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OUTLAST. OUTPERFORM. OUTDELIVER.

# MMST Owner's Manual

## Introduction

Thank you for purchasing a Mini MicroSpan Transfer (*MMST*) Transfer!

This manual has been prepared for those people who will assemble, operate, or maintain the *MMST*. It is important that all personnel responsible for the care and operation of this product **READ** and **UNDERSTAND** the information contained in this publication.

## Digital Documentation

Each *MMST* ship with a packet contains various documents. However, all the latest version documents can be downloaded from the http://www.spantechconveyors.com website.

The following items should be included in the documentation packet (however, more items may be available on the website):

- Owner's Manual (this document)
- Recommended Spare Parts Drawing
- Motor Assembly Documentation
- Motor Controller Documentation
- MicroSpan Technology Guide

# Contents

# Safety Warnings

## Installation Safety

- Installation of *MMST* transfers should be performed only by trained and experienced personnel who have read and understand all the literature included in this shipment.
- All electrical installations and wiring should conform to the National Electrical Code (NEC).
- Each control station should be clearly labeled and should be located so that the operation of the transfer is visible from the control station.
- Guards, safety devices, and safety labels should be installed in the correct locations and maintained in good repair.
- Support systems for the transfer should be securely anchored.

## Control Stations

- *Lockout the electrical power to the transfer motor in accordance with OSHA regulations prior to system maintenance. Failure to comply could result in serious injury or death.*
- The transfer should not be started until all personnel in the area have been alerted by an automated signal or by a designated person. Do not start the equipment until all applicable personnel are aware of your intention and are clear of components to be energized. Once personnel have been properly alerted, the transfer may be started.
- Only trained and qualified personnel may perform maintenance or repair tasks on a control station.

## Safety Inspections

### Evaluation After Inspection

After installation of the *MMST* transfer, the user should perform an initial on-site safety evaluation. The Pre-Operation safety checklist should be used. Additional safety labels (if needed) should be ordered at this time, before operations begin.

### Pre-Operation Safety Checklist

The Pre-Operation Safety Checklist is shown on page 8. Please make sure to go through this checklist prior to starting the Mini MicroSpan Transfer every time it starts.

### User Safety Evaluation Log

The user should maintain an ongoing safety evaluation log. The log will consist of the most recently completed Pre-Operation Safety Checklists. User safety evaluations should be performed monthly.

## Design Changes

Making changes to the equipment may create serious hazards. The user should not make changes which will affect the design, construction, installation, or handling requirements of the equipment without the written consent of the manufacturer.

***Do not mount brackets or other items on the side plates that extend above or below the chain surface, as this could create pinch points and the possibility of injury.*

## Span Tech Parts

Only parts supplied or authorized by Span Tech may be used on the transfer system.

## Major Causes of Conveyor-Related Injuries

The major causes of conveyor-related injuries include:

- Inability to rapidly halt transfer motion
- Exposed tension components
- Shear points and pinch points caused by moving components, product, or product carriers
- Falling objects

The precautions, recommendations, and instructions provided in the Safety Section (page 8) and throughout this manual should be understood and followed as a necessary part of a comprehensive effort to minimize transfer-related hazards.

## Prohibited Environments

In certain environments, *MMST* transfers should not be used. If you are unsure of the safety or suitability of your intended environment, contact a qualified Span Tech representative. Never use the *MMST* transfer in any of the following environments:

- Presence of concrete or rock dust of any type
- Presence of dust or fine particles of the following substances:
    - Flour
    - Sugar
    - Corn meal / starch
    - Salts
- Exposure to any substances of high or low pH (strong acids, bases, etc)
- Excessive moisture or dampness
- Extremely dirty or dusty environments

## In Case of Fire

***The acetal material of the transfer chain burns with a very hot, very faint flame. In case of fire, use Water, Foam, $CO_2$, or Dry Chemical extinguishers only. Use of other material will not extinguish the fire and could result in serious injury, death or significant property damage.*

If the *MMST* acetal transfer chain were to catch fire, a blue flame would be barely visible, and little or no smoke would be produced. In case of fire, immediately stop conveyor system operation. The fire can then be extinguished using water, foam, $CO_2$, or dry chemical fire extinguisher. Report any fire to the applicable Fire Department and plant management personnel immediately. Do not re-operate the transfer until all repairs have been made.

## Maximum Load and Speeds

The maximum rated load capacity of any *MMST* transfer is a function of the total load (sum of the weights of the chain and conveyed product) and speed. Contact Span Tech for additional information regarding load capacities.

***Do not exceed Span Tech guidelines regarding maximum load and speed of conveyors and related equipment. Failure to comply could result in premature component wear and conveyor failure.*

# Features and Operation

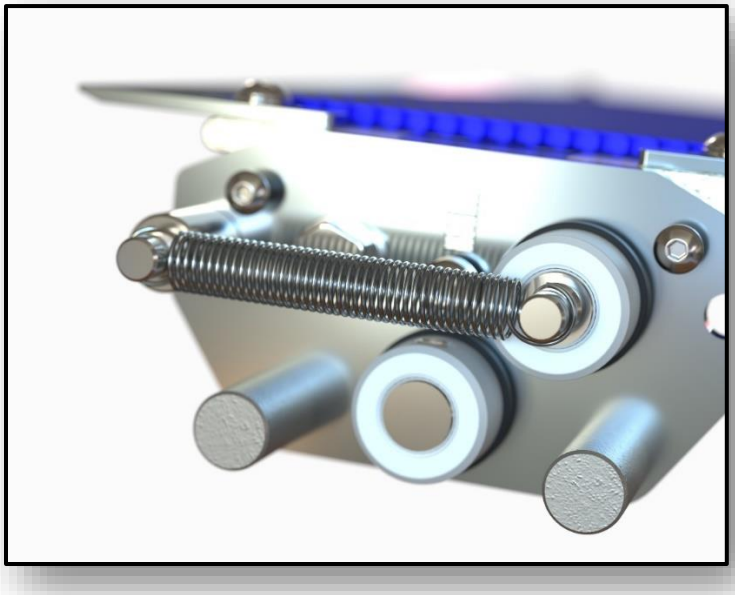
## Features of the Mini MicroSpan Transfer

