

Cardan Chain Conveyors

Technical Selection Guide for Conveyor Components



NOTICE:

This catalog is intended to illustrate the various Webb overhead conveyor components and their application into a conveyor system. Environmental as well as many other conditions will vary with each installation. Erkur Makine Company does not represent or warrant that adherence to any guidelines or suggestions set forth in this catalog will necessarily result in proper selection, manufacture, installation and/or maintenance of conveyor equipment and/or a conveyor system. Erkur Makine Company disclaims responsibility for any equipment and/or system malfunction, property damage, personal injury or any other damages of any kind or nature, or violations of law resulting from component, equipment and/or system selection, design, installation, maintenance or operation performed by a contractor, user or any other person. **DESIGN CHANGES:** Erkur Makine reserves the right to change the design or construction of its products at any time without obligation for replacement or refund on any products or parts thereof which may be in any customer's possession at the time such changes become effective. In accordance with our established policy to constantly improve our products, the specifications in this manual are subject to change without notice.

Chain Conveyors

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Cardanic conveyors are based on the movement of the chain in three axis on the universal joint rail.

Cardanic drive units are built as top-driven caterpillar unites or horizontal bearing torque safety.

Chain pitch is 400 mm or its multiples. Thanks to the central lubricating unit included on the system, roller bearings of the chain are automatically lubricated in desired periods.

Torque limiters are used in order to protect the system in cases of jamming and excessive forces.

Roller bearings mounted on the chain are capable of resisting 250 centigrade.

Either spring or screw tensioning system can be used for conveyor chain tensioning.

Cardanic conveyor rail is specially made of bended metal sheets.

Multiple drive units are used for long conveyor systems and all drive units are synchronized.

About Us

Erkur Makine is a strong company capable of making all needed investments with its own resources. The company improves and updates its manufacturing capabilities by closely following technological developments.

Our company develops monorail conveyor solutions for material processing lines, logistic handling lines, assembly and painting lines and any other processes related to manufacturing.

In addition, manufacturing efficiency is as important as quality from the point of view of Erkur Makine.

WHAT DO WE PRODUCE ?

- Overhead Conveyor Systems
- Chip Conveyor Systems
- Belt Conveyor Systems
- Silo Conveyor Systems
- Carrier and Conveyor Chains
- Non-standard chains, which are designed to your specific needs, according to the delivered technical drawings or your requirements.

Overhead Conveyor Systems

Overhead conveyor systems are the systems used to transport load on air. It is classified under three groups as self-driven and chain-driven according to operating system.

1. Webb type overhead conveyors with ,3",4",6" trolleys and chains
2. Light, middle and heavy type, universal conveyors
3. Light, middle and heavy type, fivet type overhead conveyors

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Chain

Special attention should be drawn to the conveyor chain of the cardan joint conveyor system. An insufficient stretched conveyor chain causes an uneasy run and increases wear on the chain. An overstretched chain causes extra excessive wear on the bends and conveyor rail as well as an excessive strain of the chain. The optimum chain tension will be adjusted with the chain tension unit. See separate description "tensioning station". The minimum chain tension will be monitored by the chain control unit (see separate description "control unit").

Never switch off the chain control unit!

The conveyor chain may only be used in loop form inside heated dryers ($>80^{\circ}\text{C}$). It is not permitted to keep the conveyor stationary within heated dryers ($>80^{\circ}$) for longer periods of time.

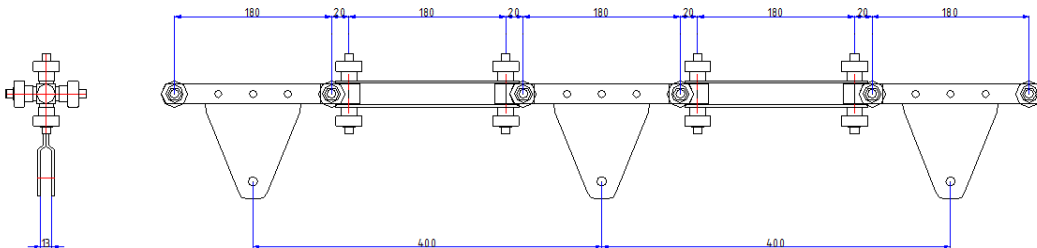
Maintenance:

For the lubrication of the conveyor chain during the operation of the conveyor system, manually (by means of oil can, spray or brush) or automatically with a lubrication unit (see a separate description "lubrication unit"), lubricate regularly with the lubricant Klübersynth CH 2-100. Make sure that the lubricant reaches the ball bearings of the drive rollers (casters).

The joints of the conveyor chain, however, will not be lubricated!

The joints of the conveyor chain are lubrication free according to standard. For the simple maintenance and replacement of the conveyor chain, a threading-in and maintenance joint / inspection section is installed in the conveyor. Observe the separate description "threading-in and maintenance joint".

The lubrication intervals are to be determined individually according to the stress on the conveyor system so that no dry-run (e.g. by squeaking noises) or over lubrication (excessive dripping within the conveyor course) of the conveyor chain occurs.

