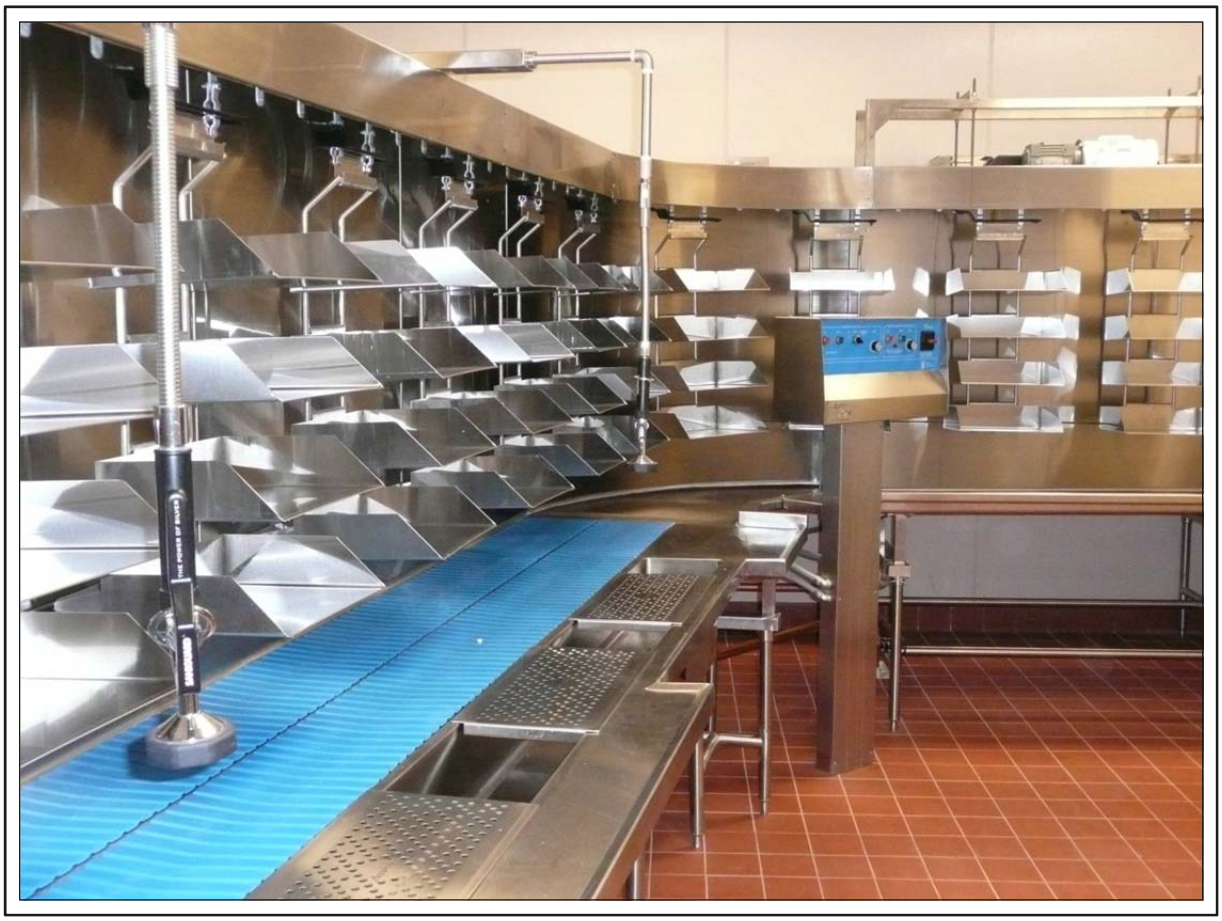
INSTRUCTION MANUAL FOR MODEL TAC - TRAY ACCUMULATOR CONVEYOR SYSTEM MONORAIL STYLE



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INSTRUCTION MANUAL FOR MODEL TAC TRAY ACCUMULATOR CONVEYOR SYSTEM MONORAIL STYLE

OPERATION

1.1. START INSTRUCTIONS

1. Make sure that all the carriers are sitting correctly on the ladders.

2. Turn the MAIN DISCONNECT SWITCH located on the main control panel to the “ON” position. Some systems may have auxiliary push button stations located in other required areas

3. Push the green 'START' button and set your desired speed.

4. Recommended speed setting is 15 when the volume of the trays to be handled is low and up to 50 when the volume is high. Running the conveyor at higher speed may not provide adequate time for loading or unloading.

