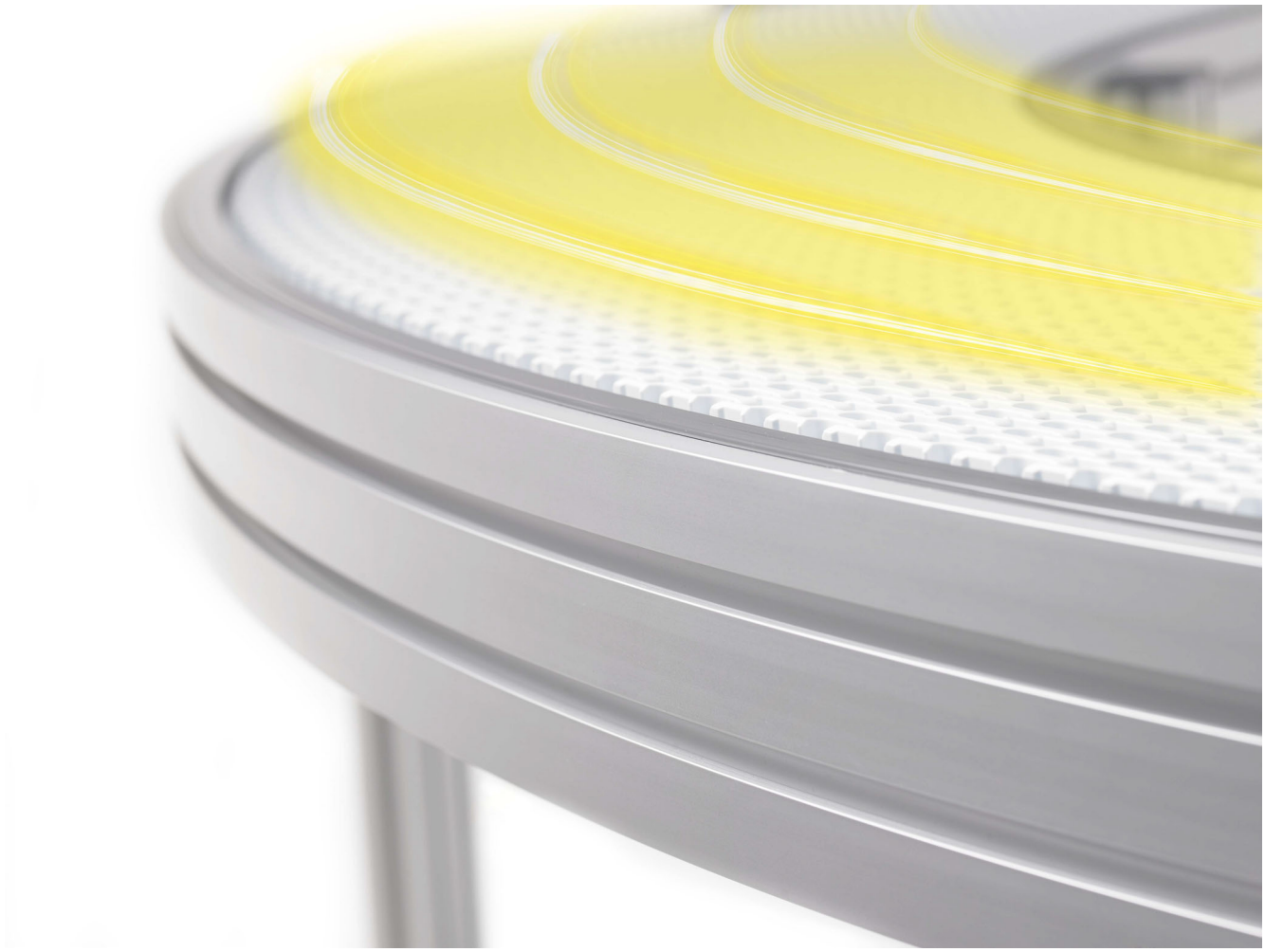
Conveyor system WL

Conveyor assembly manual



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Conveyor system WL

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1 About this manual

1.1 Introduction

The main purpose of this manual is to help self-building end users, with little or no prior experience, to assemble a FlexLink WL conveyor system.

Each chapter includes instructions and pictures showing how to assemble the different parts.

1.2 Document disposition

The document is divided into the following five main parts:

- Installation site preparations
- Tools and fasteners
- Cutting FlexLink beams
- Assembly
- Start-up and testing

1.3 Installation site preparations

1.3.1 Assembly planning

Work systematically:

1. Prepare by studying your assembly drawing.
2. Ensure that the necessary tools are available.
3. Make sure you have all the materials and components needed to assemble the conveyor system. Check with the parts list.
4. Make sure you have enough floor space to mount the conveyor system.
5. Check to see if the floor at the installation site is even, so that all feet can be properly attached to the floor.

1.4 Assembly order

The following list can be used as a checklist during your conveyor assembly work:

Activity	Check
Cut all beams into suitable lengths	
Connect feet and structural beams	
Mount conveyor beam support brackets	
Assemble conveyor beams and mount them on to the support structure	
Mount drive and idler units to the ends of the conveyor	
Mount slide rail on to the conveyor beam	
Loosen the drive unit slip clutch	
Run a short piece of chain through the conveyor to check that there are no obstructions	
Assemble and mount the chain on to the conveyor	
Mount guide rail, drip trays and other accessories on to the conveyor	
Tighten the slip clutch to a suitable friction	
Read *Final preparations* at the end of this manual	

2 Tools

2.1 General tools

To assemble a FlexLink conveyor, you will need most of the tools listed on the following pages. Not all are essential, but they will make your assembly work easier and more efficicient.

Hand tools

- 10 and 13 mm box wrench
- Cutters (for cutting slide rail)
- Set of metric Allen keys
- Roller thread fluteless tap and tap wrench (M6 and M8)
- Countersink bit
- Tape measure
- In addition, the tools listed below can be useful:
- Files
- Socket wrench
- Screw-driver
- Pliers
- Knife (for cutting off plastic screw heads)
- Soft faced hammer
- Clamp (for chain installation)
- Level

Power tools

- Cross-cut circular saw for aluminium
- Hand drill
- Drill bit (for fixing of slide rail):
- XS: ∅3,2 mm, XL/XM/XH/XK: ∅4,2 mm

3 FlexLink tools

Rivet crimping pliers

XS (∅ 3 mm):
3924776
XL/XM/XH (∅ 4 mm):
3925800

Rivet crimping clamp

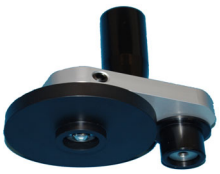
XS (∅ 3 mm):
3924770
XL/XM/XH (∅ 4 mm):
3923005
The riveting tools have replaceable pads. By replacing the pads you can use the same riveting tool for 3 mm and 4 mm rivets.