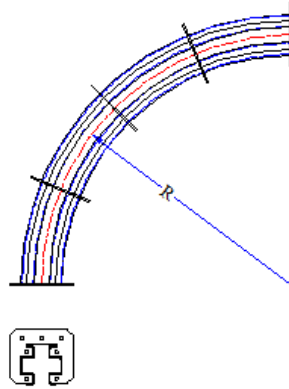
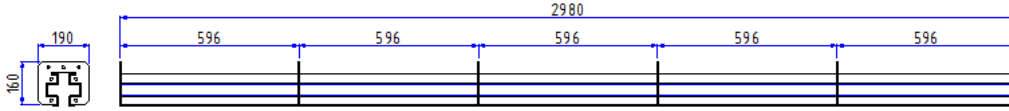


Rail & Return

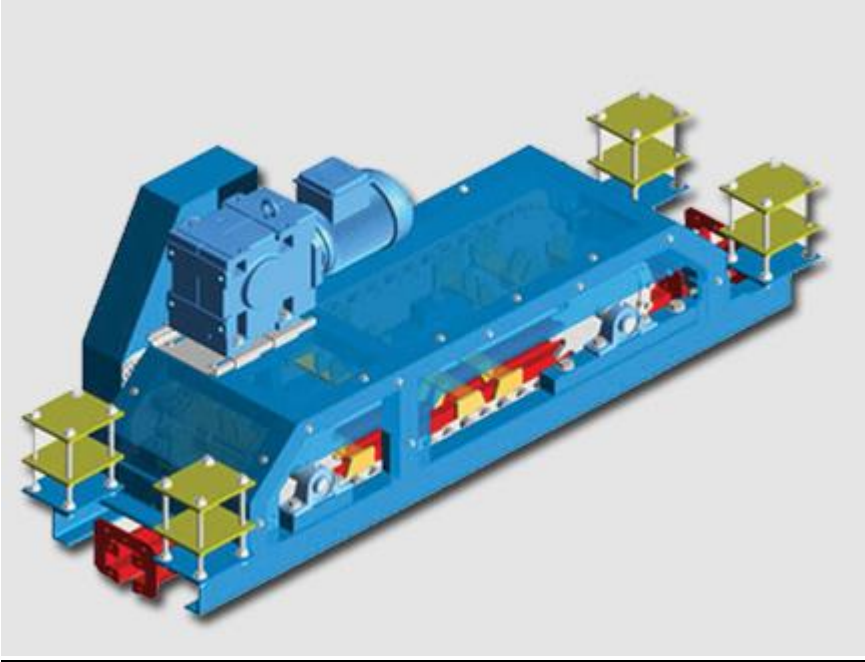
The conveyor track is to be kept free of dirt and other foreign substances. If necessary, the inner side of the conveyor rails may be cleaned with a brush or a rag with cleaning detergent. If necessary, the inner side of the conveyor rail may be treated with a qualified corrosive agent.

The bolts and screws of the conveyor track and the suspensions must be checked according to the intervals indicated in the maintenance manual.

- Load capacity of 70-80 kg
- Top driven with a caterpillar type drive unit
- 200 mm chain pitch, European made roller bearings, conveyor chain with cardanics
- Specially bended conveyor rails with universal joint type fixing flanges
- Universal joint type tensioning stations with 90 and 180 degrees of turn
- Universal joint type profiles with 90 and 180 degrees of turn
- Universal joint type up and down profiles



Driver Unite



To drive the cardanic chain as well as power chain by P&F (power and free) equipment, a caterpillar chain drive is used. This caterpillar chain drive is supplied as a compact unit ready for installation. It must be installed in a 1.100 mm long section of the conveyor system.

Principle of operation:

The cardanic joint conveyor chain (or the power chain) is picked up by a caterpillar chain (B) and is pushed into the drive section. When viewed in the conveying direction, the largest chain tension occurs at the entry into the drive, however, the tension in the chain is largely dissipated at the exit.

The above mentioned caterpillar chain is driven by means of a geared motor (F). Via a chain drive (E), the gear motor generally drives the drive shaft of the caterpillar chain drive. A sliding hub (G), which is the event of an overload, is incorporated in the sprocket mounted on the drive shaft of the caterpillar chain drive. Drive motor, chain overdrive and sliding hub are designed and constructed according to the customer's requirements.

Mounting of the caterpillar chain drive:

Arrangement of the drive in the system:

Unless contradicted by other reasons related to the customer, the most expedient installation point must be chosen according to the following criteria:

- Behind the first gradient after loading the conveying goods
- At the highest point of the conveyor system
- Before a cluster of curves
- Before the tension unit

Installation of the caterpillar chain drive:

The caterpillar chain drive is fixed / hung on the hang bolts (threated bars) (H) and connected with the conveyor rail to the yokes (V). Ensure the easy removal of the upper

cover plate (U) for later serving and maintenance. The gear motor (F) will be fixed to the motor panel (N) with the means of an additional suspension. The bores (holes) for this purpose are at both braces of the panel.

Threading-in the conveyor chain:

When the conveyor chain is inserted in the caterpillar chain drive, the axle of the horizontal chain rollers (M) is guided into the recess of the attachment drive plate (L).