Your *MMST* transfer uses MicroSpan chain – an extremely-thin, modular plastic conveyor chain - not a typical fabric belt - which eliminates any tracking issues. There are no take-ups at the ends, so the conveyor length stays constant - fitting perfectly between machines with no gap or interference. The drive unit is designed for increased performance and to make maintenance easier than ever.

All in all, we've created a system that has many advantages over typical belt conveyor designs including capability, maintenance, and price. Here are a few highlights which showcase some of the unique features of your *MMST* transfer:

### Automatic Chain Tensioner

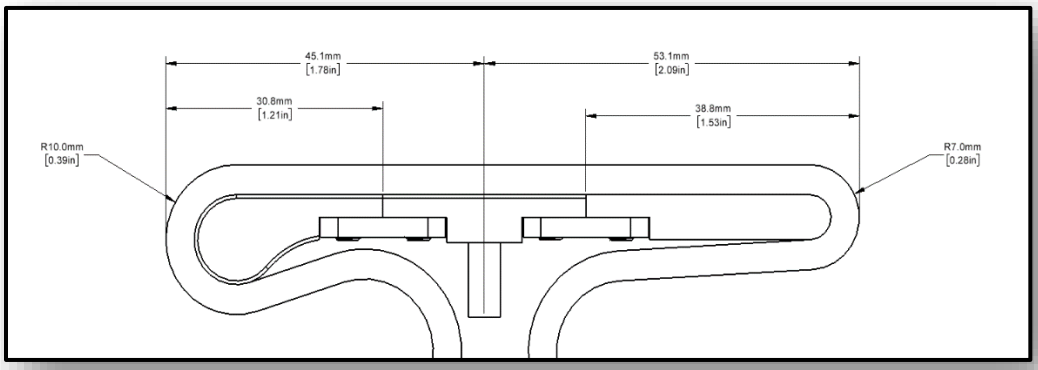
Over time, your MicroSpan chain will stretch and increase the amount of "slack" chain in the conveyor. The automatic chain tensioner will adjust to make sure that your conveyor has the proper amount of chain tension even with this additional length.



However, at some point the chain tensioner will not be able to handle an excessive amount of chain after stretching. When this occurs, the MicroSpan chain will start to skip, alerting you that chain links need to be removed.

## Conveyor End Options

The *MMST* transfer can be ordered or modified to have two different conveyor ends.




The **High Speed** (left) option has an effective diameter of 20.0mm (0.79”). The **Standard** option (right) is the standard option which has an effective diameter of 14mm (0.56”), allowing for smaller products to transfer more easily.

## Chain Styles

We offer 2 styles of chain which are interchangeable. **4mm Plain Chain** has a very smooth top and can carry practically any type of product. **4mm Raised Chain** has a very rough top which provides higher friction for better product stability.

## It’s a Chain, not a Belt

Belt conveyors require a tracking method, usually at the take-up unit at the end of the conveyor, or by using crowned rollers. The belts used on belt conveyors are difficult to repair and often expensive to replace.

The *MMST* transfer is a modular plastic chain transfer. It has NONE of these issues. It is sprocket driven, so it will not walk off the powered drive. Also, it is a fixed-length conveyor - the take-up is located internally – the overall length of your conveyor will stay the same regardless of the stretching of the chain. Repairs can be made on the MicroSpan chain while it is in place on the conveyor and involve nothing more than a set of hands.

## Easy to Work On, Easy to Modify

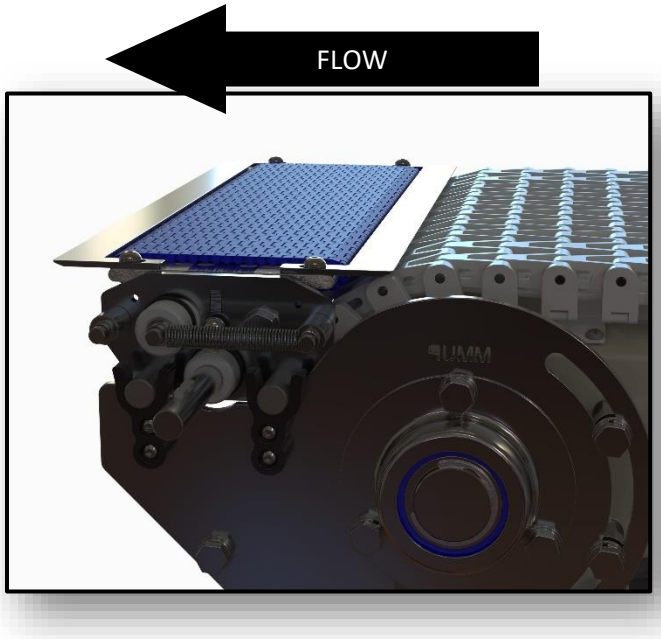
As you will see from this manual, typical maintenance issues and repairs are incredibly simple and involve a minimum number of tools. Most items can be replaced in a matter of minutes. The *MMST* transfer was designed with maintenance in mind.