Drill fixture for installation of slide rail

XS (∅ 3,2 mm):
3924774
XL/XM/XH/XK (∅ 4,2 mm):
3920500

Mounting tool for slide rail

WLMR 135



Rivet crimping pliers

XS (∅ 3 mm):
3924776
XL/XM/XH (∅ 4 mm):
3925800

Guide rail bending machine

3922963
(not shown)

Drill fixture for fastener yokes

8050040

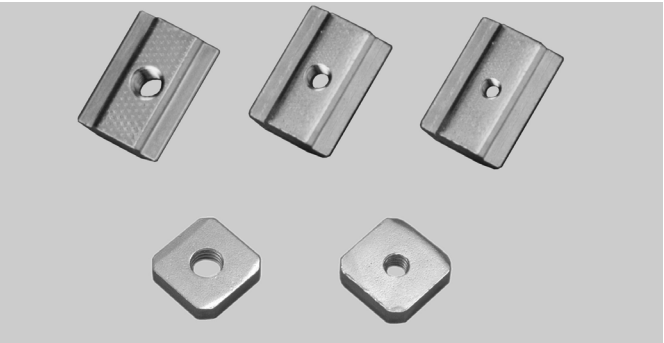
The drill fixture is slided into the stand and fixed by tightening the star knob.

4 Fasteners

4.1 Standard screws, nuts, washers

M6S, MC6S, MF6S, M6M, BRB 8,4×16, XLAL

4.2 Slot nuts and square nuts



XCAN, XLAQ

Square nuts can be used in support beams and small beams instead of XCAN nuts, but they can also be used in conveyor beams as opposed to XCAN nuts. They do not stay in place in vertical positions and have to be inserted from the beam end.

When using XLAQ square nuts, remember to put in a sufficient number before completing the assembly.

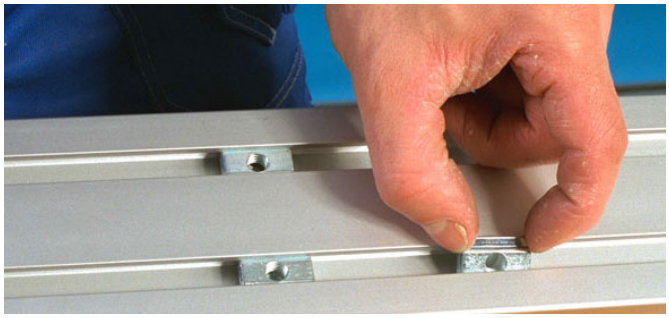


Figure 1 XCAN

On the support beam, the slot nut can be entered into the T-slot from the beam side. It will stay in position in vertical T-slots because of a thin leaf spring.

IMPORTANT

Slot nuts can not be used with conveyor beams.

4.3 Connecting strips

Figure 2 Connecting strips

Connecting strips are used for joining beams together, end to end. Use Allen key and set screws when attaching the connecting strip to the beam.

4.4 T-bolts

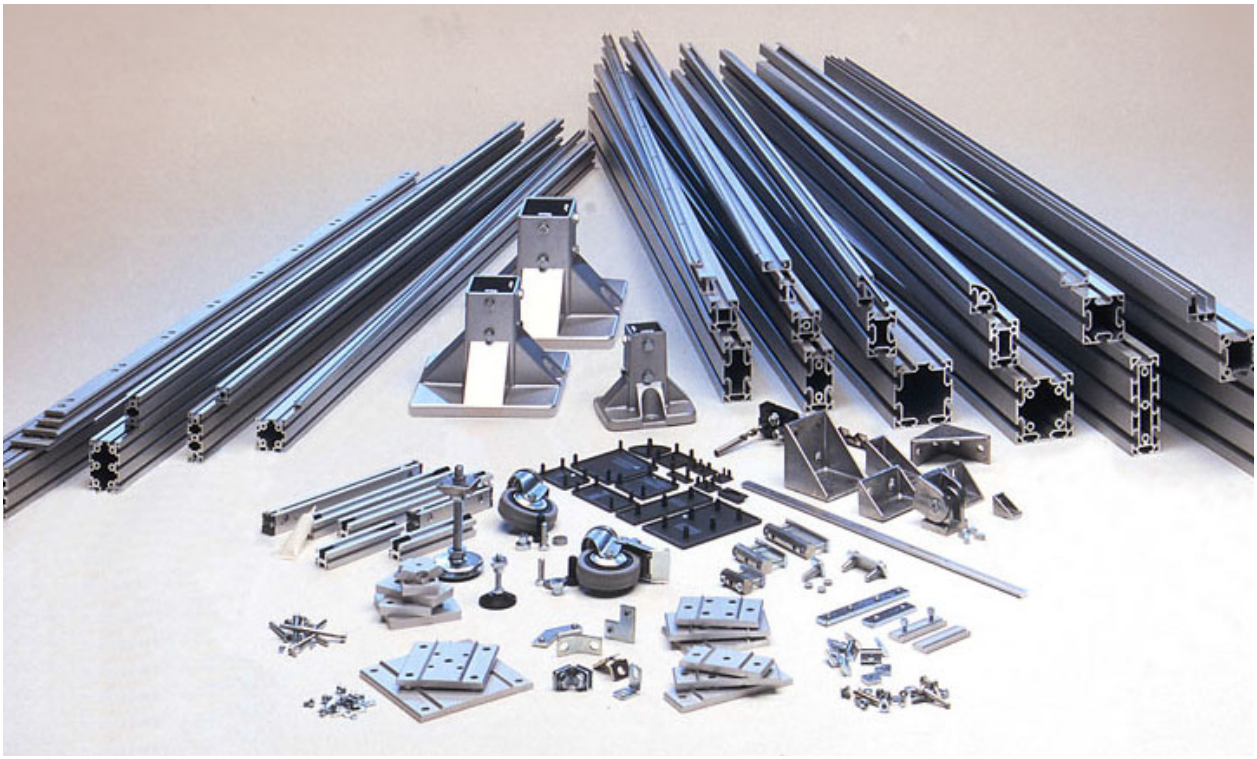
Figure 3 XLAT

T-bolts can be entered from the beam side, and when turned 90° they will stay in place after tightening with nuts (XLAN 8) and washers (BRB 8,4×16). The indication groove in the T-bolt should be at 90° to the conveyor T-slot.

T-bolts are used when attaching support brackets, guide rails and drip trays to the conveyor beam. Do not use T-bolts with support beams!