The hexagonal head of the bolt (K) in the vertical rollers, must point upwards and accordingly, the nut must point downwards.

Maintenance of the caterpillar chain drive:

Drive Motor:

The specification of the geared motor manufacturer (see enclosed documentation) apply to maintenance and operation of the geared motor (F).

Bleeding (T) must also be ensured in accordance with the geared motor manufacturer's specifications.

Sliding hub:

Refer to the special description of the sliding hub for details on how to adjust the torque.

The sliding hub is adjusted correctly if the sprocket does not slip during normal operations.

Adjusting the chain tension at the chain drive:

Remove the two-piece chain protector which is held with a magnet. By doing this, be careful, danger of accident personal injury can result.

Undo all four nuts (J) holding the motor.

Adjust the two adjustment screws (D) on the left and right of the geared motor (F)

until the unstressed section of the chain (E) can be moved up and down by approx.

1 cm. Make sure that the two sprockets lie in one line, thus ensuring that no lateral stresses will be applied to the chain. Again, tighten all screws.

Tension of the caterpillar chain:

The tension of the caterpillar chain must be checked from time to time. To do this, the cover plates (C) on both sides must be detached to be able to check the chain tension.

Caution: Danger of accident! Squeezing places! If the caterpillar chain is forced upwards by approx. 1 cm, it must be re-adjusted on the two tension frame bearings (A). These two bearings must be tensioned to an equal extent.

This ensures that the tension sprocket is exactly flush with the chain, avoiding lateral pressure on the chain.

Caterpillar chain:

The installed caterpillar chain is low maintenance in accordance with ERKUR standard.

If necessary (e.g. by noise development), the re-lubrication can be done as follows:

The cover plates (C) on both sides must be removed. Finally, not only the chain but most especially the axles (R) must be lubricated at the same time . This should only be done with UNIMOLY C 220 lubricant. The above mentioned product is supplied in spray

can and can therefore be used easily without problems.

See separate description to this also in the lists “maintenance intervals“.

In the case of maintenance free caterpillar chain only visual control of damages is necessary.

Replacing the caterpillar chain:

Should it be necessary to replace the caterpillar chain, both the top cover plates (U) and also the two side ones (C) must be removed, also the chain drive must be detached.

The caterpillar chain must be turned until the lock (pin) is in the area of the cover plates (C). The caterpillar chain can be pulled out in the upward direction after unscrewing the chain lock The installation of the new caterpillar chain is done correspondingly in the opposite order.

Bearings:

The flange and tension frame bearings have permanent lubrication and therefore require no maintenance.

It is expedient to occasionally check them visually for leaking grease. Should this be the case, the bearings must be replaced.

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Remove the two-piece chain protector which is held with a magnet. By doing this, be careful, danger of accident personal injury can result.

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Tension unit / tension joint

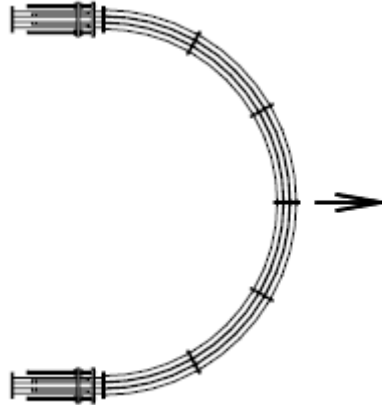
The tension unit is for tensioning the chain. An inadequately tensioned chain can lead to wear on the chain, noise formation and malfunctions.

The installation length is 400 mm. The tension way (path) is 500 mm.

Assembly:

At least 1 pair of tension unit is required per conveyor system.

These are installed possibly, after the drive at a point in the conveyor system which is easy to reach, before and after a 180° conveyor deflection.





Chain tension and re-tensioning:

The conveyor chain is inadequately tensioned if:

- the control station switches off
- the vertical rollers of the conveyor chain rolls off the outer running surface of the horizontal bend.
- the conveyor chain can be displaced by hand in the conveying direction over a long way
- the conveyor chain is not running smoothly.

To re-tension, loosen the nuts (A) and tension with nut (B). Make sure that in doing this, an even, well balanced re-tensioning with both tension units is done. The conveyor chain is tensioned correctly if the vertical rollers of the conveyor chain rolls off easily after the drive in the inner running surface of the first horizontal bend. Doing this, the conveyor system must be in operation. The complete chain must have room temperature for this work.

If the tension units have been ran until the end of its tension distance (way), they will be shoved together and 1 –2 conveyor chain pitches will be removed from the conveyor or two rail joints 1=200 mm will be installed before or after the tension unit.

Finally the conveyor chain is then stretched again as described above. The threaded spindle (screw) are to be kept lightly greased.

Lubrication unit and viewing joint



For the wear reduction and improvement in the smooth running of the cardanic conveyor chain as well as the power chain by P&F power and free equipment is lubrication imperative. For this reason, a lubrication unit was developed to meet this demand. Die device is to be installed as a compact, ready for installation unit with viewing joint in a 900 mm long track section of the conveyor. This also makes a later and simple installation in existing conveyors possible.

The lubrication unit is equipped with a complete maintenance unit shut-off valve (with solenoid/magnet valve upon request).