## Pre-Operation Safety Checklist

1. Make a visual check on the condition of the transfer. All items should be fully assembled, and all guards should be in place.
2. Make sure the chain is intact and tense by gently lifting it while the conveyor is stopped.
3. Make sure there are no items on top of the conveyor that would interfere with the operation of the equipment.

## Basic Operation

Operating the *MMST* transfer is extremely simple and requires no complicated programming. **Please note that the *MMST* transfer is designed to run in <u>one direction only</u>.** The supplied motor controller is pre-programmed so that it can run in this direction. Please do not attempt to bypass this feature as it will cause your *MMST* transfer to run poorly and will void your warranty.



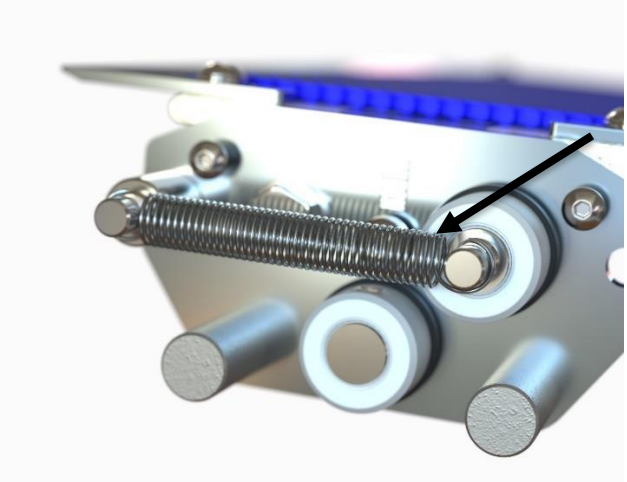

1. Plug the power cord into an appropriate outlet. Wait about 10 seconds for the Oriental Motor motor controller to initialize. The readout on the motor controller should look like this:

2. Switch the power toggle from “STAND-BY” to “RUN”. Inspect the direction of flow of the chain to confirm this. If not, toggle the FWD/REV switch to the direction run direction).


3. Rotate the motor speed wheel to the desired run speed. (The direction of rotation should be in its right direction.
4. Toggle the power toggle back to “STAND-BY” to shut the system off.

## Chain Tension Limit

Over time, the MicroSpan chain stretches. The chain tensioner will provide the correct amount of tension on the chain automatically. However, once the tensioner has reached its limit, the tensioner shaft will bottom out and a change of noise will occur. When this occurs, the MicroSpan chain will need to be changed out.



At this point, you should remove several links of MicroSpan chain to get the tensioner back into its working range. See the section on “How to Split MicroSpan Chain” for instructions on removing chain links.

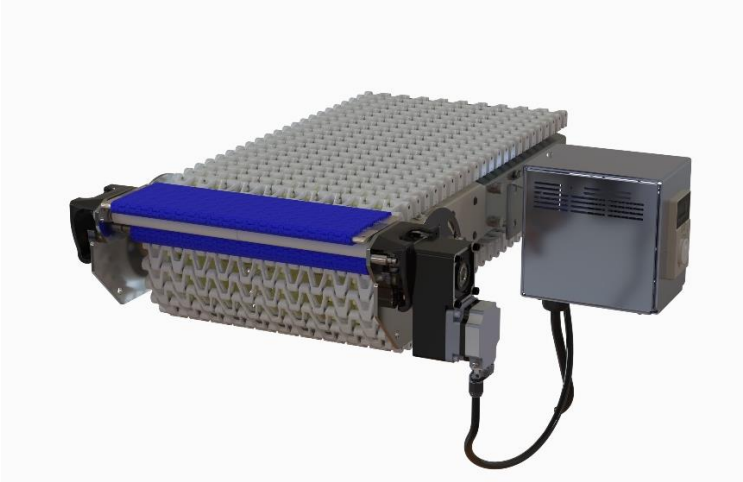
Once you have removed some MicroSpan chain links, connect the chain back again and resume operation as normal. Eventually, the replacement of the entire chain will be necessary if the function of the MMST is altered.

## Installation and Setup

It only takes minutes to get your *MMST* transfer up and running.

### Transfer Installation and Adjustment

Your *MMST* transfer should arrive with the transfer in place, angle adjustment, and if requested, with the deadplates installed. Before removing the transfer from the shipping skid, ensure that the transfer is seated correctly and firmly into place.



The MMST will come equipped with the provided DC motor. Ensure that the motor is fastened corrected. If included in the order, ensure that the motor controller guarding is fastened securely onto the conveyor.

### Angle Adjustment

To adjust the angle of the transfer, unfasten these M8 bolts on both sides. Adjust to the desired angle and tighten the M8 bolts.

### Motor Controller

The *Oriental Motor* motor controller (BMUD30-A2/C2) can be mounted directly to the conveyor with the provided guarding and mount. Please contact Span Tech if you would like to mount the motor controller somewhere else along the conveyor. The motor controller can also be installed into a panel (BLE2D30-A/C).

### Initial Startup and Break-In Period

Span Tech recommends that you run your Mini MicroSpan transfer at least 24 hours before putting it into your production environment. During this time, it is normal for the chain to "shed". This is just a wear-in period that will resolve over time.

If the MicroSpan chain looks loose and/or the tensioning shaft is bottomed out, chain links must be removed from the system. See the section on "Chain Tension Limit" and "How to Split MicroSpan Chain" for more information.

## Maintenance

### Before You Begin

Turn off the transfer and disconnect it from any electrical power source. Use an appropriate lock-out / tag-out procedure to make sure that power cannot be restored to the transfer while you are performing maintenance on the unit.