5 Assembly

5.1 Introduction



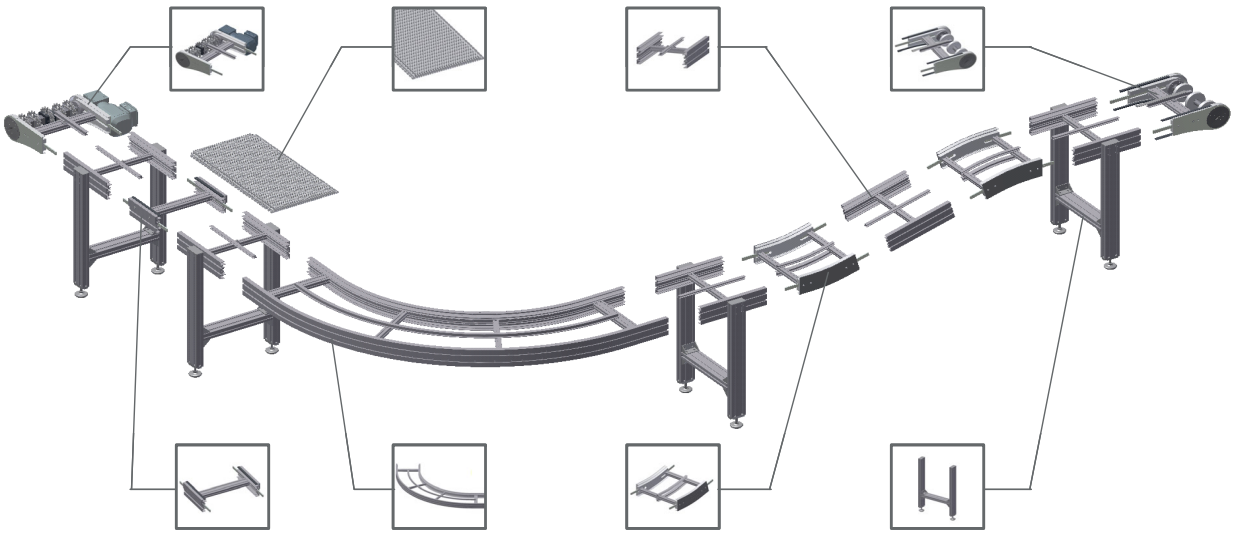
5.1.1 Component groups

The basic FlexLink conveyor structure consists of five component groups:

- support structure
- conveyor beams, straight sections and bends
- drive and idler units
- chain
- other accessories (guide rail, drip trays etc.)

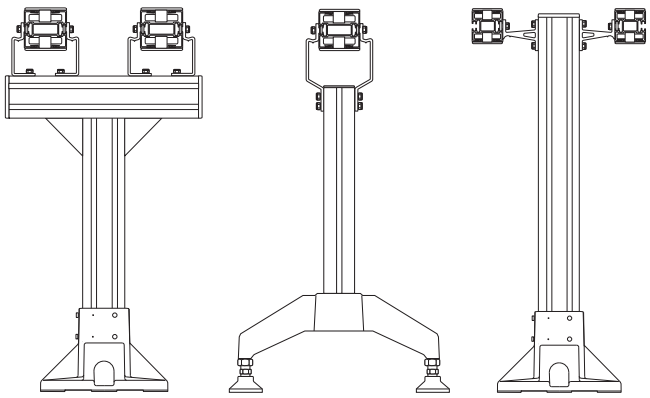
The first step in the assembly process is to assemble the support structure, which consists of feet, support beams and beam connectors. Most conveyor support designs are based on vertical support beams combined, if necessary, with horizontal support beams. There are also a number of different

feet and beam connectors, so check which ones are used in your application. Some examples are shown below.



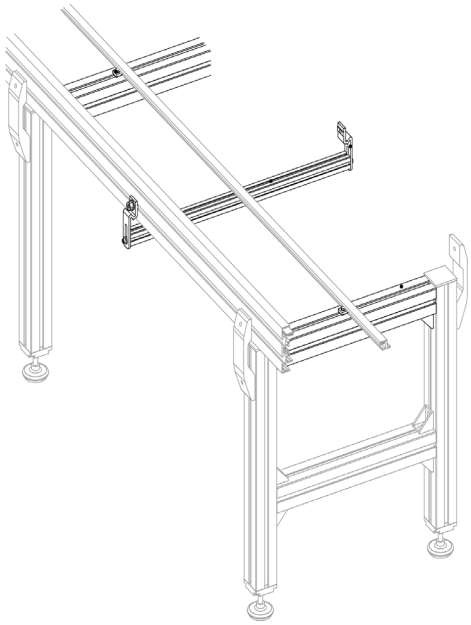
IMPORTANT

You must work in accordance with your layout, and make sure that the conveyor is supported at regular intervals not exceeding 3 m.



6 Support design

The WL conveyor system uses standard FlexLink feet, refer to appendix for assembly instructions.

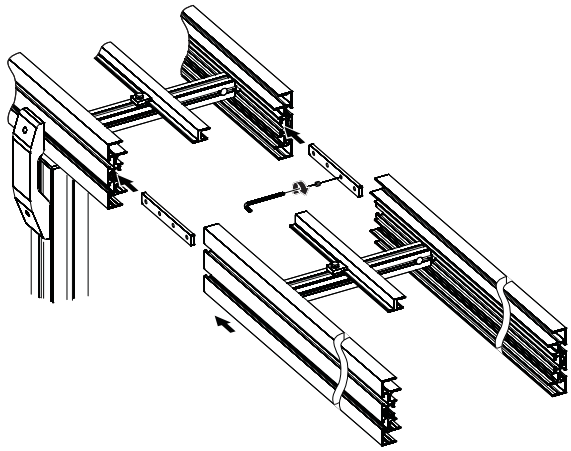


6.1 Special tool when mounting feet

Conveyor beams are mounted on to the support structure by means of support brackets. To get the right distance between the holes, use the drilling template. The drilling template are fitted on the support structure using the T-slots. Tighten the star knob before drilling.

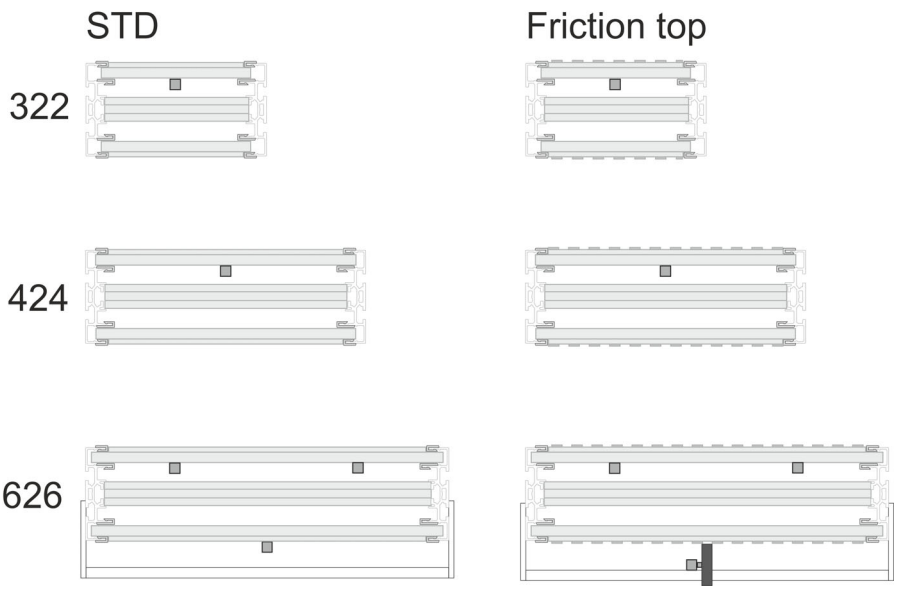
7 Beam assembly

The beams is connected using the *Connecting strips for beam*.



