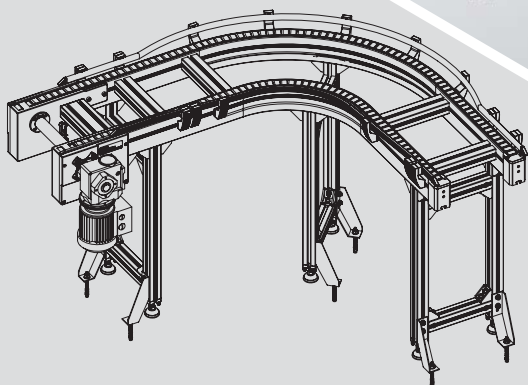


# 90° Flat Chain Curve Conveyor

## 90°平顶链弯道输送机

### Instruction & Maintenance Manual

### 安装使用维护手册



First time user must read this instruction  
首次使用必须详细阅读使用须知

大连美德乐工业组装技术有限公司  
Modular Assembly Technology Co., Ltd.



## Initial Operation Notice 首次使用须知

The chain and chain plate shall be fully lubricated before first use. See Page 8 for detailed operation instructions.

首次使用前，必须对链条整体进行润滑，具体操作详见第 8 页。

Reverse direction operation of PTS2/F is not permissible, which might be damaged and cannot be fixed. First operation should be controlled within 2 seconds, please check if the conveying direction of chain is right.

PTS2/F 输送机禁止反向运转，否则会对设备造成不可逆的损坏，首次运行需短促启动系统（最长2秒），检查链条运行方向是否正确。

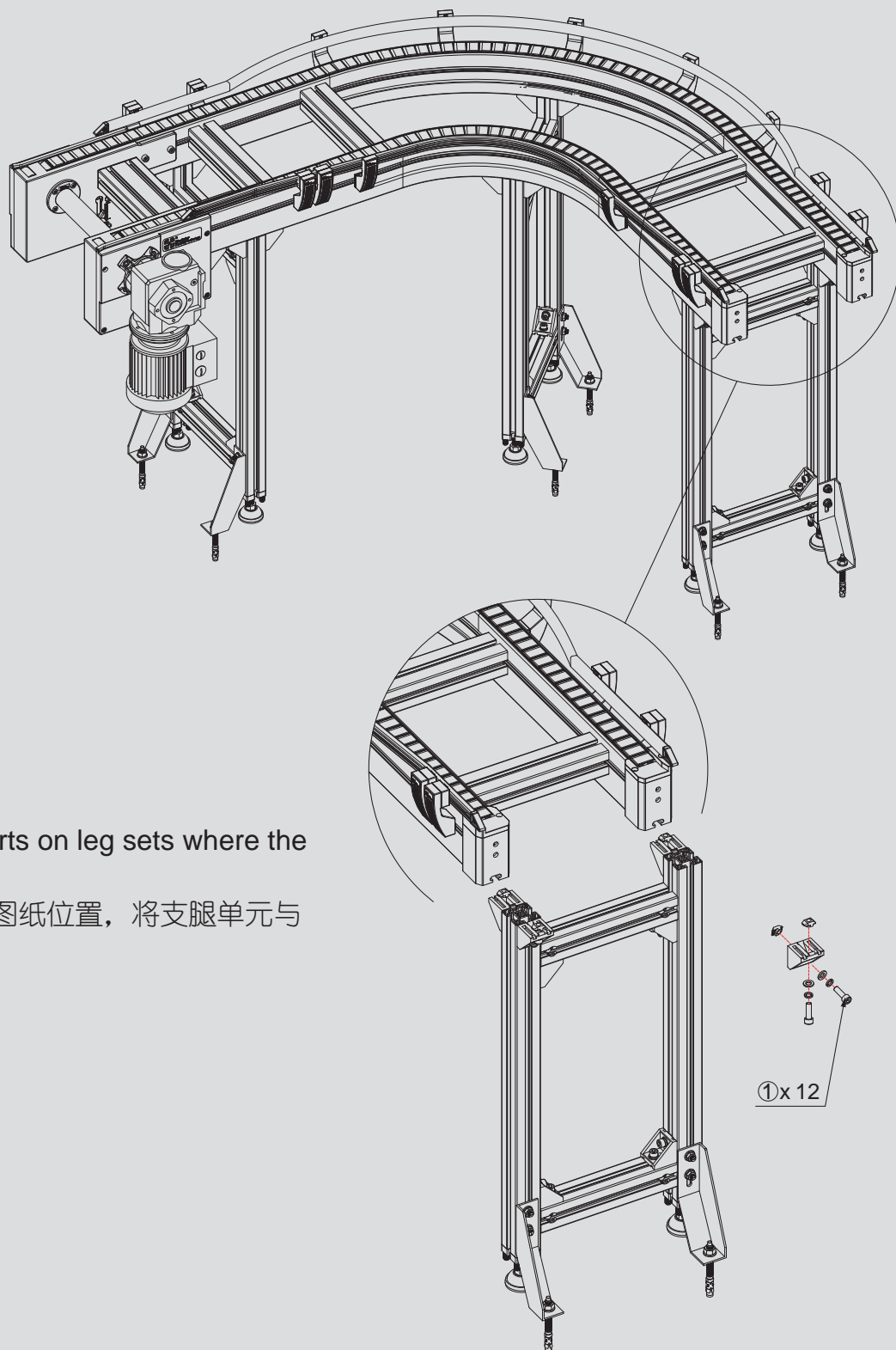
Overload circuit breaker must be installed(it will be provided by customers), to avoid the motor damage by overcurrent.