1.2. STOP INSTRUCTIONS

1. To shut down the conveyor, press the red STOP button and turn the Main Disconnect switch OFF.

2. Once the system is completely shut down perform your wash down procedures.
3. Use a heavy duty wash-down hose to spray down the entire conveyor system.

T

4. Do not spray directly at the electrical control panel or photo sensors.
   Wipe down soiled surfaces with a damp cloth.
5. Remove the carriers from the ladder and ladders from the J-hook to spray off any debris on the body of the tray accumulator.

6. When reinserting the ladder and carriers make sure each snaps completely back into place.

NOTE:

- Never load any dishes (plates, bowls, glasses etc.) on the accumulator unless they are on a tray or the system is equipped with solid stainless inserts on each carrier.

- Never attempt to convey any kitchen equipment such as pots and pans. Overloading will seriously damage this unit.

2. PREVENTIVE MAINTENANCE

The following maintenance schedule is recommended for trouble-free operation of the tray accumulator system. Before performing any maintenance operations on equipment shut down the system and disconnect the power at your main circuit breaker.

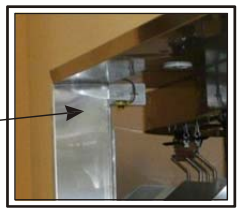
2.1. DAILY

1. Hose down the conveyor and conveyor beds to remove foreign material. Never direct the hose at the main control panel or the auxiliary controls.
2. Empty and replace all basket strainers.
3. Wipe off the reflector of anti-jam photo sensor with a damp cloth. Never spray water directly at sensor.

2.2. MONTHLY

1. Remove all Tray Carriers and Ladders and wash them.

2. Ensure none of the tray carriers or ladders is damaged or missing.
   If additional parts are required, contact Aerowerks with part and model number.



3. Inspect the photocell to ensure that it is clean and centered.
   A misaligned photocell will prevent the system from starting.

4. Inspect the chain for excessive slack and remove if necessary.

5. Inspect chain take-up.

2.3. SEMI-ANNUALLY

1. Inspect the chain for slack and remove if necessary.

2. Lubricate the bearings that are located on either end of the caterpillar drive.

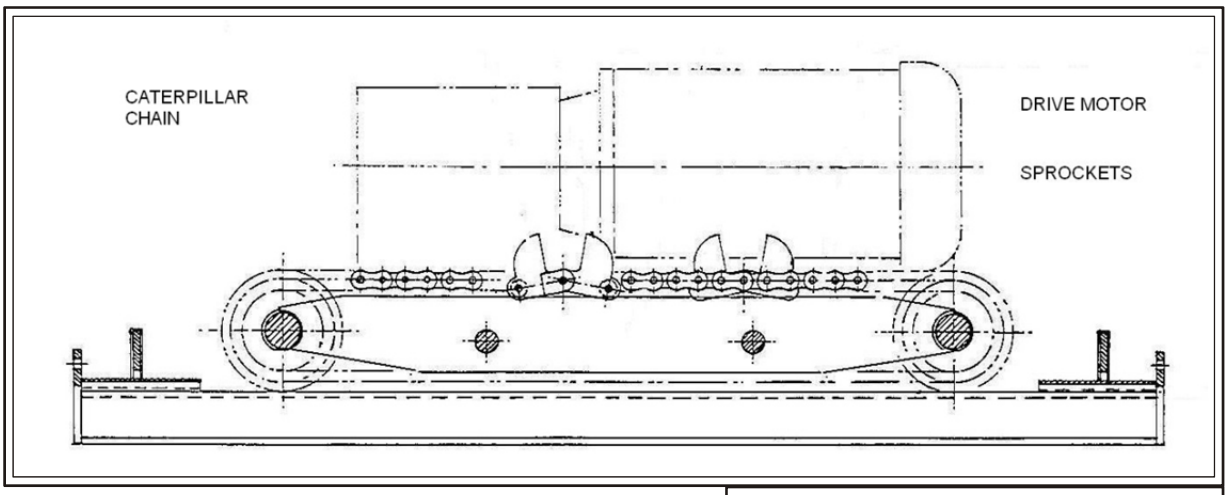
3. Inspect the sprockets, shaft and bushings for wear. Replace the worn parts.