7.1 Support profiles

Note the different location of the support profiles due to belt width. See table below for placement of the support profiles.



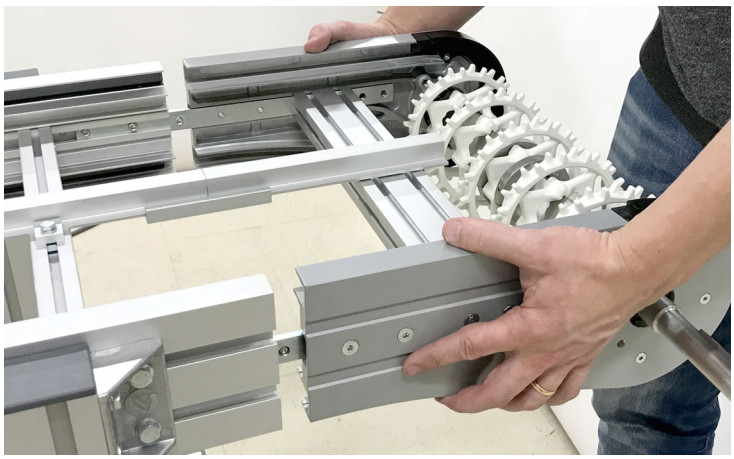
8 Drive and idler unit assembly

This step is to mount drive and idler units to the frame structure. All drive and idler units come with connecting strips included. Attach them to the conveyor beam using an Allen key and the set screws that are included.

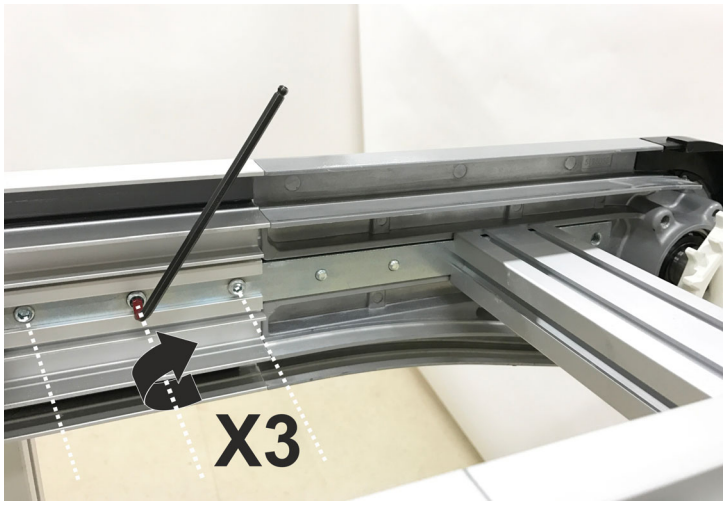
Drive units can be attached to supports of various kinds; check your drawing to see how your conveyor is designed.

It should be remembered that conveyor belt should always be pulled, not pushed, by the drive unit.

1.

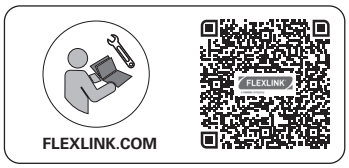


2.

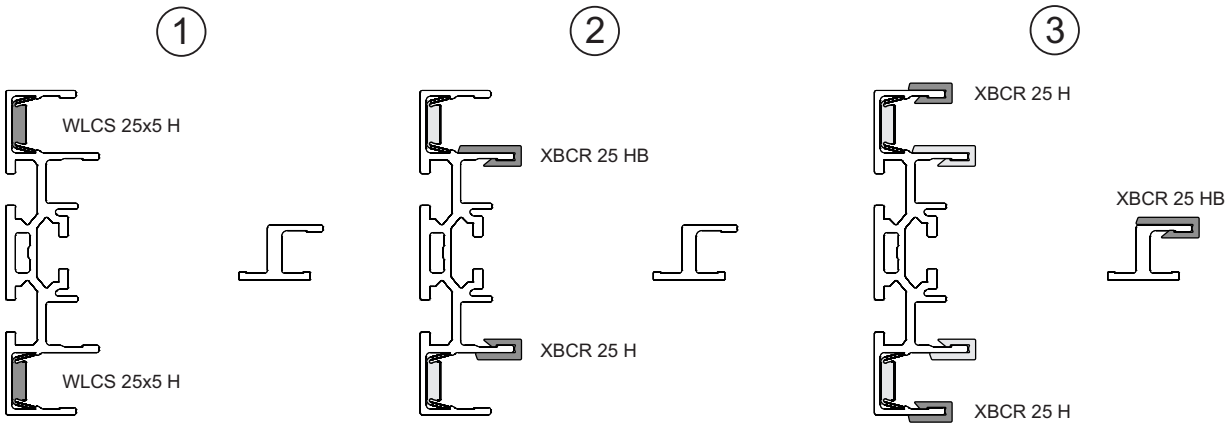


9 Slide rail and support rail

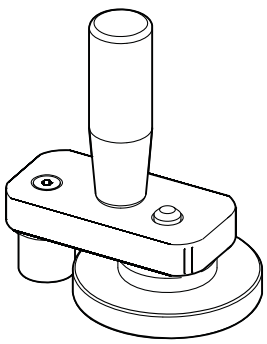
Slide rail and support rail is standard FlexLink equipment and are described in the Mounting instruction; "Installation of plastic slide rail and support rail" (FLX1003231).



The slide rails used in the WL conveyor system are mounted in three steps as shown below.



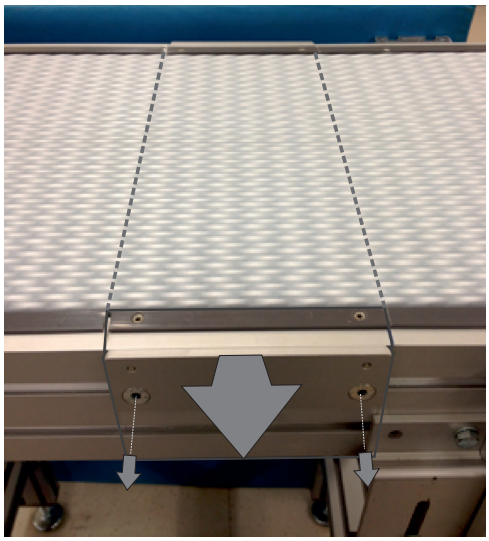
Use the mounting tool (WLMR 135) for slide rail.