Every rolling bearing of the rollers will receive on impulse an exact volume doses of lubricant, whereby the “clean keeping“ of the other chain and the surrounding are extensively ensured.

Working method:

The switching valve (A) touches the roller of the chain joints and releases the upcoming compressed air to the lubricating pump (B) (the compressed air is needed only for activating the lubricating pump). The central lubricating pump (C) draws in the lubricant from the storage reservoir and conveys this under pressure through the main line (D) and the distributing connector (E) to the dosing valve (F). From there, the lubricant (predosed voluminously) is supplied through the pipe (G) to the lubricating point. After that, the main line is relieved through central lubricating pump – except for a low rest pressure

and every single dosing valve is filled with lubricant. The next pressure impulse can be executed.

Assembly of the lubrication unit:

Order of the lubrication unit in the system:

If there are no other customer specified reasons which are against this, the most convenient installation point is to be chosen:

- between the loading and unloading of the conveying goods - before a perhaps available pretreatment (washing machine) of the conveying goods

Installation and commissioning:

By the installation of the lubrication unit, the conveying direction must be implicitly observed.

The compressed air line (approx. 5 bar) will be fixed on the shut-off valve (I) of the maintenance unit with a sleeve nut. For the purpose of a better operation of the shut-off valve, it is recommended to install an extension line between the maintenance unit and the shut-off valve. The shut-off valve can therefore be installed at a point which is easily reached. The switching valve which is fixed to the hold plate (J) is to be adjusted so that lubricant is supplied to each of the four rolling bearings of the rollers.

The lubrication unit should not operate continuously as otherwise the chain will be overlubricated.

The duration of lubrication should correspond with a chain circle time and the frequency of lubrication the grade of stress (e.g. 1 x per day, 1 x per shift). The chain should never be dry (no dry run) but always be wet with the lubricant.

For more to this topic, see also under maintenance, in section cardanic chain as well as in the list "maintenance interval".

Maintenance of the lubrication unit:

Lubricant level:

The minimum level in the pump container is reached when the lubricant is just about visible in the viewing pipe (K). To refill, unscrew the lid (L) and fill in the recommended lubricant. It must be implicitly observed that no dirt gets in to the lubricant. As required, drain the water at the air filter (M) and the fog/mist oil (N) (suitable oils with a viscosity of 10-750 mm/s at 20°C, operating temperature).

Ventilating the pneumatic lubrication unit:

Unscrew the ventilation screw (O) at the distribution strip. Adjust the pressure with the adjustment screw (P) to 1-2 bar – see manometer (Q). After that, activate the touch roller of the valve several times (repeatedly) until the line and the distribution list are vented. Screw tight the venting screw. Adjust operating pressure to approx. 5 bar.

Viewing joint:

The viewing joint will be installed directly after the lubrication unit to be able to check the correct application of the lubricant. The cover (R) is removable.

Caution! There is squeezing danger.

Others:

Accessories:

Instead of a shut-off valve, the installation of a magnet valve is possible. Please advise the kind of current and the type of protection.

Technical Data:

Chain speed: max. 12 m/min

Pressure connection: 1/4"

Operation pressure: 5 - 6 bar

Container content: 4,5 Liter

Lubricant dosing: approx. 30 mm³

Lubricant: Synthesco

Can be used up to 250°C by continuous
lubricant consumption

Magnetic valve: 24 oder 230V

Recommended spare parts:

3/2 way-pneumatic valve

Dosing valve

We reserve the right to change technical data!

Legends of Symbols Used

Make sure to observe the following symbols:

Thoroughly study the maintenance instructions before you start to work on the system and follow the symbols carefully. Unless this is ensured, your personnel will be exposed to hazards or damage to persons and material.



Oil can

This symbol shows where to apply oil.



Grease gun

This symbol shows where to apply grease for lubrication.



Wrench

This symbol shows which point shall receive maintenance.



Hand

This symbol indicates that the text following contains important information of the system component described.



Warning of electric current

Disregarding the premarks adjacent to “Warning of electric current” may lead to your personnel exposing themselves to direct hazard of life or to danger of damage to or destruction of material.



Warning of hazard

Disregarding the remarks adjacent to “Warning of hazard” may lead to your personnel exposing themselves to direct hazard of life or to danger of damage to or destruction of material.

Accident Prevention and Safety Instructions

Kewesta conveyor equipment is manufactured in accordance with the state of the art as well as the recognised rules, regulations and standards with regard to safety. In addition to protecting your health and the value of the equipment within the company, the safety regulations are intended to clearly specify the responsibilities which arise as a result of the possession and operation of the conveyor equipment. Therefore, each person who works on Kewesta conveyor equipment must have read and understood the following notes regarding safety. In addition to this, the generally applicable legal and other binding accident prevention rules and regulations (e.g. work place guidelines etc.) and regulations relating to environmental protection must be observed!

Unpack / check the scope of supply

Check immediately upon receipt of goods whether the scope of supply corresponds with the shipping documents. No guarranty can be accepted for complaints made afterwards.

- visible damages in transit must be queried with the carrier immediately.
- defects and incomplete delivery must be queried immediately with the company Erkur.