2.4. INSPECTION CHART

	CHECK ITEM	CORRECTIVE ACTIONS
DRIVE	Lubrication for various parts	See Lubrication guide
	Wear on drive sprocket and roller	Lubricate; replace if damaged
	Slack chain at drive	Adjust the chain take-up. Replace if worn.
	Caterpillar chain wear	Lubricate as per lubrication guide Replace worn parts
	Driven sprocket slipping and/or torque limiter loose.	Retighten adjusting screws, if slippage continues, replace friction plates
CHAIN	Lubrication for various parts	See lubrication guide
	slack chain	Adjust take-up springs. If necessary, remove chain links
	Excessive chain tension	Re-adjust take-up springs.
	Bent chain links NOTE: Secure both ends to sides of track when repairing broken chain.	Replace
TAKE UP	Chain tension	Must be adequate to remove any slack chain. Be sure to tighten both springs equally.
	Minimum travel remaining	Remove chain link
	Sliding joints & roller damage	See lubrication guide Replace
TRACK	Excessive wear	Check track for proper alignment
	Damaged parts	Replace

2.5. LUBRICATION

In addition to the conveyor chain, the drive unit requires periodic lubrication. Gear reducers are generally shipped with oil, but each gearbox should be checked prior to starting a new conveyor system to make sure it is filled to capacity. Caterpillar drive chains and sprockets need to be greased periodically. The chain drive between the gear reducer and the Caterpillar chain sprocket requires light oil lubrication.



The sliding members on the take-up and the compression springs require periodic lubrication.

Idler sprockets contain sealed bearings and require no lubrication. Consult your regular supplier for information concerning type and amount of lubricant.

LUBRICATION GUIDE

Ser.No	ITEM	LUBRICATION TYPE
1.	Gear reducer lubricant	SAE 50 grade oil
2.	Caterpillar chain & sprocket	Shell Tellus 27 or equivalent
3.	Caterpillar drive dogs, retaining pads & guide tracks	Shell Alvania 3 grease or equivalent
4.	Chain drive	Shell Alvania 3 grease or equivalent

3. MAINTENANCE

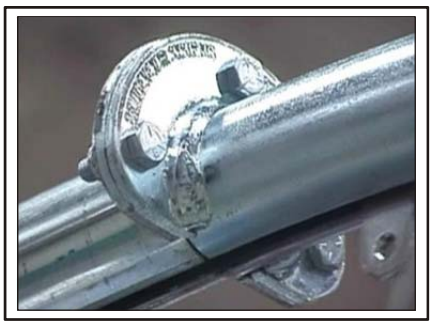
Aerowerks conveyor systems are built to high quality standards to provide a reliable service and trouble-free operation. The life of the equipment can be extended by regular maintenance. It is strongly recommended to have the equipment serviced by Aerowerks or its authorized service agent.

Following is the recommended maintenance schedule. (A spare parts reference sheet is provided at the end of this manual). Refer to this list when ordering parts. Before performing any maintenance operations on equipment shut down the system and disconnect the power at your main circuit breaker.

3.1. CHECKING THE CONVEYOR TRACK & CHAIN

(This procedure should be carried out only by an authorized & experienced maintenance technician**)**