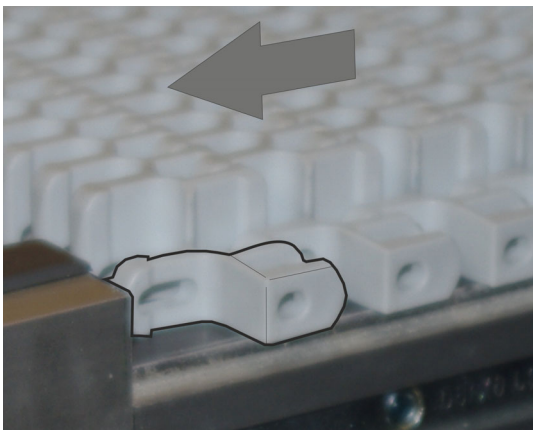
10 Belts

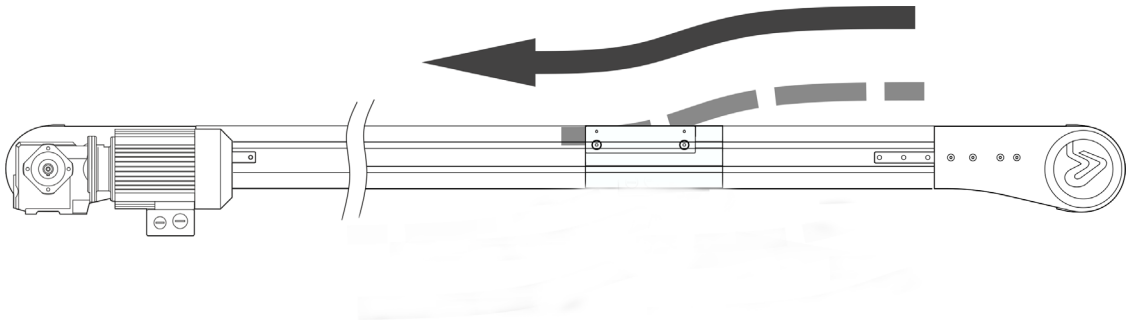
The belts is delivered in one meter section to be manageable. They are mounted in the conveyor using the belt insertion section. The belt should be mounted with the front in the running direction.

1. Loosen the two screws and remove the cover on both sides.

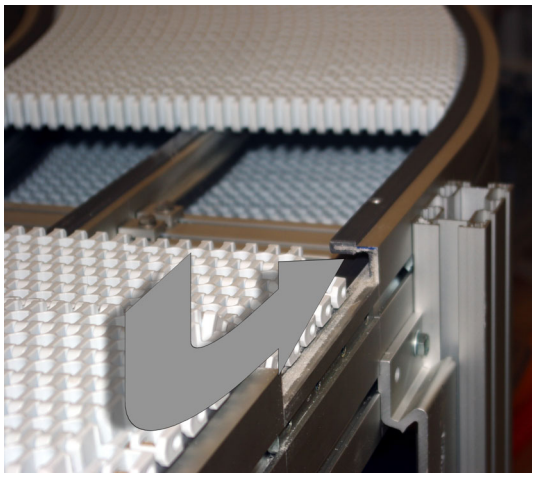


2. Insert the belt from the top: insert the front of the belt pointing towards the End drive unit.

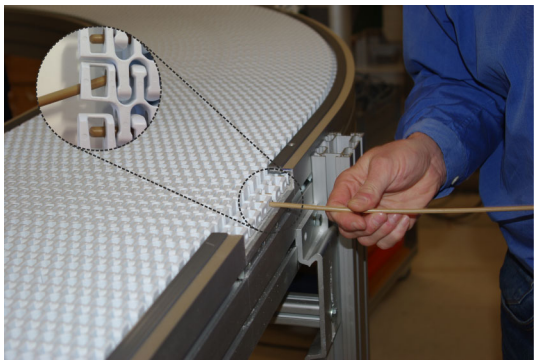




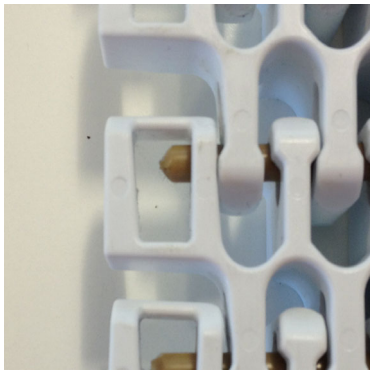
Insert the belt and push it forward.



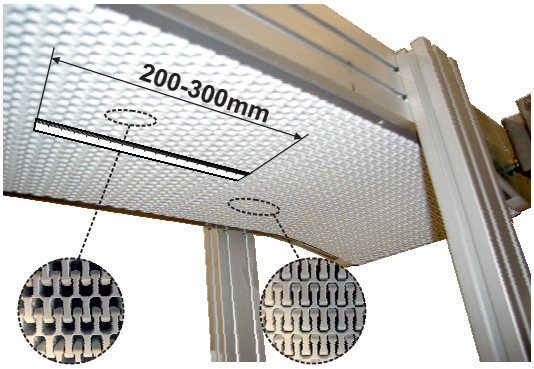
3. Assemble the belt section with the previous belt section; Align the links of the two belts and insert the rod.



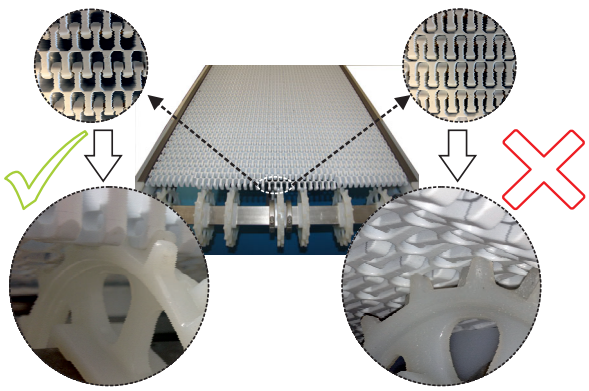
4. Press the rod into the belt until it "snaps" in place.



5. Insert required number of belt sections. When the total number are installed and stretched, there should be a total slack of 200-300 mm compressed belt for the whole belt length.

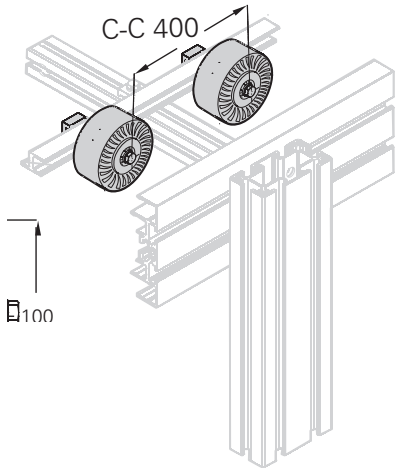


6. Fitting the belt in the drive unit.
It is important the belt fits into the cogs. If the belt is not properly fitted on the cogs, it will bypass the teeth of the cogs when operating the conveyor.
If the belt is attached incorrectly, a bubble will appear in the belt.



10.1 Roller Kit

Use the roller kit to relieve the belt from its own weight. The roller kit is mounted with a C-C of 400 mm all under the belt.



Things to consider:

1 The profile needs to be mounted horizontally.

2 Wheels of the profile should be in line with belt underside, to high they will create a concave shape of the belt, nor too loose so that

it forms a convex profile.