电机必须额外安装过载断路器（客户自备），可避免电流过载导致电机损坏。

Initial operation notice: When the conveyor is assembled and the electric wires are connected, before connecting to the power, lock the chain tensioner handles by rotating the handle nuts on both sides clockwise to the lock position (as shown in the figure). Turn on the switch, check if the chain movement direction is correct. If so, release the chain tensioner handles by rotating the handle nuts reversely to the unlock position. The conveyor will be in work condition from the test operation then. However, these procedures are necessary after any maintenance, repair or relocation of the conveyor.

接线后首次运行说明：当设备安装并接线完成后，接通电源回路之前，需将链条自适应张紧器手柄螺母（两侧各 1 个）顺时针旋转直至手柄被锁紧（如图示），使张紧器手柄固定。接通电源，判断输送机运行方向并调整至正方向后，释放张紧器手柄螺母（逆时针旋转至滚花手柄根部），线体由调试状态进入工作状态。如遇设备维修，迁移等情况，需要重新接电，必须按以上方法重复操作。

If your shipment of conveyor is in parts, please follow the assembly instruction as below.  
如果您收到的是产品单元或部件，请按照以下说明进行安装。



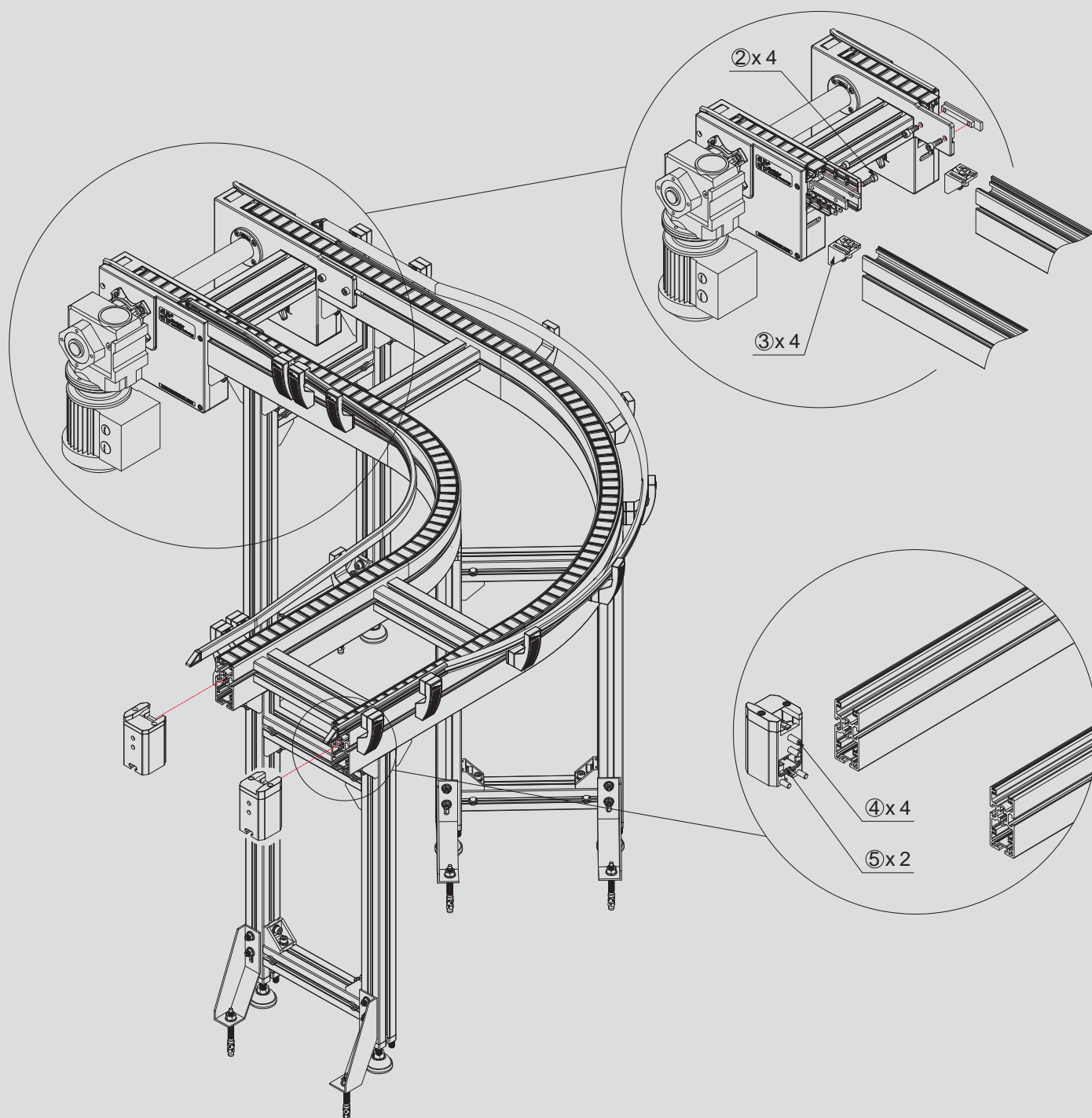
**A** Mount the section parts on leg sets where the layout indicated.