1. Open the track of the conveyor chain by unbolting the flanges.



Conveyor Track

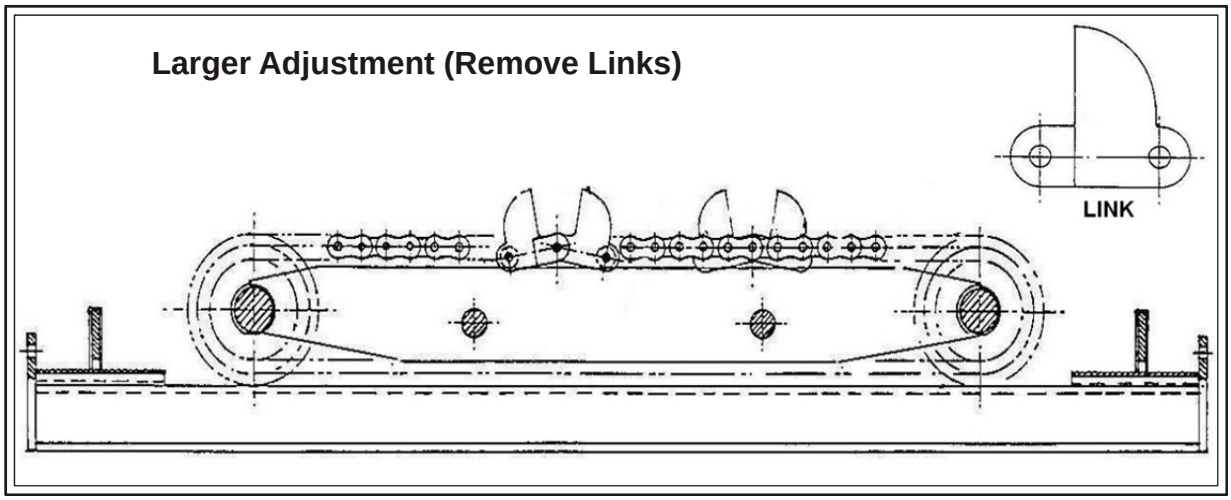
Unbolting the Track Flanges

2. Remove all conveyor chain throughout system.
3. Check for bad rivets on universal joints of chain.
4. Check for bad welds. (Using a flashlight, check that there are no weld burrs inside track section at welded joints).
5. Check for bad mounting of the two vertical bearings. (One bearing positioned backwards from the other).
6. Check for obstructions in the line. (Nuts/bolts/washers etc.)
7. Pull 10' length of chain through system.
8. Check for bad curves. (Tight spots or drag points).
9. Check for damaged chain bearings. (Replace where necessary).
10. After adjusting the conveyor chain, check that all tracks and curved sections are smooth with no misalignment of track joints. Any lip or overhang in this area will cause chain to jam. (Grind smooth where necessary).

3.2. CHAIN TAKE UP

The conveyor chain is made up of hardened steel plates and bearings which by design, eliminates the tendency of excessive chain stretching normally found in link or round steel wire chain. All chain is pre-stretched before leaving the factory. Generally the drive chain does not need any replacement. Easy adjustment of chain tension keeps the system running trouble free. However, it requires periodic adjustment to remove the slack that will develop in the chain over time. Following are the steps that need to be taken for adjusting the chain take up:

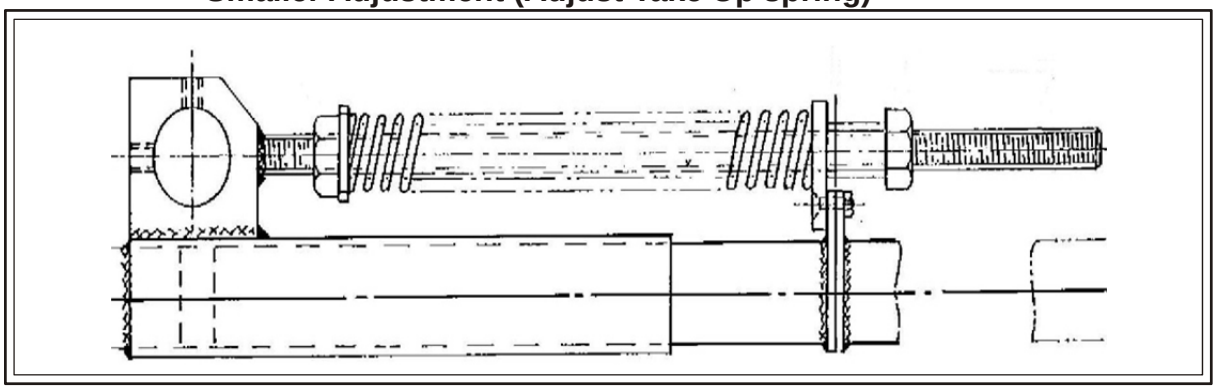
Larger Adjustment (Remove Links)



Drive Chain

Conveyor Chain

Smaller Adjustment (Adjust Take Up spring)