### How to Split MicroSpan Chain

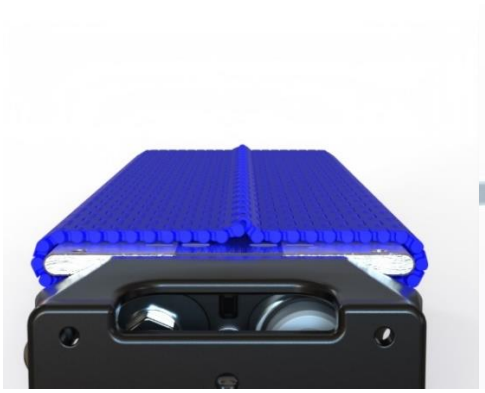
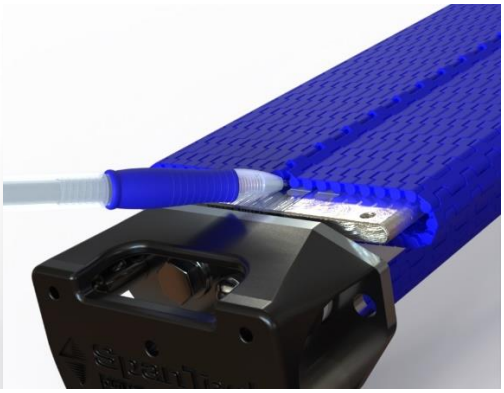
The first step in removing MicroSpan chain is to split it. This is done by folding the chain while simultaneously pulling on it in a "tearing" motion. It is strongly recommended to use a tool such as pen or ruler to give leverage under the chain. This will help make it easier for you to grab the chain and make a v-shape to tear it apart correctly. Disabling the tensioning system will also make splitting the chain much easier. This process is explained in the "MicroSpan Technology Guide".

If you are "shortening" the chain (to reset the chain tensioner system), simply repeat this process for however much chain you want to remove and join the chain together again. It's recommended to have 2-3 links of compression (overlapping links) in the chain per the MicroSpan Technology Guide. Please be aware that the automatic take-up unit will keep the chain under tension while you are doing this.

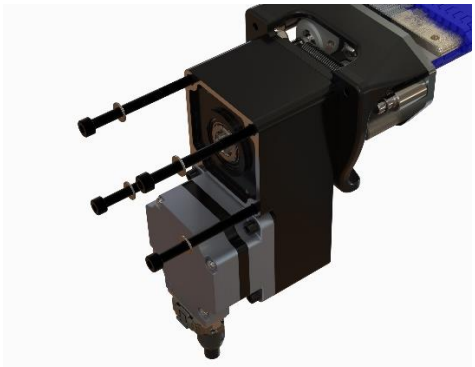
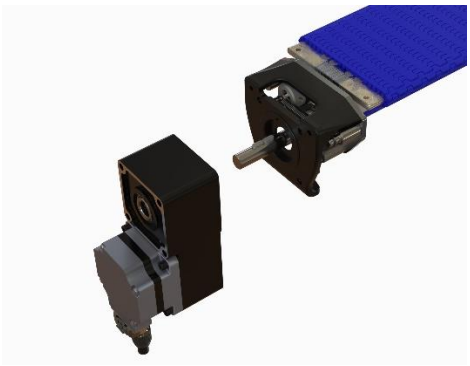
## Disassembly Steps for Various Maintenance Procedures

Various maintenance procedures will require you to do some or all the following steps in no particular order. Please read through all the content and refer to these in future instructions:

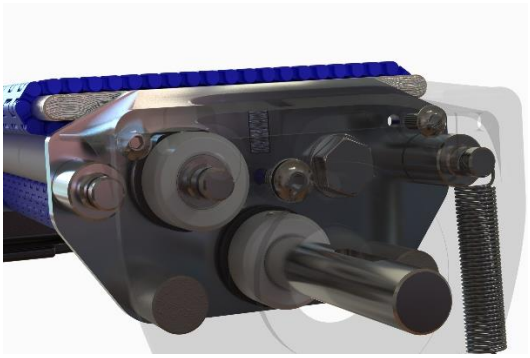
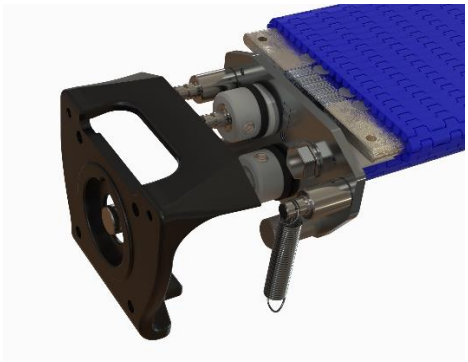
1. **SPLIT THE MICROSPAN CHAIN** as described in the previous section.

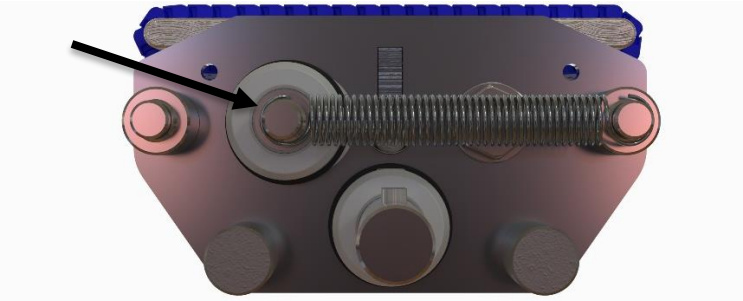
2. **REMOVE THE FOUR MOTOR BOLTS**. Unfasten the 4 shoulder head bolts from the motor. Keep note that are washers and lock nuts on the inside of the motor mount.