**A** 按您定制机器的规划图纸位置，将支腿单元与线体单元组装在一起。

① M8X25  
⑥ 13Nm

**B** Attach the Drive Unit and Driven Unit to the conveyor section(don't leave the cover plate on Driven Unit).

**B** 将驱动单元和从动单元安装到线体单元上（请勿遗漏从动单元上的挡板）。



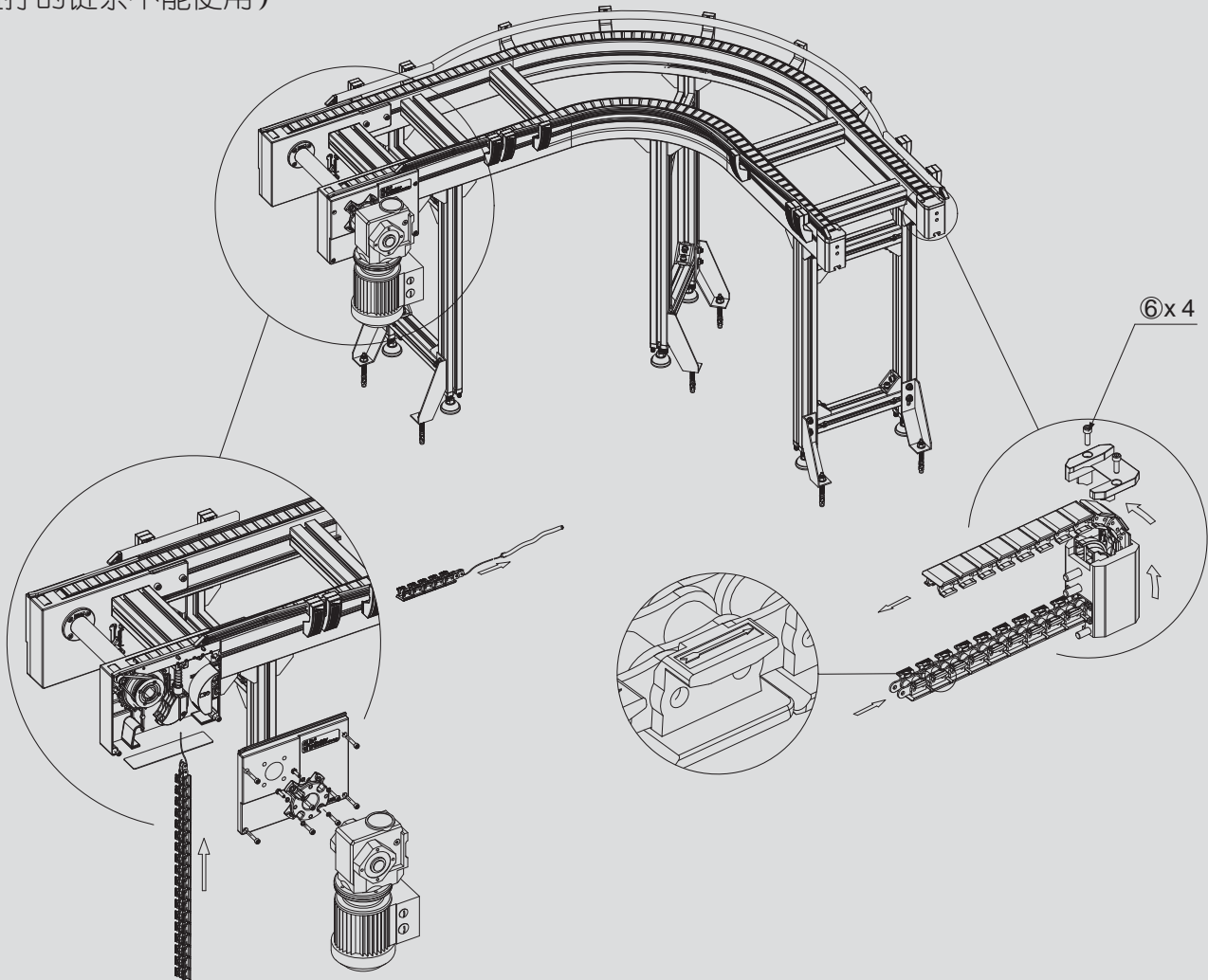
② M8X20  
⑥ 13Nm

③ M8X25  
⑥ 13Nm

④ M8X25  
⑥ 13Nm

⑤ Cover plate  
挡板

- C** Install the flat chain along to the transport direction. The chain shall not be twisted during the installation (Twisted chain can't be used).
- C** 穿入链条时图示箭头方向需与链条运行方向相同，穿入链条过程中注意不要将链条扭拧损坏（扭拧的链条不能使用）