Basic principles

- It is not permitted to use Erkur conveyor equipment for transporting persons!
- It must be clearly laid down within the individual company, who is responsible overall for the conveyor equipment (plant operator) and who may operate the equipment (machine operator).
- The individual responsibilities of the staff who are responsible for transportation, assembly, commissioning, operation, care, maintenance and repair of the equipment must be laid down and it must be ensured that the arrangements made in this respect are kept to.
- No one may operate or work on the equipment without having received the appropriate instruction – even for a short time.
- No one may maintain, repair or commission the equipment without having received the appropriate instruction.
- Plant operators and machine operators must both ensure that no one works on the conveyor equipment who is not authorised and appropriately trained - and that only reliable staff are used.
- Transport, installation, commissioning, repair and maintenance work may only be carried out by persons who are particularly trained and qualified in the particular specialist area. In doing the work, they must adhere to the instructions contained in the operating manual as well as the relevant safety regulations and any local rules and regulations which apply.

- Before commissioning of the conveyor equipment, it is absolutely essential that the relevant members of staff read and understand the operating instructions. In particular the safety instructions must be obeyed. The instructions contained in the operating instructions must be obeyed for all work such as transportation, erection, assembly, conveyor operation, maintenance and repair work. Read the corresponding sections in the operating instructions carefully before starting the work.
- The plant operator and machine operators must ensure that the operating instructions are available at all time. If in doubt, read the relevant section of the instructions instead of experimenting on the equipment.
- The plant operator undertakes only to operate and use the equipment when it is in perfect condition. The plant operator must check its condition before use and must ensure that any faults are eliminated before commissioning. All safety instructions and warning notices on the machine must be in place and legible.
- All changes to the equipment, to its operating behaviour and to its environment must be reported to the plant operator immediately. In the case of changes which affect the safety of the equipment, the conveyor must be immobilised immediately. The mains switch must be secured against operation.
- The plant operator must ensure cleanliness and good visibility at and around the equipment by means of corresponding instructions and checks.
- The plant operator must ensure that the operating staff wears suitable safety clothing, e.g. protective goggles, safety boots, protective gloves, suitable working clothes, ear protectors etc.
- The plant operator and the machine operators must ensure that the equipment is only used in accordance with the regulations and the purpose for which it is intended and that all safety instructions and hazard warnings on or near the machine are obeyed.
- The plant operator and the machine operators must avoid abusing the equipment in any way. Using the equipment in a fashion which is not in accordance with the regulations leads to exclusion of all liability on the part of the manufacturer. Such abuse or incorrect use can lead to unforeseeable dangers to persons, causing injury or death and also to damage to the machine or to other equipment belonging to the plant operator.
- No changes or additions may be made to the equipment without the express permission of the manufacturer. Safety and function of the machine may otherwise be effected and the guarantee may become invalid.
- Equipment which serves trouble-free function, unlimited use, active or passive safety may not be changed, bridged over, circumvented or rendered inoperative. Standard conveyor settings (e.g. machine parameters) may not be changed without prior consultation with the manufacturer.
- Switch off the conveyor before safety equipment has to be rendered, ineffective or removed before repair or maintenance work. Make sure that all the safety equipment is reinstalled after the work is finished and that it is functioning perfectly before the conveyor is put into operation.
- During operation both plant operator and machine operators must observe the behaviour of the conveyor in order to notice any changes at an early stage and take any

necessary measures to prevent equipment failure (check by specialist staff or our service engineers).

- The requirements of the water conservation law (WHG) must be observed during operation, immobilisation or disassembly of the conveyor equipment or parts of it. Detailed information on this subject may be obtained from the ordinance referring to equipment in connection with handling substances which endanger water quality.

Space required for the conveyor

- Free spaces around the equipment can change depending on the items to be transported. Items may become unstable in particular after changes of direction (turning, in curves, after and during upwards and downwards slopes). Such areas must be made safe by special means.

- Take account of the free space which is necessary and observe the valid safety regulations as well as local regulations and observe the specified safety distances and escape routes.

- Nothing may be put down or stored in areas where parts of the conveyor are in motion or items are being transported or are moving. If space is restricted, you can be wedged into the machine and injured.

- Make sure that the necessary access is available in order to carry out repair and maintenance work.

- The safety area around the conveyor must always be observed: do not place anything within this area, even on a temporary basis. Be careful to avoid tripping and becoming trapped in any way. Place appropriate warnings around the conveyor as well as at locations where tripping and danger cannot be avoided.

- If the conveyor is overlubricated, oil can drip out and lead to increased danger of slipping. This danger is increased if the floor covering is unsuitable:

- Wear non-slip safety boots!

- Do not use too much lubricant!

- Clean the conveyor and surrounding area regularly!