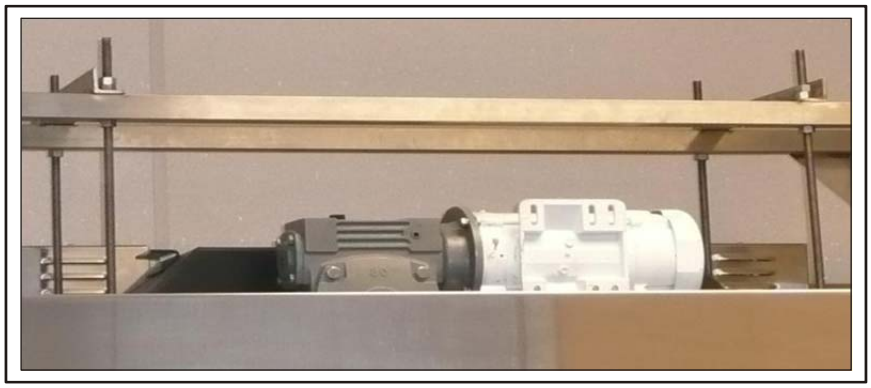


TAKE UP SPRING

a) Check chain take-up for proper conveyor chain tension.
b) This can be accomplished either by adjusting the take-up spring (Recommended for small adjustments) or by removing one of the chain links (Recommended for larger adjustments).
c) Correct chain tension should permit chain pendant to move approximately 1/4" in either direction parallel with the track.
d) This check of chain tension should be made by holding the bottom of the pendant between two fingers approximately 2-3 feet past the drive in the direction of travel. (Should chain need to be adjusted at take-up, ensure that conveyor is in motion so as to equally distribute chain tightening).
e) Check that drive dogs are located on large single horizontal bearings. (Do not located drive dogs on tapered pendant bearings).
f) Check caterpillar dogs for bad springs, damaged pins, and worn pressure rollers.
g) Check that chain travels freely through drive into track and into regular track section
h) Check that there is no drag in drive track section.
i) If no adjustment is left on take-up, it may be necessary to remove chain links from conveyor chain.

3.3. GEAR MOTOR

Gear motor is an integrated unit of a motor and step-down gearbox. The unit has been lubricated for life and no maintenance lubrication is required.



3.4. REPLACING DRIVE MOTOR

An electrician should do replacement of the gear motor. Before replacing the gear motor, follow the trouble shooting procedure to determine if the motor is defective. If the motor is defective, please contact us with the model number and make of the gear motor.

Follow the steps given below to replace the gear motor:

Drive Assembly (without Motor)

AC Gear Motor

1. Turn off the main circuit breaker to disconnect the main power to the conveyor
2. Remove the cables connecting the motor.
3. Release the tension of the chain by adjusting the motor take-up.

If it is required to disconnect the chain, remove the connecting link or use a chain breaker to disconnect.

4. Remove the mounting bolts that fasten the motor to gear box.
5. Replace with new gear motor.
6. Turn on the power to check the direction of rotation.
7. If the shaft rotates in the right direction, replace the drive sprocket and the key.
8. Assemble the chain and adjust the motor take-up.
9. Tests run the conveyor.

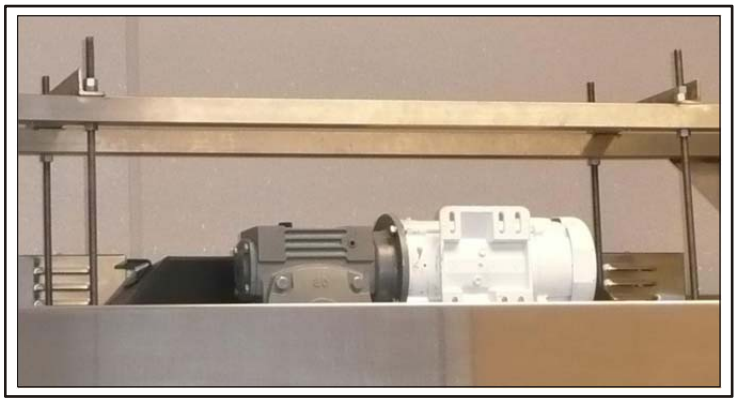
3.5. GEAR BOX

An oil change is mandatory after the first 1000 hours of operation, then annually or after 2500 hours of normal service, whichever comes first. Use a turbine type of oil or SAE 50 grade oil. The oil viscosity for the particular unit is specified on the metal plate fixed to the gearbox.