**D** Insert the chain by a chain pulling device (a  $\Phi 2$  mm wire is recommended) into the drive unit, and pull through the lower slot of the chain profiles to the return head. Insert the chains around the return wheels and pull the chains through the upper slot of the chain profiles to the drive wheels until the ends of the chains are in the positions as shown in the figure.

**D** 将链条的头端用钢丝（建议 2 mm 直径）牵引从驱动单元头端穿入，由线体下层穿过，绕过尾单元的从动链轮，由上层向头端牵引，绕过头端链轮，使链条两端处上图被连接位置。

**!** Note: It is suggested to use  $\phi 8$  plastic tube together with the steel wire as indicated to ensure the smooth guidance of chain.

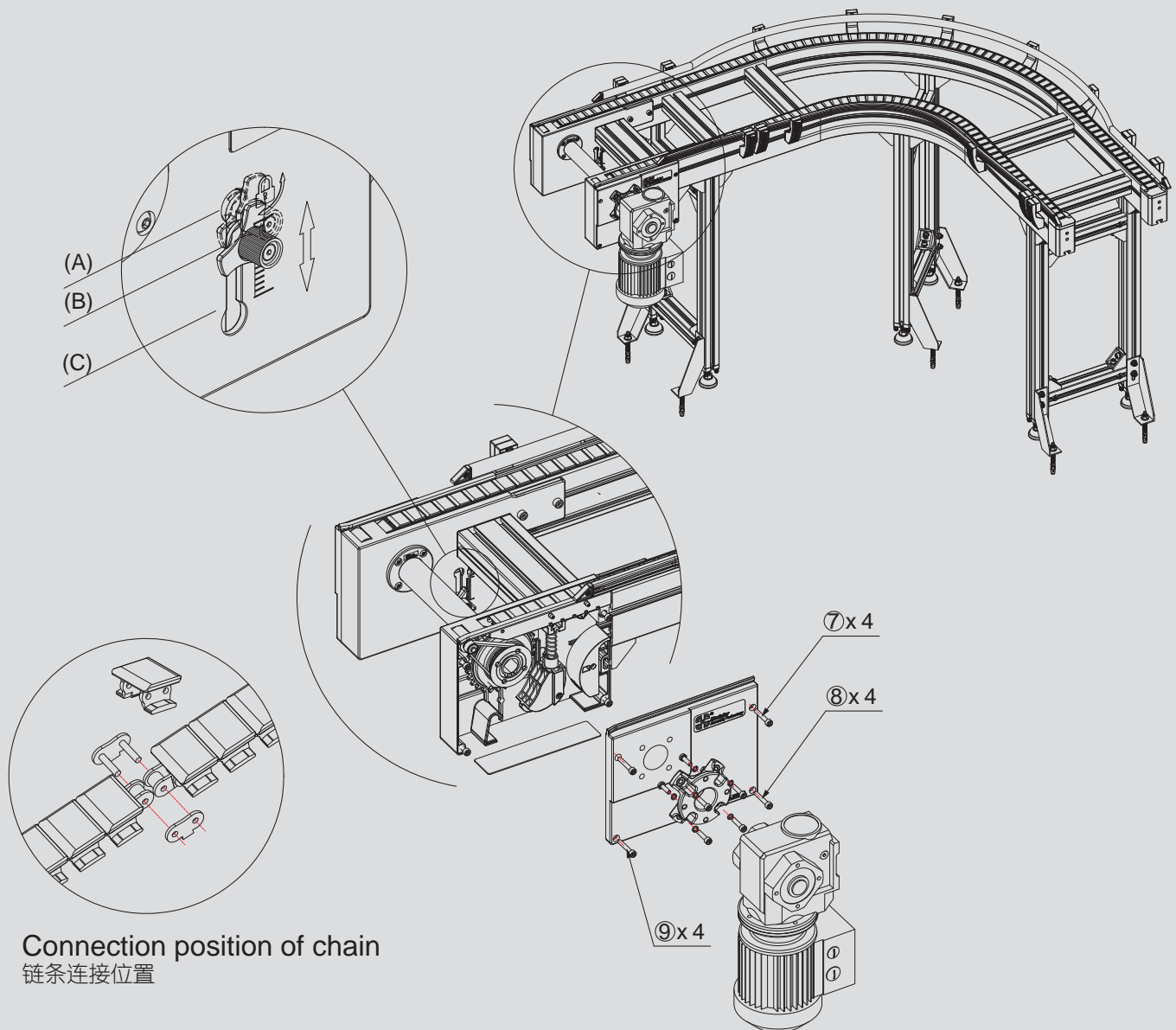
注意：为保证链条牵引过程流畅，建议使用 $\Phi 8$ 塑料管配合钢丝使用，如上图所示