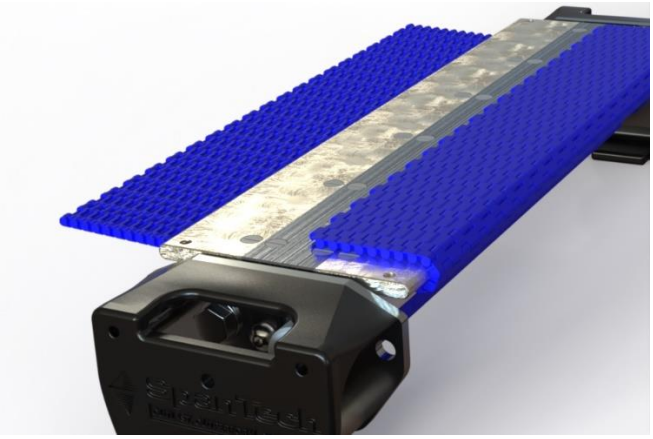
3. **REMOVE THE GUARDS**. Use an Allen key to remove the 2x M4x10 BHCS, 1x M5x12 BHCS, 1x M5 Washer, and 1x M5 Lock Washer. Then remove the side guards. This is the same on motor mount and side guard versions.

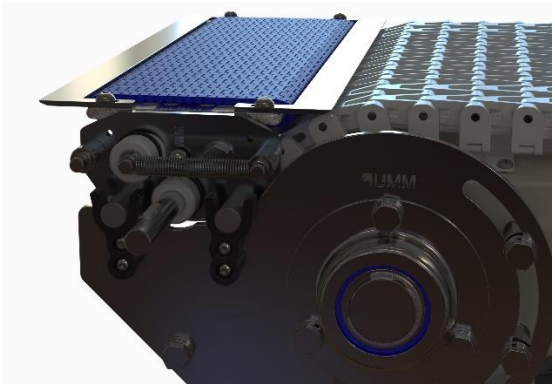
4. **REMOVE THE TENSIONER SPRING** by hooking on one end and pulling the spring off. This will make all the maintenance procedures easier to complete.

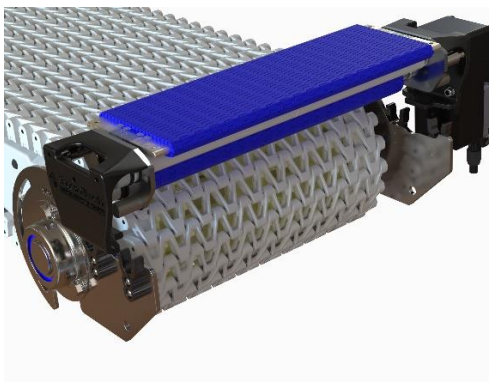


5. **REMOVE THE MICROSPAN CHAIN** by pulling it out of the conveyor in the direction of flow.



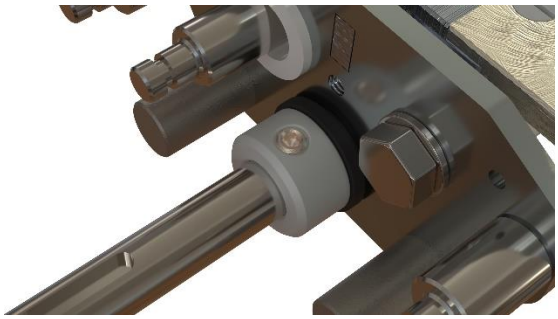
6. **REMOVE THE MMST ASSEMBLY**. This can be done at the beginning of maintenance or after step 5. The assembly can be lifted off the transfer mount.

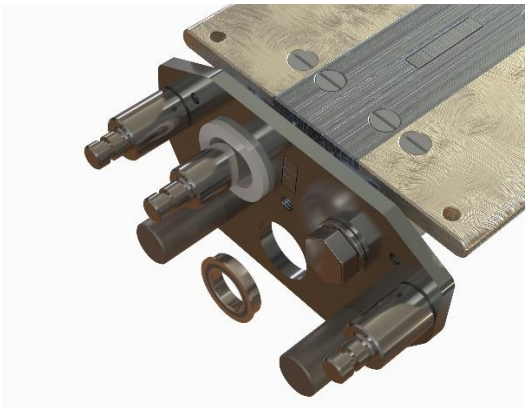


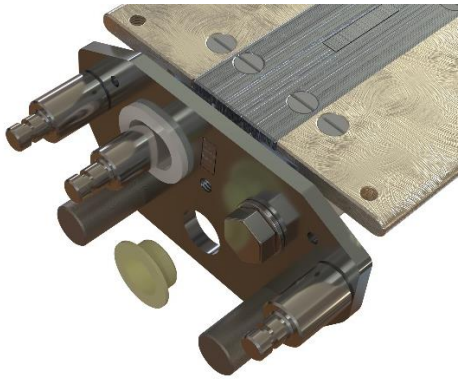


7. **TO REPLACE THE SPROCKETS.** Ensure that the chain is disconnected from the system. Take any standard flat head screwdriver and unclip both sides of the sprocket. Then pull out the top sprocket off the shaft. The bottom sprocket can be pulled off by hand.