11 Final preparations

11.1 Plug beam ends

Ensure that end caps (XCBE) have been fitted to all aluminium profile ends. The beam profiles should be deburred before fixing end caps. It may be necessary to tap the cap into position using a soft-faced hammer.

11.2 Anchor feet to the floor

After the assembly of all components it may be necessary to anchor the conveyor support feet to the floor. Use a type of fastener that is right for the kind of floor where the conveyor is installed.

Instability of the conveyor during operation may result in a dangerous operating environment or damage the conveyor components.

11.3 Other preparations

- Adjust the height of the structural beam if necessary.
- Make sure that the installation is stable and that all screws have been properly tightened.
- Use a plummet and/or water-level to make sure that the construction is not askew.
- Make sure that all electrical equipment is properly connected.
- Make sure that the conveyor is running in the correct direction before starting the conveyor! Never run the conveyor with tightened slip clutch until you have ensured that the running direction is correct.
- Tighten the slip clutch to a suitable friction. (Slip clutch adjustment, see page 32)
- Make sure that the transmission cover is attached to the drive unit.
- In pallet installations, make sure that all pneumatic equipment is properly connected.

Remember that conveyor belt should always be pulled, not pushed, by the drive unit.

12 Start-up and testing

12.1 Safety considerations

To eliminate the risk of accidents, it is important to be aware of certain areas of the conveyor where special caution is required, during installation, operation and maintenance. Some areas present a higher danger to personal safety, and because of this various kinds of safety devices need to be installed.

- All pinch and shear points as well as other exposed moving parts that present a hazard to employees at their workstations or their passageways must be safeguarded.
- Cleated conveyor chains are more susceptible of creating pinch and shear points than plain chain.
- When two or more pieces of equipment are interfaced, special attention must be given to the interfaced area to ensure proper safeguarding.
- For overhead equipment, guards must be provided if products may fall off the equipment for some reason. The same applies to all incline, decline and vertical conveyors.

Safeguarding can be achieved by:

- Location – locate the hazardous area out of reach of the personnel involved.
- Guards – mechanical barriers preventing entry into the hazardous area or protecting against falling goods.
- Control devices – machine controls preventing or interrupting hazardous conditions.
- Warnings – instructions, warning labels, or sound or light signals, alerting on hazardous conditions. Warnings shall be used when other means of safeguarding will impair the function of the installation.

Caution:

It must be difficult to bypass or inactivate safeguards during operation!

Safety devices should be designed to minimize discomfort or difficulties for operators.

12.2 Slip clutch adjustment

12.2.1 Introduction

The slip clutch on the drive unit is a safety device which allows the chain to stop if the load becomes excessive. It has two purposes:

- Prevent damage to conveyor
- Prevent damage to the products on the conveyor

Where a slip clutch is fitted, it must be adjusted so that it does not slip whenever the drive unit is started under full load. The installation is carried out as follows:

12.2.2 Preparations for adjustment

1. Stop the conveyor.
2. Ensure that the conveyor can not be started accidentally. For example: unplug the electric power plug.
3. Remove any load on the conveyor.

Caution:

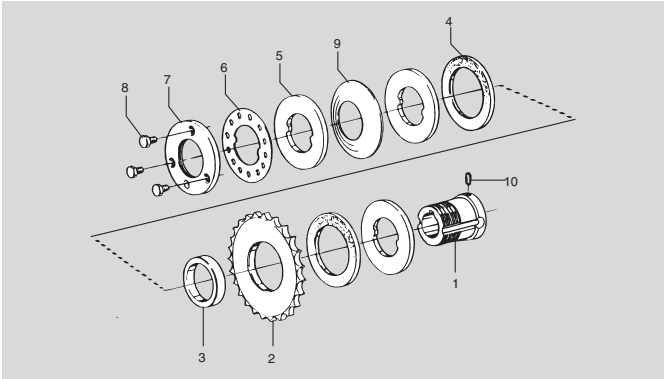
If you try to adjust the slip clutch when there is still load on the conveyor, the accumulated tension in the chain can cause severe injuries when you release the clutch.

12.2.3 Slip clutch should not be adjusted until

3 Motor direction is confirmed

4 Conveyor is fully assembled

12.2.4 Adjustment



1. Remove the transmission cover.
2. Unscrew the three screws (8) so that the outer ring (7) can be rotated freely.
3. Hand-tighten the outer ring (7) to stop (no tools!).
4. Look for the desired maximum traction force in the table to the right and determine the X value for that force.
5. *Positive X-value: (If the X value is negative (X≤0) ignore step 5 and go to step 6.)* Turn the outer ring (7) counter-clockwise the number of divisions given by the table, i.e. the X value. One division is defined as the angle (30°) between adjacent holes in the stop ring (6). Check that screws (8) align with the holes in the stop ring (6).
6. *Negative X-value: (If the X value is positive (X≥0) ignore step 6 and go to step 7.)* Turn the outer ring (7) clockwise with a hook wrench, the number of divisions given by the table, i.e. the X value. One division is defined as the angle (30°) between adjacent holes in the stop ring (6). Check that screws (8) align with the holes in the stop ring (6).
7. Tighten the three screws (8) to stop. Use 10 mm wrench

Important:

The slip clutch is not a personal safety device. It is primarily intended to protect the equipment.

12.2.5 Clutch adjustment table

F_{max} is the desired maximum traction force applied to the chain by the drive unit. The clutch will start slipping at forces above $F_{max.}$

NB: *Note*

The values in the table are approximate and apply to new slip clutches.

F max (N)				F max (N)			
XS XL	XM XH XW	XK	X (div.)	XM XH	XW	XK	X (div.)
450	450	100	19	1200	1200	1400	6
475	475	200	18		1300	1500	5
	525	300	17		1400	1600	4
	575	400	16		1525	1700	3
	625	500	15			1800	2
	675	600	14			1900	1
	725	700	13			2000	0
	775	800	12			2100	–1
	825	900	11			2200	–2
	875	1000	10			2300	–3
	925	1100	9			2400	–4
	1000	1200	8			2500	–5
	1100	1300	7				

12.2.6 Example (XM, XH or XW conveyors)

You wish to set the clutch so that it permits a maximum traction force of 900 N. Above that load, the clutch should release.

From the table you find that the ring must be released at least 9 divisions from hand-tightened position. Since the ring should be turned by complete steps, you should select 9 steps. This corresponds to three quarters (¾) of a full turn. The clutch will release at approximately 925 N. If you release the ring by 10 divisions the clutch will release at 875 N.

Also see formulas for chain tension calculations in the main conveyor catalogue, chapter "Multiflexing conveyors", section "Engineering guidelines".

12.3 Start-up

12.3.1 Lubrication

The conveyor chain is lubrication-free. However, for some specific applications where the operating environment is particularly hostile, regular lubrication of the slide rail/conveyor chain will result in a lower coefficient of friction, longer life and reduced running costs. Use a silicone-based lubricant (LDSS 450 or an equivalent lubricant).