⑥  $\begin{cases} \text{M5X12} \\ \text{④ 4Nm} \end{cases}$



**F** Lift the self-adjustment chain tensioner handle to the highest position, clockwise turn the knurled part of the handle by 90° and the handle will be locked in that position. Connect the chain ends with chain link as indicated. Then anticlockwise turn the knurled part of the handle by 90° and the tensioner handle will slide down to position (B), which is at a distance of 1/3 (AC) from position (A). When the chain tensioner handle reaches position (C) after a period of service time, shorten the chain by removing chain sections.

**F** 将链条自适应涨紧器手柄抬至位置 (A)，顺时针旋转手柄滚花处 90 度，手柄将被锁止在该位置，按图示用链条活节将链条连接成环。然后，逆时针旋转手柄滚花处 90 度，涨紧器手柄将会沿着槽口下滑至位置 (B)，(B) 位置应靠位置 (A) 1/3 (AC) 处。随着时间的推移，当涨紧器手柄至位置 (C) 时，需要通过去除链节的方法来缩短链条长度。



Connection position of chain  
链条连接位置

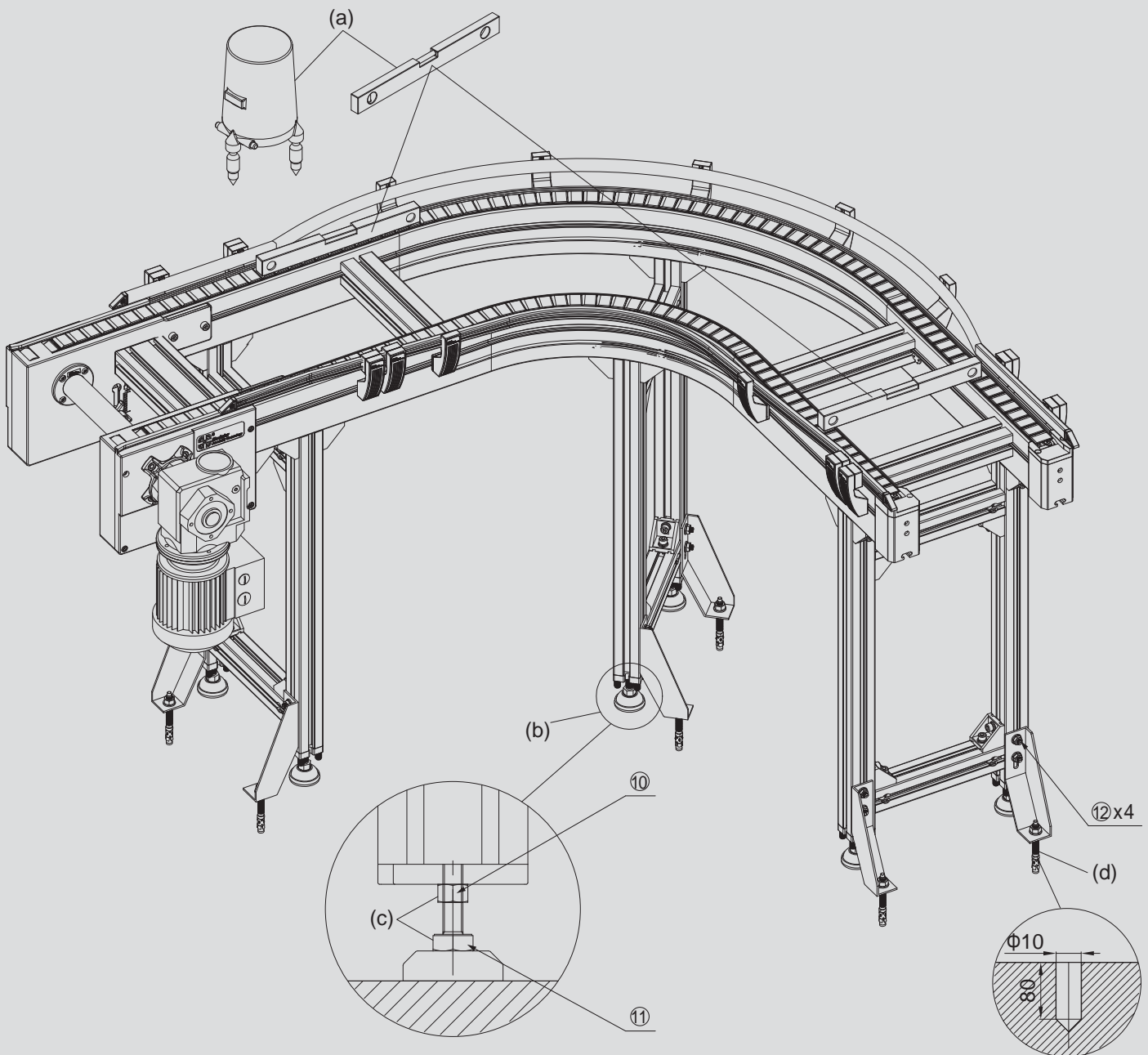
⑦ M6X30  
⑤ 8Nm

⑧ M6X20  
⑤ 8Nm

⑨ M6X25  
⑤ 8Nm

**G** With help of (a) level instruments, level the conveyor longitudinally and laterally by adjusting (b) pivot leveling feet under the stand supports. Fasten (c) nuts on the feet after adjustment. Fix the conveyor on the ground with (d) expansion bolts.

**G** 用(a)水平尺或水平仪（建议使用精度较高的水平仪）对输送线的横向和纵向进行水平调整。调节支腿下方的(b)微调支脚来达到要求。调整完成后，将支脚上的(c)螺母锁紧。最后，用(d)膨胀螺栓将输送线固定在地面上。



⑩ M12  
SW18 20Nm

⑪ M12  
SW24 20Nm

⑫ M8  
SW13 13Nm

## Maintenance 维护和保养

Modular Pallet conveyors are designed and produced for a long life cycle, but correct maintenances are required timely. These include the cleaning, replacement of damaged parts and preventive measures. The measures should be scheduled daily, weekly, monthly and seasonally.

Modular 托盘输送设备按较长的使用年限设计并生产；然而它也需要被适时和正确的维护。包括按时清洁和及时更换损坏的零部件。并作预防性的维护工作。包括下文的日维护，周维护，月维护和季度维护。