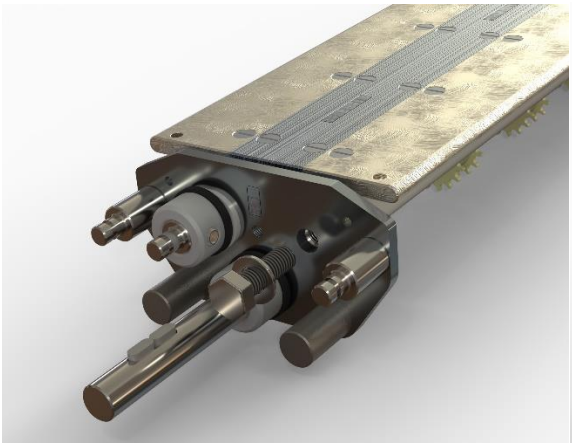
8. **TO REMOVE THE BEARINGS OR BUSHINGS**. Use an Allen key to loosen the 2 set screws on the shaft collars on both sides of the drive shaft. Slide the shaft collars and washer off the shaft. One side at a time, slide off and replace the bearing or bushing. Bushings require replacement after a year of continuous use.

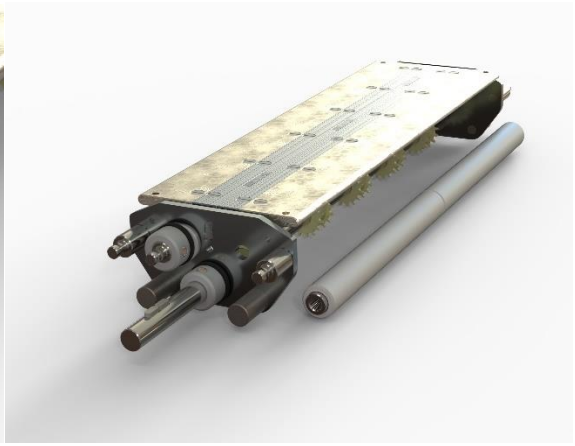




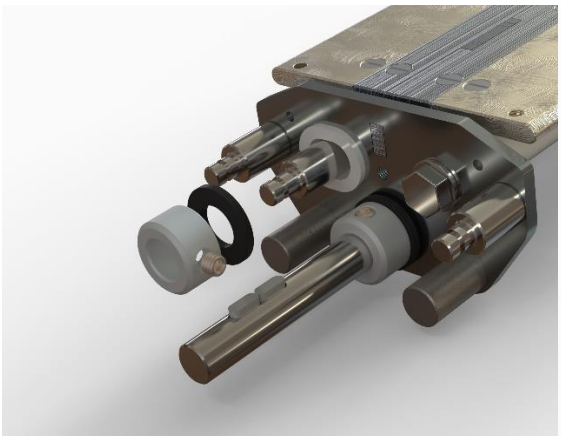


9. **REMOVING THE IDLER TENSIONER**. Remove the M8 Hex fasteners from both ends of the Idler Tensioner and slide the Idler Shaft and rollers off. Keep mindful that the rollers may fall or lose grip of the shaft.



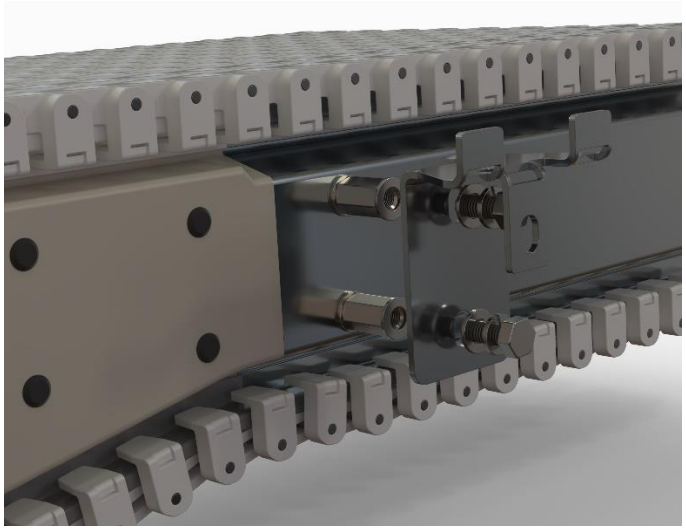


10. **REMOVING THE DYNAMIC TENSIONER**. Unfasten the set screw to the shaft collar and slide out the shaft collar and washer. This is only needed for one side but both sides can be done for ease of removal. Once that is done, slide the tensioner side from one side and be sure to catch the sleeve rollers. Replace with the steps in reverse.

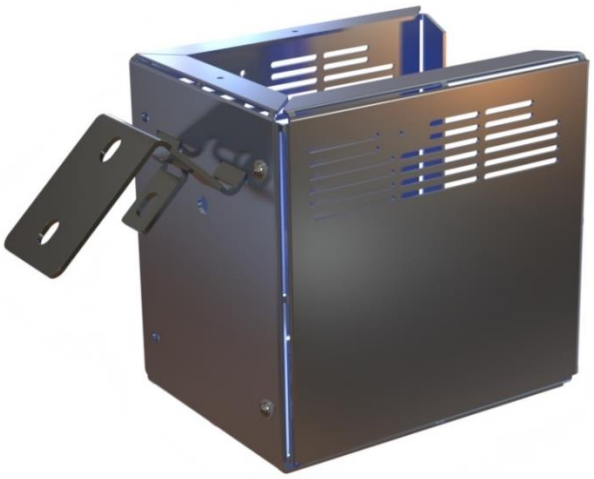


11. **ASSEMBLING THE MOTOR CONTROLLER GUARDING**. With the DS6720 Enclosure Bottom Panel and DS6721 Enclosure Side Panel, alone the holes and slots and fasten with x4 BHCS M4x8 bolts and M4 washers.