1. Remove the oil breather located on top of the gearbox.
2. Take out the socket head drain plug located at the bottom to drain the oil from the gearbox.

When the oil is drained completely, replace the drain plug.

1. Fill to the specified level with new oil. A level glass is provided in the gearbox to visually check and monitor the oil level.
2. Replace the oil breather.



3.6. ANTI-JAM SWITCH

An anti-jam Switch is added for the accumulator caterpillar drive assembly so that in the event of a jam, it will shut down and START light will flash intermittently.

Solution: Open the motor cover and locate the damaged link and replace.

3.7. ELECTRICAL SYSTEM

- The electrical system control unit contains all the electrical components required for operation of the conveyor control.
- There may be auxiliary start-stop stations in addition to the main control panel. Check the schematics for details.
- The main control panel and photo sensors are NOT waterproof.
- Under no circumstances should the control panel be hosed down.

4. TROUBLESHOOTING TRAY ACCUMULATOR CONVEYOR

PROBLEM	PROBABLE CAUSE	SOLUTION
1. Trays seem to "whip" around corners.	Tray holders or ladders are not properly mounted. Speed of the conveyor is too fast.	Make sure that all tray holders and ladders are properly mounted. Reduce the conveyor speed
2. Conveyor has stopped abruptly or does not run when start button is pushed.	A misplaced tray has interrupted the photo-cell beam, shutting down the system. Chain has stretched and excessive slack has caused a jam.	Ensure all trays are properly inserted into the carriers. Check and tighten the chain. See section 3.1
3. Chain not feeding properly.	Misalignment of track joints.	Check all track and reassemble the flanges where there is misalignment (grind if necessary)
4. Conveyor chain Jams	Obstruction in the line. Speed is set to zero.	Remove cause of obstruction (nuts, bolts or washers, etc.). Check the speed knob on the main control panel to make sure that speed is not set at zero.
5. Start button pushed but system does not operate.	Building power supply is not on. Main power breaker is off. Panel fuses have blown.	Make sure the building power supply is on. Turn on main breaker at main control panel. Replace the blown fuses. If this persists, check the chain track for possible jams

TRAY
ACCUMULATOR
ELECTRICAL
MANUAL (TAC)

WARNING

To prevent electrical shock, injuries
or even death always disconnect the power before working on
our electrical system.

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Accumulator Electrical Manual

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About

This manual covers the Aerowerks accumulator conveyor electrical system and assist the user to troubleshoot and optimize its performance. The main control panel is **not** waterproof and under no circumstances should the control panel be hosed down with water.

Panel Components

The electrical control panel contains many different electrical components that are used on a case by case basis. These components are DC power supplies, disconnects, fuse blocks, programmable logic controllers (PLC), Variable Frequency Drives (VFD), and relays.

DC Power Supply

The control system of the conveyor operates on 24VDC supplied by a DC power supply unit. It will be protected with 2A or 4A fuses depending on your panel requirements. Always refer to the electrical diagram for further information.

Disconnect

Our disconnect switches are ABB and are rated up to 30A 600V; however the specified voltage for your particular job is located on the nameplate of the control panel and is labeled above the disconnect switch. The majority of our systems will be supplied by a 15A breaker as well. Always refer to the nameplate before connecting power to the panel.

Fuse Blocks

All fuses are sized individually for control or power circuit so it is important to refer to the electrical wiring schematics when replacing fuses. The fuses are class CC and are labeled with the correct fuse size on the fuse block.

VFD

The variable frequency drive (VFD) controls the AC motor speed and current by varying motor input frequency. The VFD's display will show the frequency of the drive when it is running. The VFD is covered in more detail further on in the manual

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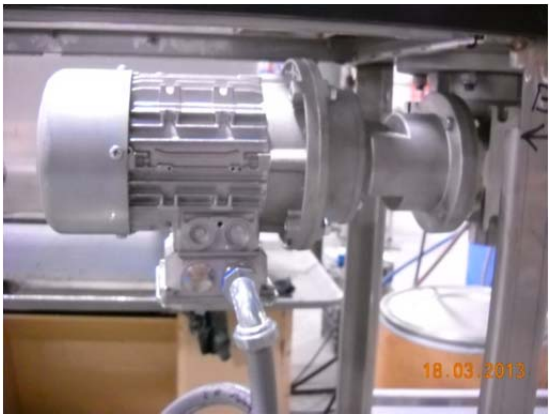
Relay

The relay is used in some cases to replace the PLC or for higher current operations. The relay is 24V controlled and will be either a three or four pole type.