### Daily Care 日维护

Before running the conveyor each day, please check and remove small parts or fragments in the chain which may damage the conveyor.

每日开机前，检查和移除任何掉落于运动链条上的碎片，碎片进入到链条与轨道的间隙中会造成设备损坏。

### Weekly Care 周维护

Clean the dust on the surface each week. Check if there is any debris or fragment embedded underneath the plastic parts of the pallets.

每周清洁设备表面污垢。检查是否有异物或碎片嵌入托盘底部的塑料材料内。



**Note:** cleanser that might corrode metal can not be used.

注意：不能使用能够腐蚀金属的清洁剂。

### Monthly Care 月维护

Check the fasteners that may loose and tighten them with wrench each month. Check whether the chain need to be lubricated, if yes, see the Chain Lubrication instructions as below for operation to ensure long service life.

每月检查可能松弛的紧固件，并使用对应的扳手锁紧；检查链条是否需要润滑，如需润滑请参照下方《链条润滑》说明进行操作，以保证较长的使用寿命。



**Note:** 1. The maintenance shall be done on regular basis. Lacking of lubrication will cause the failure of chain, which will lead to the failure of equipment or cause irreversible damage to the equipment.

2. lubricant that might corrode, UHMWPE, POM, Nylon and rubber etc can not be used.

注意：1. 请您务必保持保养周期，缺失润滑会导致输送链失灵从而引起设备运行故障，甚至造成不可逆的损坏。

2. 不能使用具有腐蚀超高分子量聚乙烯，POM，尼龙，橡胶等材料性质的润滑剂。



## Seasonally Care 季度维护

Check and watch out if the chain is loose. When the tensioner nut is up to the lowest location, the chain need to be shortened by removing the chain sections. (Refer to step F for installation instruction)

每季度检查，重点观察链条是否松弛；当张紧器滚花螺母移动至最低刻度时，需要通过去除链节的方法来缩短链条长度。（参照安装说明，步骤F）

## Chain Lubrication 链条维护

### Lubrication of Chain In Carbon Steel 碳钢链条润滑

The chain shall be lubricated before starting the equipment. Lubrication method: rotate the whole chain. It is suggested to use Shell 15W40 machine oil. 2~3 ml of oil per meter. Refer to Figure 1 for lubrication point.