Assembly of conveyor

- Make sure that the elements to which the conveyor is fixed have sufficient load bearing qualities. Have the load bearing qualities checked by a qualified surveyor (statics expert) and ensure that the load bearing qualities of the elements (factory roof, supports and columns, floor, intermediate storey etc.) – particularly in old buildings – are formally approved of and that building regulations are observed and obeyed.
- If the conveyor is installed on cellar floors, other floors or other load bearing constructions, have a surveyor experienced in the field of building dynamics formally state that the load bearing construction is able to bear the mass forces and weight of the machine and that the measures for reducing vibration are adequate.
- Make sure that all the safety equipment is installed and fully functional before the equipment is put into operation again.
- If it is necessary to work overhead when installing the machine or on other occasions, use the climbing aids which are provided or other climbing aids and platforms. Do not use the conveyor as a climbing aid!
- If necessary, isolate the area when the equipment is being installed, allowing amply safety margins.
- If carrying out assembly work at a great height, wear equipment which protects against falling! Use all handles, steps, ladders, scaffolds and platforms in accordance with the safety regulations.
- Individual components and larger assemblies should be fixed securely to hoists so that there can be no danger. Only suitable hoists in perfect working order and fixing mechanisms or equipment with sufficient load bearing capacity may be used! Do not stand, walk or work under overhead loads.
- Fill the machine with the necessary auxiliary materials.
- The plant operator must ensure that the necessary electrical, pneumatic and hydraulic connections are available at the correct locations.
- Electrical connections may only be made by a specialist. Provide the power supply in accordance with the information on the nameplate on the switch cabinet. Also observe the information and instructions given in the operating instructions.
- Ensure that the power supply is voltage-free when the connection is made. Too high voltage endangers life!
- Make sure that the connection is made correctly. It must correspond to the information in the operating instructions or in the circuit diagrams. If an additional transformer is used, the connections must also be made there. Ensure that the voltage setting is correct.
- Before commissioning, it must be checked that the connection is correct. Observe and obey the instructions in the operating manual.
- Check the direction of rotation by motors.
- Check the function by sensors.
- Carry out a final check after assembly. All the points mentioned in the operating instructions must be carried out and signed off.

- The machine can be assembled, connected and commissioned by our service engineers.
- Initial commissioning of the machine must be carried out by our service engineers, otherwise the equipment will not be guaranteed. Only the technical design and manufacture of the components will then be guaranteed.

Before commissioning

- If untreated machine parts are protected with anti-rust fluid, this must be removed with suitable solvents or cleaning oil before commissioning. Do not use aggressive solvents, chlorinated hydrocarbons, acetone or similar.

Initial commissioning

- Initial commissioning of the machine **must** be carried out by our service engineers, otherwise the equipment will not be guaranteed. Only the technical design and manufacture of the components will then be guaranteed.

The following points must be checked before the first switching-on:

- Is the mechanical fitting all right?
- Are all the mechanical components adjusted?
- Was a function test of the electrical components carried out?
- Was a function test of the mechanical components carried out?
- Are the motors direction of rotation correct?
- Are all screws firmly tightened?
- Were all chains lubricated and stretched?
- Are all safety facilities in function?
- Is no staff in the danger area?

Process engineering

- In the area where items are moving on the conveyor it is necessary to work precisely and safely. Make sure that you have the correct environment for working. You can work best if your attention is not distracted.
- Work on automatic conveyors demands your full attention and sometimes it is necessary to react quickly. In order to fulfil these requirements, you must be healthy and fully alert. It goes without saying that certain medicines, alcohol and other intoxicating substances should not in any way influence you or your behaviour.
- Be sure to wear the right protective clothing and equipment when using the conveyor!
- Avoid injuries which could be caused by catching on edges or protruding components:
 - wear close-fitting clothes
 - fasten sleeve buttons
 - do not wear watches, jewellery (bracelets or necklaces) or rings!

- Injuries which are caused if you catch your clothing on the machine are made worse by these.
- Despite careful working, it can happen when loading or unloading items on and from the conveyor that something can fall. Wear safety boots and helmet!
- When loading the items to be transported, make sure that within the whole conveyor area nothing can fall, jam, catch on the machine or rock.
- In particular when items have changed direction (turns, curves, after or during upward or downward slopes) they can move or swing. These areas must be made particularly safe.
- When working overhead, be sure to wear a helmet and protective goggles.

Conveyor Operation

- Observe the instructions regarding turning the machine on and off which is indicated in the operating instructions.
- Observe the correct order when turning the machine on or off and for switching on again after interruptions in operation. Failure to do so can lead to disturbances in operation.
- The function of the safety equipment and safety monitoring equipment must be checked after switching on the mains switch.
- You can only work with the machine in automatic mode if all the guards are fully closed and locked.
- When the machine or control system is switched off or when the Emergency Stop switch is operated or the electricity supply fails, it may be necessary to carry out a procedure for acknowledging a fault.
- Set the correct operating mode. Observe the instructions in the operating instructions as to how to change the operating mode. The operating mode may not be changed while the equipment is running.
- Operation in the reverse direction (reverse drive) must be expressly allowed in the operating instructions. If reverse drive is operated incorrectly, the conveyor can be severely damaged.
- The lubrication intervals must be kept to in accordance with the instructions in the operating manual.
- Lubrication must be checked regularly, even if there is an automatic lubrication system.
- The amount of lubricant in the system must be checked after every lubrication cycle.
- Lubricant must be regularly added.
- Observe unusual noises
- Observe leakage or falling level of lubricant in the gear motor, gears etc.
- Look out for loose fasteners
- It is not permitted to stand or remain in the conveyor area while setting up the equipment. Danger to life and limb! Only specialist staff responsible for setting up the equipment are permitted to remain in the conveyor area at this time.