Machine Components



Motor

The drive motor is AC voltage. It is located inside the accumulator where shown on drawings and provides motive power to the drive chain and sprocket assembly.

Anti-Jam Sensor

As shown in the picture above the accumulator conveyor is equipped with an anti-jam sensor designed to stop the conveyor if a tray is improperly loaded (protruding) into the tray carrier. It is very important that the sensor is aligned properly. A mis-aligned sensor will cause nuisance activation. Customers and staff should be made aware that trays must be fully inserted into the carrier shelf. Each accumulator conveyor has two sensors; one at the tray drop area and one on the dishroom side.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
Start Button is pushed and conveyor is not running.	System is not getting power	Verify if the main power breaker is on and the system is getting power.
	Conveyor speed is set to 0%	Increase the conveyor speed.
	The anti-jam light is on.	Check the anti-jam sensor for any tray or item blocking it and remove the blockage.
	Excessive mechanical load.	To verify if there is an excessive mechanical load, do the following: open the panel, turn the power on and locate the VFD. (It has a large label on the lower right side of it: "VFD"). Press the start button, check the VFD and if "OCF" is observed on the display then the load is excessive. The entire belt and return track must be checked for any snags or obvious damage. There could also be instances where utensils or foreign objects are lodged in the chain.
	VFD Fault.	To check for a VFD fault, follow the same steps as above. Any error code other than "OCF", as above, indicates a faulty VFD. Contact Aerowerks for a replacement.
	Motor is damaged or not receiving power.	First remove the T1, T2, and T3 wires from the bottom of the red terminal blocks on the problem motor. Ensure the VFD responds correctly by showing an FR 10.0 to FR 55.0 range depending on the speed setting (If not call Aerowerks). Check the wire connections to ensure they are correct. Check the resistance across the T1, T2 and T3 terminals to verify there is no short circuit or open circuit. If it there is either, trace the wire and check its integrity.
	DC power supply is not working.	Check to ensure the "24V O.K." light is on. If the light is on verify with an electrical meter that it is outputting 24VDC. If the light is off then check the fuses and connections supplying the DC power supply.
Anti-jam light will not go off.	Anti-jam is triggered.	Check the anti-jam sensors to ensure that no trays are blocking the reflector.

	Anti-jam triggers frequently causing random stops. Anti-jam will not reset.	 The anti-jam will only trip if its sensor is interrupted. It is important to ensure the sensor secured and aligned correctly. Check the wiring to the solenoid in the plumbing box and ensure the wires are connected. Check the resistance across the solenoid to make sure there is no open circuit or short circuit. If there is check the wiring to ensure its integrity. If the wiring is ok and the problem persists, contact Aerowerks.
The speed control is not working.	Loose wire to the solenoid or solenoid is damaged.	Tighten the screws on the knob to make it tight to the potentiometer spindle.
	The knob has become loose and is not turning the spindle.	Verify the integrity of the cord to ensure it is not cut or damaged. Check to ensure the connection to the VFD is tight and correct.
	The cord has become damaged or loose. The potentiometer is burned out.	Check the resistance from T1 to T2. The minimum setting should read 5K ohm and the maximum setting 0.1 ohm with a variance in between. The exact opposite effect occurs across T2 and T3. Verify that the measurements are taken from the proper terminal by removing the VFD cover and checking the terminals on the VFD. If these values are not observed the potentiometer may need replacing. Refer to the section below for instruction on replacing the potentiometer.

Replacing the potentiometer

In order to replace the potentiometer the following tools are required:

- Solder gun
- Solder
- Wire cutters
- Channel grips
- New potentiometer (call Aerowerks for replacement 888-774-1616).