The equipment shall be re-lubricated after stop for more than 6months. The redundant lubricating grease, oil or other impurities need to be cleaned before lubrication. Check whether the chain is worn or extended during the lubrication process. The lubrication method and oil volume are the same as first operation.

It is suggested to re-lubricate the chain if no exact stop duration is known.

When the equipment is in normal use, the chain shall be lubricated every 1000 hours. Little lubrication oil each time is suggested. It is about 2 ml lubrication oil per meter.

When the equipment is in humid environment, it is necessary to shorten the lubrication circle according to the situation.

It is suggested to use AL automatic lubrication system. Refer to "Automatic lubrication " for detailed method.

首次开机前，碳钢链条必须润滑，润滑方式：转过全部链条，用大约 2~3 ml/每米链条的油量（推荐使用 15W40 壳牌机油）给链条上油，润滑点如图 1 所示。

设备停机 6 个月或更长时间，需要重新润滑，润滑前需清除链条上多余的润滑脂、油污或者其他杂质；在进行润滑时，需要检查输送机链条是否磨损和伸长；润滑方式及所需油量与首次开机相同。

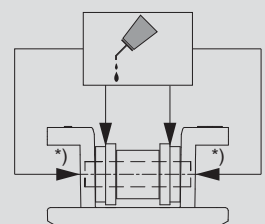
如果不清楚设备停用了多久，建议重新开机前做好润滑。

设备正常使用时，链条每 1000 小时需要润滑一次，每次少量润滑，每米链条使用约 2 ml 润滑油。

设备运行环境湿度较大时，需要根据实际情况缩短润滑周期。

我们推荐使用 AL 自动润滑系统，详细设定方法参考《自动润滑》。

Fig.1 图1



\*) The lubrication shall be done on the sides for flat chain.  
对于平顶链板必须在链板侧面进行润滑

## Lubrication of Maintenance-free Chain

### 免维护链条润滑

The chain shall be lubricated before starting the equipment. Lubrication method: rotate the whole chain. It is suggested to use Shell 15W40 machine oil. 2 ml of oil per meter. See figure 1 for lubrication point.

The equipment shall be re-lubricated after stop for more than 6months. The redundant lubricating grease, oil or other impurities need to be cleaned before lubrication. Check whether the chain is worn or extended during the lubrication process. The lubrication method and oil volume are the same as first use.

It is suggested to re-lubricate the chain if no exact stop duration is known.

When the equipment is in normal use, the chain shall be lubricated every 2000 hours. Little lubrication oil each time is suggested. It is about 1 ml lubrication oil per meter.

When the equipment is in humid environment, it is necessary to shorten the lubrication cycle according to the situation.

It is suggested to use AL automatic lubrication system. Refer to "Automatic lubrication " for detailed method.

首次开机前，免维护链条必须润滑，润滑方式：转过全部链条，用大约 1~2 ml/每米链条的油量（推荐使用 15W40 壳牌机油）给链条上油，润滑点如图 1 所示。

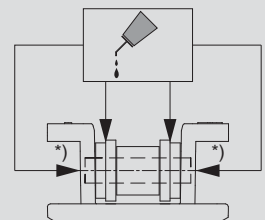
设备停机 6 个月或更长时间，需要重新润滑，润滑前需清除链条上多余的润滑脂、油污或者其他杂质；在进行润滑时，需要检查输送机链条是否磨损和伸长；润滑方式及所需油量与首次开机相同。如果不清楚设备停用了多久，建议重新开机前做好润滑。

设备正常使用时，链条每 2000 小时需要润滑一次，每次少量润滑，每米链条使用约 1 ml 润滑油。

设备运行环境湿度较大时，需要根据实际情况缩短润滑周期。

我们推荐使用 AL 自动润滑系统，详细设定方法参考《自动润滑》。

Fig.1 图1



\*) The lubrication shall be done on the sides for flat chain.  
对于平顶链板必须在链板侧面进行润滑

## Automatic Lubrication

### 自动润滑

AL automatic lubrication system will provide the even lubrication on the chain during the running process. Refer to Figure 2 for lubrication point.

AL自动润滑系统能够在设备运行过程中对链条进行最佳定量的均匀润滑，润滑点如图 2 所示。

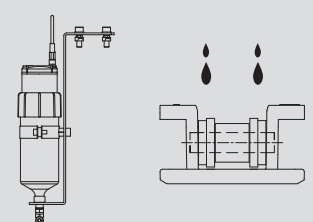
1、For the chain in carbon steel,  
the lubrication oil per meter is 0.85 ml/100 h min ( $\approx 8$  g/1000 h)

对于使用碳钢链条的线体，  
每米线体润滑供给量  $\geq 0.85$  ml/100 h ( $\approx 8$  g/1000 h)

2、For the maintenance-free chain,  
the lubrication oil per meter is 0.21 ml/100 h min ( $\approx 2$  g/1000 h)