Maintenance

- The level of lubricants must be checked and topped up in good time.
- The maintenance schedule for Kewesta conveyors is given in the operating instructions. The plant operator must ensure that the maintenance intervals are observed in order that all the functions of the machine are at optimum standard for the entire life time of the machine.
- Only carry out maintenance work which is specified in the instruction manual. Any other work should be carried out by our specially trained service engineers.
- Before cleaning and maintenance work, switch off the machine at the mains switch and secure the switch against unauthorised or unintentional operation. This prevents other members of staff from switching on the machine by mistake while the maintenance work is being carried out.
- Inform those responsible for operating the machine before carrying out repair and maintenance work!
- If necessary, isolate the area where the maintenance is being carried out, leaving sufficient safety margins!
- Clean the conveyor and in particular connections and screw connections thoroughly at the start of the repair or maintenance work! Do not use aggressive cleaning materials! Use fluff-and fibre-free cloths!
- Remove any items being transported from the conveyor before starting repair or maintenance work. This avoids risk of collision and injury.
- If carrying out assembly work at a great height, wear equipment which protects against falling! Keep all handles, steps, ladders, scaffolds and platforms clean.
- Individual components and larger assemblies should be fixed securely to hoists so that there can be no danger. Only suitable hoists in perfect working order and fixing mechanism or equipment with sufficient load bearing capacity may be used! Do not stand, walk or work under overhead loads.
- If it is necessary to remove or loosen fixings on conveyor components during repair work, e.g. loosening of locking devices, brakes etc. additional safety precautions must be taken in order to avoid all danger to the machine or to persons.
- Fixing equipment and hoists must be voltage-free during maintenance and repair work and must be secured in this condition.
- Repair, maintenance and assembly work on electrical, pneumatic or hydraulic portions of the conveyor and accessories may only be carried out by trained specialist personnel.
- Before carrying out work on the hydraulic or pneumatic parts of the machine, all pipelines and pressure storage vessels must be made pressure-free. Danger of accident!
- When repairing or maintaining chains or belts, these must be de-tensioned and retensioned after the work to the correct force.
- Note that pneumatic and hydraulic equipment can be constantly under pressure, even if the mains switch is off.
- Wear parts, hoses etc. must be checked at appropriate intervals and changed as necessary.

- Check all pipelines, hoses and screw connections regularly for leakage and damage which is recognisable from the outside. Repair any damage immediately.

After completion of repair or maintenance work

- Always tighten any loosened screw connections
- Remove any safety or securing equipment or barriers
- Check that the conveyor and safety equipment are functioning perfectly.
- The conveyor may only be re-started if it is in perfectly satisfactory condition.

Environment protection

- Any materials and substances which are used must be handled and disposed of in the correct manner.
- Dispose of lubricants in the proper manner. On no account should they be released to the sewage system or into water.
- Use cleaning and protective materials which are as kind to the environment as possible. Suck off any aerosols, dust and vapours. Dispose of old and used parts or return for recycling.

Replacement parts

- Replacement parts must fulfil the requirements set by the manufacturer. This is always the case with original parts from the original manufacturer.
- If other parts than the above are used, the guarantee does not apply.

Operational and Maintenance Instructions

General

In order to ensure an undisturbed operation of our conveyor system, please pay attention to the following hints and explanations!

The conveyor is designed for customer specific requirements and should not be over loaded.

Not allowed is:

- the exceeding of the allowed conveying goods individual weights per suspension.
- the exceeding of the allowed conveying goods total weight of the system.
- the exceeding of the allowed conveying speed limit.
- the exceeding of the allowed thermal strain of the conveying system.

See also in the data sheet on this topic for your conveyor.

To avoid is:

- a thrust-like-shock of the conveyor chain (e.g. by conveyor loading and unloading)
- unnecessary lateral loads on its hanger bars on the conveyor chain.

Important Notice:

All the required maintenance work and intervals have to be taken from the maintenance plan. However, in very damp, warm and aggressive environment, the intervals have to be shortened. The following points should be observed during maintenance works:

Check all the sprockets' bearings and drive shafts for smooth and quiet running, temperature, lubrication and wear.

Re-lubricating the bearing in between the intervals is not required under normal operating condition.

The conveyor (particularly the conveyor rails) is to be kept free of dirt and other foreign substances. If necessary, the conveyor chain and the inner side of the conveyor rails may be cleaned with a brush or a rag with cleaning detergent. After cleaning, the conveyor chain rollers should turn easily. If necessary, the inner side of the conveyor rails may be treated with a qualified corrosive agent.

Starting Torque for Screws and Nuts

All screws and nuts (e.g. connecting chain pins, screws to hanger bars, rails connectors etc.) must be tightened according to the following table. This does not apply to adjustment screws.