DROP AREA LED LIGHTING

- LED Lights are installed on top of the sound baffle and powered from Aerowerks control panel.
- The LED light are rated for 24VDC only.
- There is no separate switch for the LED lights, As soon as turn on the main disconnect the Led lights will turn on.
- The tray drop area opening between 4’-7’ -One LED light.
- The tray drop area opening more than 8’-two LED lights.
- The LED length 1000mm, Natural White Unit 4000K and 11W.

1. Remove the screws from the front of the panel.

2. Loosen the screws on the dial and pull the dial off.

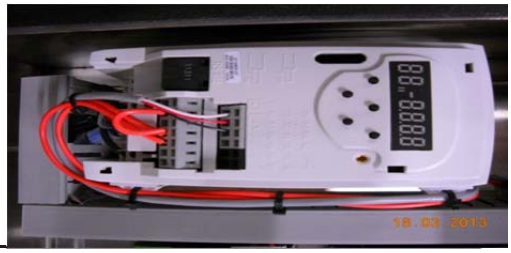
3. Loosen the nut on the potentiometer and pull it off so it can be removed.

4. ** Ensure power is disconnected** Pull the potentiometer out and cut the wires.

5. Strip the wires and solder them on in the following configuration (white, red, black).

6. Ensure the top wires match from left to right (white red, black)

   Reattach everything back to its designated position making sure it is safe electrically. Then the system can be tested to ensure the speed control works as required.



6. WARRANTY:

AEROWERKS INC. LIMITED WARRANTY, SERVICE & PARTS POLICY

6.1 WARRANTY PERIOD

Aerowerks warrants its products to the original purchaser against any defects in material and workmanship, under normal use and service for a period of one year after the date of installation. Such installation must be performed by Aerowerks personnel or an Aerowerks authorized agent.

6.2 GENERAL

Aerowerks will not cover for damage to electrical/mechanical equipment on conveyors due to power surges, water damage (due to building plumbing leaks or improper equipment maintenance) & electrical overloads. Aerowerks is not liable for damage caused by faulty installation, mechanical or electrical failure caused by unauthorized alteration, misuse or abuse of the equipment.
Liability or obligation in connection with the products of Aerowerks is limited to the products covered in this warranty.
This warranty is exclusive and in lieu of any other warranty, either written or oral and whether express or implied.
This warranty is limited to the United States and Canada.
In no event shall Aerowerks be liable for incidental, indirect or consequential damage whether caused by use, misuse, or defects in the product.

6.3 CUSTOMER RESPONSIBILITY

In addition to complying with all suggested maintenance guidelines and instructions, owner's obligation shall include but not be limited to: operating the equipment in accordance with the owner's manual or any other additional instructions given at time of installation or in subsequent communications provided by Aerowerks or its authorized agent.
The owner shall exhibit reasonable care in the use, operation, maintenance and general upkeep of the equipment.
Failure to comply with these requirements will void any applicable warranty.

6.4 HOW TO HANDLE A WARRANTY CALL

Please contact Aerowerks Customer Support Staff at **1-888-774-1616 ext. 0** for all concerns regarding Aerowerks equipment. Hours of operation are 8:00 am to 4:30 pm EST.

Do not contact Hobart Service: Hobart Service is our authorized service agent and will only perform warranty service with a valid purchase order and authorization from Aerowerks. Contacting us directly will speed up the

process of your warranty concern to minimize downtime. If you require after hours emergency service then call Hobart Service. In the event that Hobart Service has scheduled a service call without prior notification to Aerowerks they must notify Aerowerks and request a valid purchase order from Aerowerks during our normal business hours before invoicing Aerowerks.

6.5 Tray Accumulator Conveyor

The following items are not covered under this warranty:

Normal wear on parts including sprockets, shafts, bushings, rail /chain guides, rollers and equipment damage due to power surges or electrical overloads are not covered under warranty. It is important that you do not operate your system with broken or damaged parts. If you notice extreme wear please contact Aerowerks.

Conveyor Jams: Conveyor jams due to improper insertion of the trays in the carrier basket will not be covered under warranty. It is important to train your staff on proper operation and clean-up procedure.

Anti-Jam Photo Sensor: The anti-jam photo sensor is a very sensitive part and should never be hosed down with water. It is pre-set by our factory to operate according to the programming in the control panel and is not user-serviceable. If the sensor is malfunctioning, it must be replaced immediately; contact Aerowerks.