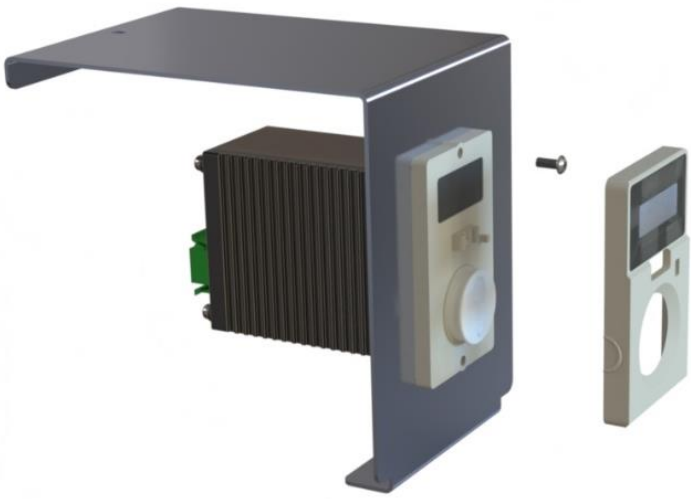
12. **MOUNT THE MOTOR CONTROLLER BRACKET TO THE CONVEYOR.** M8 Standoffs should be already installed on the conveyor, if not, x2 M8 Standoffs, M8 Washers, M8 Lock Washers, are needed to install the DS6722 Enclosure Conveyor Mount to the side of the conveyor. Line up the slots and install the two M8x20 Hex Bolts, M8 Washers, and M8 Lock Washers.



13. **INSTALL THE MOTOR ENCLOSURE GUARDING TO THE BRACKET**. This step can be done before step 12 or now, whichever is easiest. The DS6720 Enclosure Bottom Panel can be slid onto the DS6722 Enclosure Conveyor mount. Install x1 M8x20 HHCS, M8 Washer, and with a M8 Whiz Nut to the inside of the bracket and the DS6720 Enclosure Bottom Panel. This ensures that the Enclosure does not disconnect from the bracket.



14. **INSTALL THE MOTOR CONTROLLER TO THE FRONT PANEL**. With either the BMUD30-A2 or BMUD30-C2, take the front plastic off to access the through holes to install the two M4 BHCSx10 bolts with M4 Washers.



15. **HOOKING POWER AND COMMUNICATION WIRES TO ENCLOSURE.** Using a cord grip for a ½ knockout hole, run the communication cable through and connect it to the Motor Controller. Then run the power cable through a cord grip for a ¾ knockout hole and connect it to the Motor Controller.

16. **INSTALL THE FRONT PANEL WITH MOTOR CONTROLLER TO THE GUARDING**. Using two M4x8 BHCS bolts with M4 washers, slide the DS6719 Enclosure Front Panel to the DS6720 Enclosure Bottom Panel to where the top slot and bottom slot line up with the tapped holes.

# Common Maintenance Procedures

## Removing MicroSpan Chain

To remove the MicroSpan chain into your transfer, do the following:

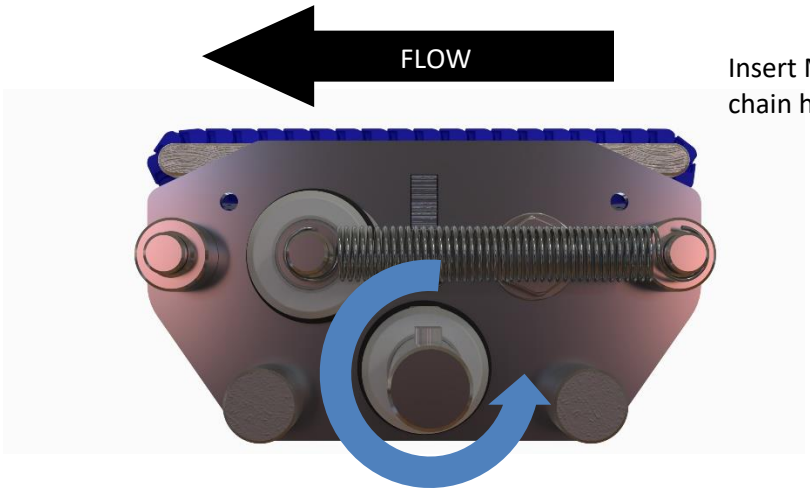
| STEP | DESCRIPTION |
|---|---|
| 1 | DISCONNECT THE MOTOR FROM THE SHAFT |
| 2 | SPLIT THE MICROSPAN CHAIN |
| 3 | REMOVE THE MICROSPAN CHAIN |

## Installing MicroSpan Chain

To install the MicroSpan chain into your transfer, perform the following steps as described in the "Disassembly Steps for Various Maintenance Procedures" section of this document, and other steps described below:

| STEP | DESCRIPTION |
|---|---|
| 1 | REMOVE THE SIDE GUARDS |
| 2 | REMOVE THE TENSIONING SPRINGS |
| 3 | FOR EASE OF INSTALL, REMOVE IDLER TENSIONER |
| 4 | RUN MICROSPAN CHAIN THROUGH SPROCKETS AND TENSIONERS |
| 5 | IF UNINSTALLED, REINSTALL THE IDLER TENSIONER |
| 6 | CONNECT THE MICROSPAN CHAIN TOGETHER |

1. Check to make sure the above steps have been completed. Your transfer should be in a condition which makes it easy to install the MicroSpan chain at this point.
2. Place the chain on top of the Mini MicroSpan Transfer – make sure it is oriented properly as shown in the "MicroSpan Technology Guide".
3. Feed the chain into the top of the transfer at the infeed end and snake it around the system. Ensure the sprockets make even contact with the chain. It can be easier to lay the MMST upside down on a table to align the chain onto the sprockets.