Dimension	Tightening Torque (Nm)		
	8.8	10.9	12.9
M4	2,9	4,1	4,9
M5	8,0	8,5	10
M6	10	14	17
M8	25	35	41
M10	49	69	83
M12	86	120	145
M14	135	190	230
M16	210	295	355
M18	290	405	485
M20	410	580	690
M22	550	780	930
M24	710	1000	1200
M27	1050	1500	1800
M30	1450	2000	2400

Calculation basis for tightening torque in accordance with VDI guideline 2230
 Table valid for metric regular type screw thread DIN 13, sheet 13.

Chain Drive

For the drive of the conveyors, a caterpillar chain drive or geared drive will be used. For larger conveyor systems or high conveyor load, a number of drives will be used. In this case, please check for a regular current consumption of the driving motors (see separate description of the motor manufacturer). The caterpillar chain drive is to be maintained according to the separate description "caterpillar chain drive".

Friction Clutch

A Sliding hub is provided in order not to exceed the maximum permitted chain pull. This sliding hub must be maintained in accordance with the separate description described as "sliding hub".

Expansion adjustment joint

In order to make up for the existing rails expansion at high varying temperatures (from 80°), the rails have build-in expansion compensator (expansion joint) at the appropriate places. (see separate description "expansion adjustment").

Maintenance plan and maintenance intervals

Before re-lubricating, the running surface, sliding bars and chains are to be cleaned and checked for possible damages. The lubricant must reach the joints points to be able to fulfil its function.

	Standard/ reference value	Individual value
Check all load-bearing screw fastenings and if necessary, tighten up.	1600h	
Check impact breakages and damage	800h	
Check rollers reversing wheel bearings and journal bearings	800h	
Check chain adjuster and chain suspensions	600h	
Check sprockets for wear	600h	
Control chain tension and if necessary, shorten or replace chain	600h	
Check pneumatics for damage and leakage	800h	
Check function and fastening at all electrical switch	800h	
Check switching points	800h	
Depending on the operating conditions, clean all optical sensors	40h	
Guide and running roller, bearing, universal shaft, clean lubricant off joints and chains in the cold area or lubricate	800h	
Clean lubricant off guide and running roller, bearing, universal shafts joints in the warm area (dryer) or lubricate if not automatic.	160h	
Clean lubricant off rollers and chains in the warm area (dryer) or lubricate, if not automatic.	40h	
Lubricate chain in normal area, if not automatic	80h	

For further maintenance intervals, see special operating instructions

Safety notice:

Servicing and maintenance work may only be carried out by persons who are particularly trained and qualified in the particular specialist area and only the original spare parts must be used.

When working on the conveyor system it must be ensured that no danger to the staff is possible.

This can be achieved e.g. through shutdown of the conveyor system or the entire equipment, or subsection, depending on what type of work is to be carried out. Safety facilities may not be made ineffective or abused.

In very damp/humid, warm and aggressive environment, the intervals are to be shortened.



Lubricant

Select the correct lubricant from the following list:

Grease:

Standard/guide value for grease up to 120°C temperature range.

Saponification type: lithium

Dripping point: 185°C

Worked penetration at 250°C: 265-295

NLGI-sort(class) 2

The grease Staburags NBU 12 is to be used for operating temperatures up to 150°C.

The grease BARRIERTA L55/0 is to be used for operating temperatures up to 250°C.

Oil:

Standard/guide value for oil:

Surrounding temperature -4°C upto +38°C: SAE-No. 30

Surrounding temperature +38°C upto +60°C: SAE-No. 40

Surrounding temperature +49°C upto +60°C: SAE-No. 50

The oil "Synthesco" is to be used for operating temperatures up to 250°C.

Recommendations:

Conveyor Chain:

Use Klübersynth CH 2-100 to lubricate the conveyor chain.

Caterpillar Chain Drive:

The caterpillar chain is to be re-lubricated only with UNIMOLY C 220.

The above mentioned oils and greases are available at:

Conveyor malfunction

All malfunction reports occur, if available, visually through a flashlight and malfunction lamps at the control panel.

All malfunctions will be displayed in the text display device at the control panel if available.

At this point, only general statement about malfunction can be made as through the complexity of the equipment, quite a number of malfunctions can occur and would go beyond the scope at this point.

The following questions are to be checked by disturbance:

- Has the emergency stop switch been pressed?
- Has the personnel protection facility been activated?
- Has sensors or switch been switched on manually?
- Are sensors or switch faulty?
- Have fuses failed?
- Are motors overloaded?
- Has the main fuse failed?
- Is the equipment under power supply?
- Are cables faulty or not correctly installed?
- Are the electrical contacts corroded?
- Has the overload protection effected the control/switch cabinet?
- Can storage noises be heard at drive motors, drive shafts or drives?
- Are chains broken?
- Are trolleys defect or bent?
- Has the air for the pneumatic failed?
- Are universal shafts broken?
- Is the conveyor rail free from foreign matter?

More information to this are indicated in the electric documentation.

Rectification of malfunctions:

Mechanical disturbances can be cleared by replacing the faulty components.

By electrical disturbances, no exact statement about rectification can be made due to the variety of the possible disturbances.

Further information to this are stated in the electric documentation.

If you cannot rectify the malfunction, please contact us.