12.3.2 Wear

The degree of wear on a conveyor depends on a number of factors, such as:

- running time
- load, contact pressure
- speed
- product accumulation
- sharp or rough products
- chemicals
- foreign particles, e.g. chips, grinding particles, broken glass, sand, sugar
- temperature
- plain bends

Try to minimize the running time for the conveyor by stopping it when there is no transport.

Multiple horizontal and vertical plain bends in a conveyor will often result in increased wear. One reason is that the friction losses are large in plain bends. Also, the contact surface between chain and slide rail is small and the chain pull is acting towards the slide rail in the bends.

12.3.3 Run-in period

Two or three days are usually enough as a run-in period. During this time, the conveyor should be cleaned a couple of times to remove dust:

1. Remove the chain and clean it with warm water (50°), use soap if necessary.
2. Clean the conveyor beam itself
3. Re-install the chain.

After run-in, wear will be minimal, unless particles from the product or process reach the conveyor continuously.

12.3.4 Chain elongation

During the run-in period, regular checks should be made to the elongation of the conveyor chain. This is especially important if the conveyor is transporting high loads or is of long overall length.

Regular inspections of the chain elongation are important. The chain should be shortened after a run-in time of 40 hours. Further inspections should be made at 200, 500 and then at 1000 hour intervals.

13 Troubleshooting

13.1 Jerky running

Cause	Corrective action
Damaged or badly fitted slide rail	Inspect and replace as necessary.
Wrongly adjusted slip clutch	Check and adjust slip clutch.
Worn transmission parts	Check/replace transmission belt, belt drive sprocket.
Conveyor belt is too tight/ loose	Tension conveyor belt correctly.
Dirty conveyor	Clean conveyor belt/slide rail. Lubricate with silicone based lubricant.

13.2 Drive unit is running, conveyor belt is not

Cause	Corrective action
Wrongly adjusted slip clutch	Check adjustment of slip clutch.
Friction discs in slip clutch are worn or contaminated	Check and replace if necessary.
Damaged/badly fitted slide rail	Check the free running of the conveyor belt.
Transmission products are not fitted	Check and fit.

13.3 Motor overheating on drive unit

Cause	Corrective action
Overloaded conveyor	Remove products from conveyor and test run.
	Check actual conveyor load against recommended loading.
Gearbox leaking oil	Check output shaft seal and area around motor/gearbox interface.
Dirty conveyor	Clean the conveyor belt with warm water (50°).

13.4 Noise

Cause	Corrective action
Worn or damaged bearings in drive unit	Check/replace drive unit.
Damaged/badly fitted slide rail	Check the free running of the conveyor belt, especially in slide rail joints.
Excessive conveyor speed	Lower speed.
	Check actual load against recommended loading.
Incorrect conveyor belt tension	Lengthen/shorten conveyor belt.

13.5 Abnormal wear on plastic parts

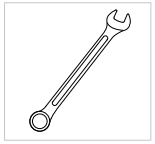
Cause	Corrective action
Overloaded conveyor	Remove products from conveyor and test run.
	Check the free running of the conveyor belt.
	Check actual conveyor load against recommended loading.
Ambient temperature too high	Check against recommended temperature for conveyor.
Chemicals in the environment are affecting plastic parts	Check in FlexLink main catalogue (section TR) for listing of incompatible chemicals.
Damage due to ingress of contaminate	Clean the system.
Particles, swarf etc.	Remove source of contamination.

14 Appendix

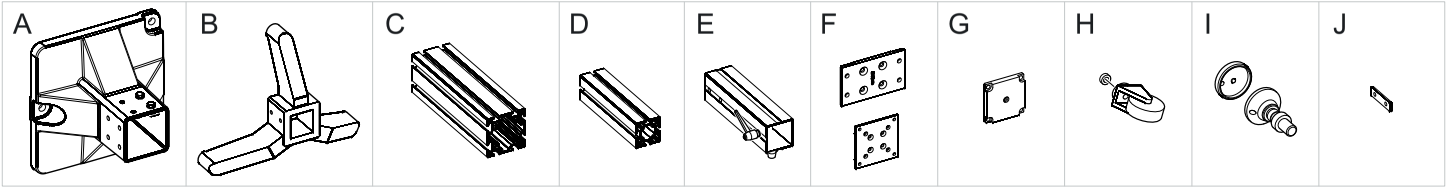
The following single sheet assembly instructions can be used as stand alone or together to assemble a conveyor systems.