对于免维护链条，  
每米线体润滑供给量  $\geq 0.21$  ml/100 h ( $\approx 2$  g/1000 h)

Fig.2 图2



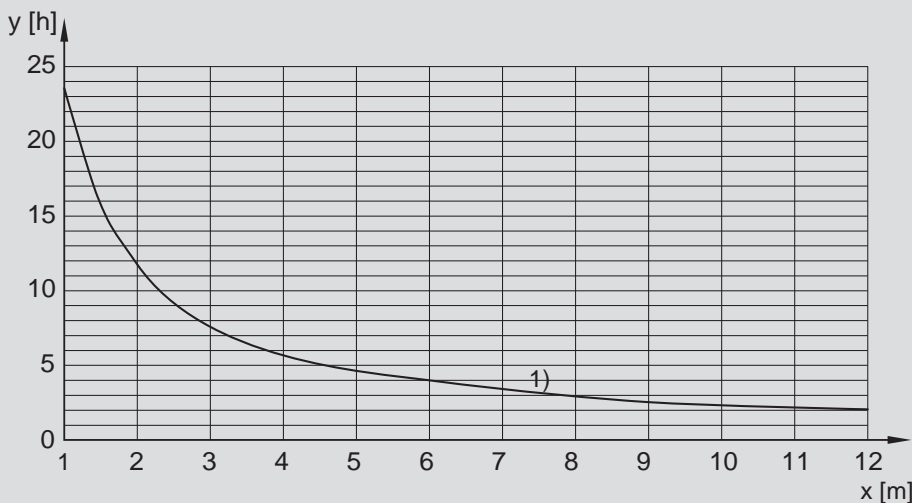
AL Automatic Lubrication System  
AL自动润滑系统

## The setting of Automatic lubrication circle 自动润滑周期设置

Reference value of lubricating circle for 120ml oil tank (month)/120ml油罐润滑周期参考值 (月)												
Conveyor length/输送线体长度	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m	11m	12m
Carbon steel chain/碳钢链条	12	9	6	5	4	3	3	2	2	2	1	1
Maintenance-free chain/免维护链条	12	12	12	12	12	12	11	9	8	7	7	6

Reference value of lubricating circle of 250ml oil tank (month)/250ml油罐润滑周期参考值 (月)												
Conveyor length/输送线体长度	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m	11m	12m
Carbon steel chain/碳钢链条	12	12	12	10	8	6	5	5	4	4	3	3
Maintenance-free chain/免维护链条	12	12	12	12	12	12	12	12	12	12	12	12

## The Setting of Automatic lubrication pulse 自动润滑脉冲设置



- x [m]: Conveyor length  
输送线体长度
- y [h]: The interval of pulse lubrication  
脉冲润滑的间隔
- 1): Reference value /Impulse for chain in carbon steel: 0.26 ml  
碳钢链条每脉冲的剂量: 0.26 ml  
Reference value /Impulse for maintenance-free chain: 0.1 ml  
免维护链条每脉冲的剂量: 0.1 ml

### Note 注意

- The length difference of lubrication lines is 10 mm max. Different length of lubrication lines may lead to unequal distribution of lubrication oil because of uneven flow resistance.  
润滑管道的长度差别要 < 10 mm。不同的润滑管道长度由于不同的流动阻力可能会导致润滑剂分配不一致。
- The lubrication line must always be located lower than the lubrication pin, otherwise the lubrication line runs dry (uncontrolled oil leakage, air bubbles form in the tubing).  
润滑管道必须处在润滑头的下方，否则润滑油会不受控流出，在润滑管道形成气泡，甚至可能导致润滑管道流空。
- Please fill in the lubrication lines with oil before the first operation. For example, Actuate the lubrication system by pressing button in the PLC control until the oil is spilled out of the line. (the details please refer to the mannual of AL lubrication system).  
在初次运行前请注满润滑管道，例如，操作润滑设备 PLC 控制器上的键 (详见自动润滑单元使用手册)，直到润滑剂从润滑头中溢出为止。

## Regular Troubleshooting 常见故障及处理方法

- 1、Abnormal noise from chain: it is mostly because of minor parts falling into the chain. If any, stop the equipment at the first place and take out the parts according to the noise.  
链条异响: 多由微小零部件掉入链条间隙引起, 需要紧急停机, 根据声音位置找到异物并取出。
- 2、Noise from drive unit or driven unit: the bearing maybe need to be lubricated.  
驱动单元或从动单元异响: 考虑是否轴承需要润滑
- 3、Overheated motor: check if the equipment is overloaded, there is loose motor wire or the motor loses on phase.  
电机过热: 检查设备是否超载, 电机接线是否松动或电源是否缺相。

## Modular Conveyor System

## 模块化输送系统

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