## Replacing Mini MicroSpan Sprockets

To replace the Mini MicroSpan sprockets in your Mini MicroSpan Transfer, perform the following steps as described in the "Disassembly Steps for Various Maintenance Procedures" section of this document, and other steps described below:

| STEP | DESCRIPTION |
|---|---|
| 1 | SPLIT THE MICROSPAN CHAIN |
| 2 | REMOVE THE SIDE GUARDS |
| 3 | REMOVE THE TENSIONERS |
| 4 | REMOVE THE MICROSPAN CHAIN |
| 5 | UNCLIP THE MINI MICROSPAN SPROCKETS |
| 6 | REPLACE THE SPROCKETS |

Once the sprockets are replaced, simply reassemble the transfer by performing the steps described above in reverse.

## Replacing Gearmotor

To replace the gearmotor in your MMST transfer, perform the following steps below:

| STEP | DESCRIPTION |
|---|---|
| 1 | REMOVE THE FOUR NUTS ON THE INSIDE OF GUARD |
| 2 | REMOVE THE FOUR BOLTS FROM THE MOTOR |
| 3 | SLIDE THE MOTOR OFF THE SHAFT |
| 4 | BE SURE TO RETRIEVE THE SHAFT KEYS |

## Replacing Dynamic Tensioner Rollers

To replace the dynamic tensioner rollers (in the Drive Tensioner or Idler Assembly) in your MMST transfer, perform the following steps below:

| STEP | DESCRIPTION |
|---|---|
| 1 | REMOVE THE GEARMOTOR (*FOLLOW* "REPLACING GEARMOTOR") |
| 2 | REMOVE THE NON-MOTOR AND MOTOR SIDE GUARD |
| 3 | REMOVE THE SPRING TENSIONERS ON BOTH SIDES |
| 4 | UNBOLT THE IDLER TENSIONER M8 BOLTS AND PULL TENSIONER OUT |
| 5 | RETRIEVE THE ROLLERS FROM THE IDLER TENSIONER |
| 6 | UNBOLT SHAFT COLLARS FOR DYNAMIC TENSIONER AND REMOVE |
| 7 | RETRIEVE WASHERS ON BOTH SIDE FOR DYNAMIC TENSONER |
| 8 | SLIDE THE DYNAMIC TENSIONER SHAFT THROUGH AND REMOVE |
| 9 | RETRIEVE THE ROLLERS FROM THE DYNAMIC TENSIONER |
| 9 | REPEAT PROCESS IN REVERSE TO INSTALL NEW ROLLERS |

1 - Removing the MicroSpan chain is optional for this step. It will make it easier, but it is not necessary. There is no need to remove the MicroSpan chain from the transfer entirely.

2 – For less steps, it is only necessary to take one guard off to remove the rollers, but it can become more complicated to complete the steps above.
3 – The Idler Tensioner Rollers can be removed by only following step 3-5.

## Maintenance Schedule

Be sure to follow any maintenance recommendations from purchased components on the system (motors, motor controllers, bearings/bushings, etc.).

### Weekly Maintenance

- Visually inspect the transfer. Look and listen for any signs of excessive chatter, vibration, or noise such as squeaking or squealing.
- Look for any signs of premature wear on the components such as plastic dust or shavings.
- Keep the moving components of the MMST transfer as clean as possible. Remove any dirt or debris from the chain, sprockets, drive unit, etc. whenever you inspect the machine.
- Visually inspect the location of the dynamic tensioner shaft in relation to dynamic tensioner bushing location. If it is getting close (within 1mm or so) or bottomed out, you may consider removing some MicroSpan chain during your next down-time.

### Monthly Maintenance

- Inspect chain tension, check for dust and particles from chain, and look for sprocket damage.
- Inspect the bearings or bushings for wear or damage.
- Follow general maintenance recommendations from Oriental Motor for the motors and controllers.

## MMST Troubleshooting Guide

| PROBLEM | POSSIBLE CAUSE(S) | SOLUTION(S) |
|---|---|---|
| Conveyor does not run | • No power | • Check the front panel of the motor controller. If it reads nothing, unplug, wait 10 seconds, and plug the system in again. If this does not work, check the connection from your power source and the motor controller. |
| | • Overload Error | • If this occurs, the readout on the motor controller will read “AL30”. This means the load of the transfer exceeded the capacity of the motor. Check for obstructions in the system and restart the system. |
| MicroSpan Chain Surges or Pulses Rapidly | • MicroSpan chain running in wrong direction | • The MMST is designed to run in one direction only. On the underside of the conveyor, the chain should enter the dynamic tensioner prior to passing through the drive sprockets. The transfer is shipped with the motor controller programmed so this cannot occur. However, this happens if chain was re-installed in the wrong orientation, or if the motor controller was re-programmed to run in the reverse direction. |

| | | |
|---|---|---|
| Mini MicroSpan transfer excessively noisy | • Excessive friction between chain and running surface<br>• Chain running backwards<br>• Damaged bushing or bearing | • This is due to the chain "sticking then slipping" on the running surface. It can be minimized by cleaning the running surfaces where the chain travels and/or lubricating the running surfaces with an appropriate lubricant. Span Tech recommends SpanLube™ only (part number DS0000).<br>• Chain running backwards can cause excessive noise from unintended contact points touching elements backwards.<br>• Dry Igus bushings on smooth shaft surfaces can cause a squeaking noise from the transfer. Likewise for any bearings that are damaged or at the end of their lifetime. |
| MicroSpan chain "jumps" or "skips" erratically | • MicroSpan chain misfeeding on sprocket due to debris or damaged sprocket | • Check the underside of the MicroSpan chain for any debris that may be trapped in the links. Check the Mini MicroSpan sprockets for any damage. Replace any damaged chain/sprockets as necessary. |