PRE-REQUISITES

Recommended tools

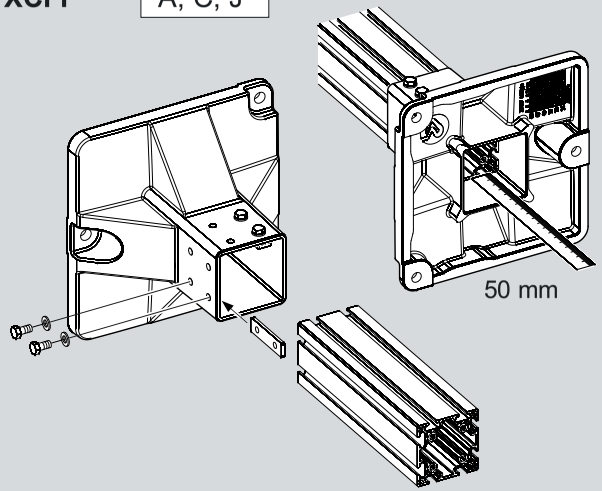


PRODUCTS



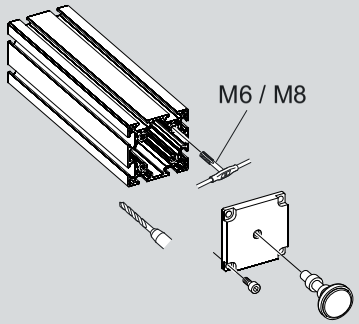
XCFF

A, C, J



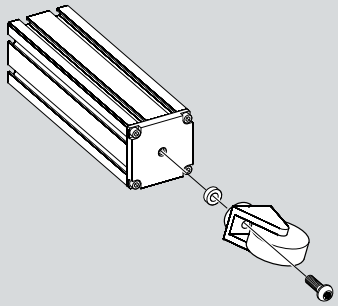
XCFE
XCFS 12x68

C, G, I



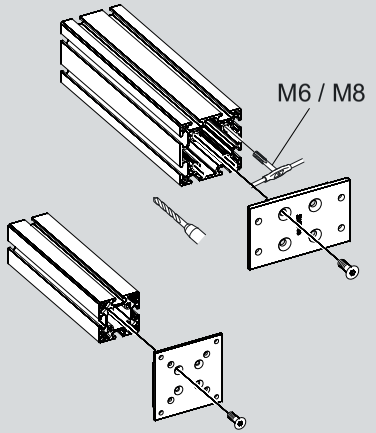
XCAG 80

C, H



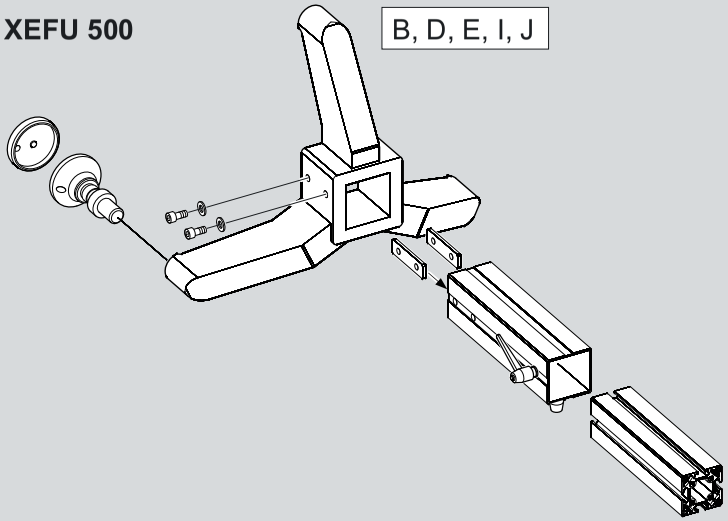
XCFB...F

C, D, F



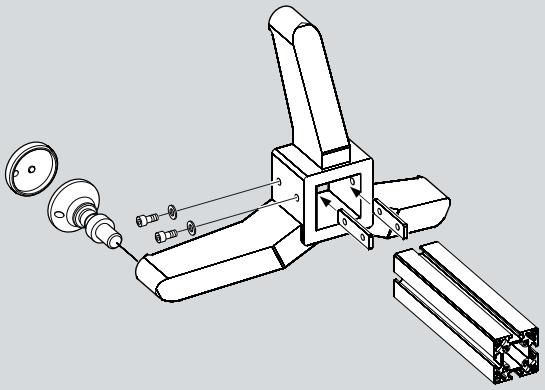
XEFU 500

B, D, E, I, J



XEFG
XLFS 20 P, XLFJ 69

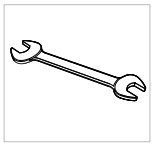
B, D, I



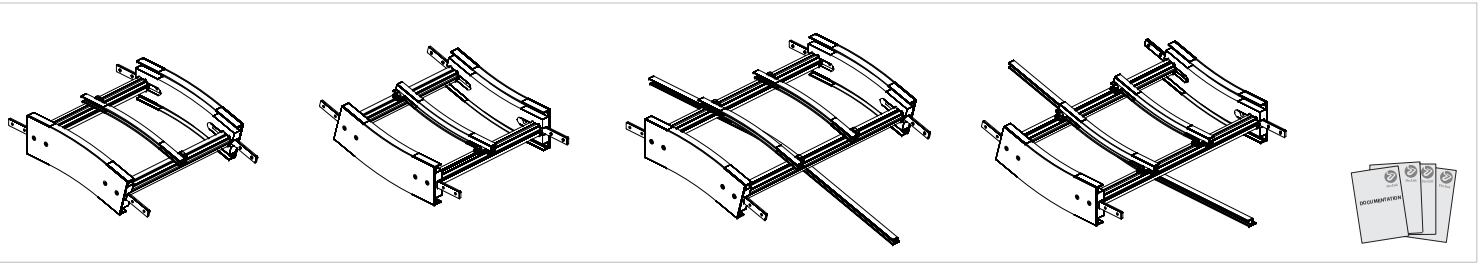
Basic value, Torque for dimension			
M5	M6	M8	M10
4 Nm / 35 lb. in.	9 Nm / 80 lb. in.	24,5 Nm / 217 lb.in.	45 Nm / 398 lb.in.

PRE-REQUISITES

Recommended tools

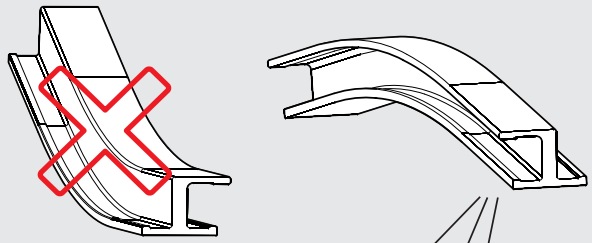


Products

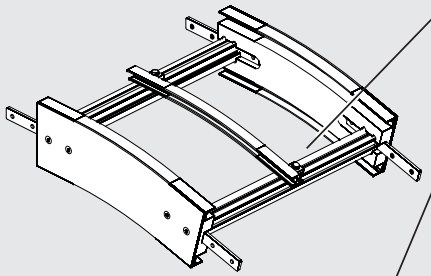


5116271

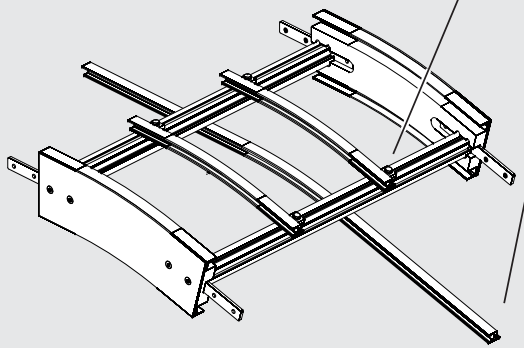
Decline



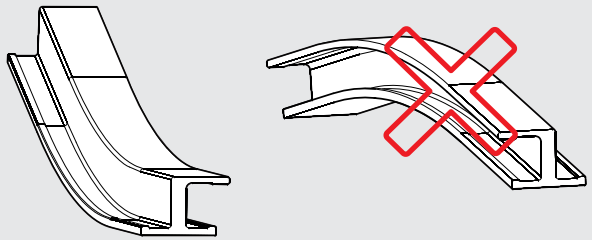
WL 322 / WL 424



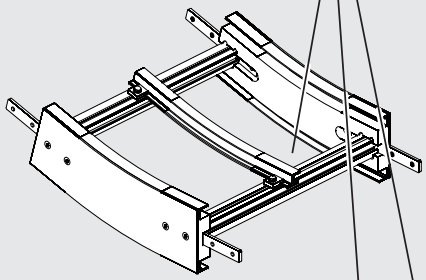
WL 626



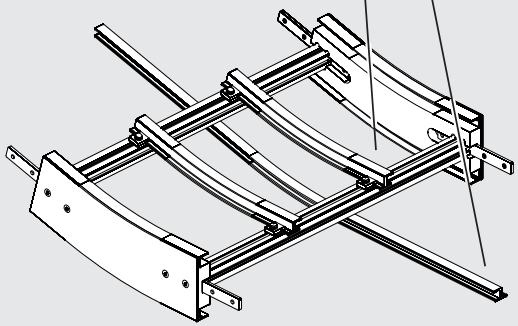
Incline



WL 322 / WL 424



WL 626



The illustration may not always correspond exactly to ordered component.