SECTION 4 START-UP AND TROUBLESHOOTING

System Start-up

Personal and Equipment Safety

1. Be sure to wear all necessary *Personal Protective Equipment* (PPE) prior to beginning any work.
2. Always observe all *Lockout-Tagout* procedures prior to performing any work on the system.
3. All safety systems should be tested and verified for correct operation before starting the system.
4. All electrical systems should be tested and verified for correct operation before starting the system.

Verifying Installation

1. Verify the installation to the provided layout. Communicate any discrepancies with your Lubing representative before system start-up. Total lengths, component locations, elevations and/or offsets, should be confirmed before proceeding.
2. Ensure that gearbox rotation has been verified for each drive unit. Incorrect rotation will cause damage to the chain and possibly drive units or other components.
3. All components should be securely anchored into the appropriate position according to the layout drawing provided.
4. Pre-lubricating the chain is critical for start-up to prevent damage to the chain, drive units, and other components. Verify all Oilers are present, wired for correct operation, and adjusted to apply (1) one drop of oil onto the chain links every (10) ten seconds during the initial break-in of the conveyor.

   Note: During *Start-up* and *Break-In*, oil may be present under the conveyor until the entire system has been lubricated. After *Break-In* is complete, adjust any Drip Oiler(s) according to the procedures outlined in *Section 3 Assembly and Installation*.

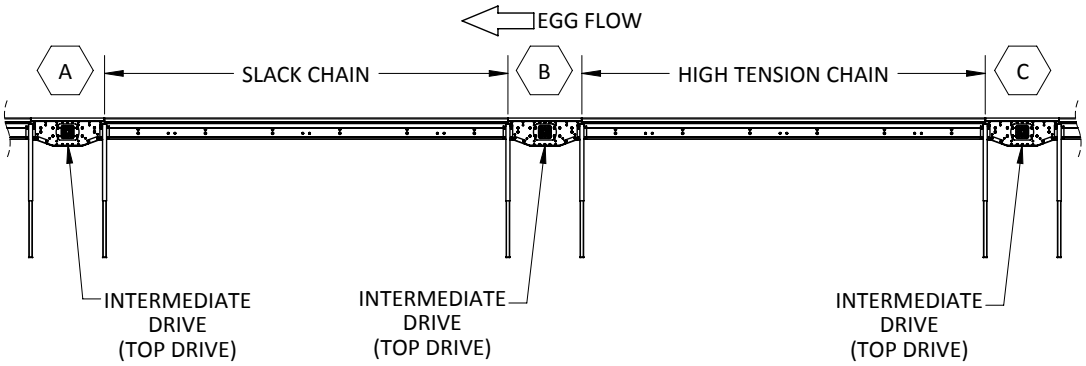
   Note: Mineral Oil and other lubricants often found on egg complexes are not acceptable substitutions for proper chain path lubrication. The lubrication provided, as well as the manufacturer cross references provided, are specifically engineered for this application and contain the required additives for the conveyor system.

Start-up Checklist

1. Review the *Final Assembly Considerations* in *Section 3* of this manual.
2. Inspect the entire length of conveyor for loose or foreign objects. Remove if present.
3. Stage personnel at intervals along the length of the system, especially at drive locations.
4. Ensure all slack has been removed from the system at the tensioners.
5. Verify the chain is oriented correctly and in its appropriate track on the top and bottom sides of the conveyor along the entire length.

Jogging the Conveyor

1. With all personnel and objects clear of the conveyor, jog the system for (2) two seconds or approx. 12” of linear travel. Stop and inspect the entire system especially at drive locations for slack or high tension areas in the chain.
2. Slack chain at a particular drive location is usually indicative of an issue at the next drive. Verify the drive is operational and turning the correct direction (see view below).
3. High tensioned chain at a particular drive location is usually indicative of an issue at the previous drive. Verify the drive is operational and turning the correct direction (see view below).



NOTE: CHAIN ISSUES DEVELOPING AT OR NEAR A DRIVE LOCATION MAY INDICATE PROBLEMS AT ANOTHER DRIVE LOCATION EITHER UPSTREAM OR DOWNSTREAM

INSPECT THE NEAREST UPSTREAM OR DOWNSTREAM DRIVE OF THE SAME CONFIGURATION (TOP OR BOTTOM DRIVE)

THE VIEW ABOVE REFLECTS TOP DRIVES BUT REMAINS TRUE FOR BOTTOM DRIVE ISSUES

IN THE CASE OF SLACK CHAIN OBSERVED AT LOCATION "B", VERIFY DRIVE OPERATION AT LOCATION "A" (DOWNSTREAM RELATIVE TO EGG FLOW)

IN THE CASE OF HIGH TENSION CHAIN OBSERVED AT LOCATION "B", VERIFY DRIVE OPERATION AT LOCATION "C" (UPSTREAM RELATIVE TO EGG FLOW)

4. In the case of high tensioned chain, inspect the Closing Rods for damage. In most cases, a stretched Closing Rod will be missing Security Elements.
5. Verify the chain has remained in the appropriate track on the top and bottom sides of the conveyor.
6. Ensure any slack appearing in the conveyor is removed before starting again.
7. Repeat the above process until the conveyor has been advanced a total of (6) six seconds or approx. 36” of linear travel without slack or high tensioned chain being observed. A complete inspection should be made after each (2) two second or 12” linear travel segment.

Initial Start-up

1. Select and mark a Closing Rod with tape or some high-visibility indicator to track through the system for (1) one complete revolution.
2. Position personnel at each drive location to observe chain behavior as the system runs. Personnel should be able to communicate any issues immediately so the system may be stopped if any need should arise.
3. Start the system and observe until the marked Closing Rod has made at least (1) one full circuit through the system.

   Note: A revolution is complete when the marked Closing Rod is in the same location and on the same side (top or bottom of conveyor) as when start-up began.

Commissioning the System

1. Once the single revolution of chain is successful, start the system and allow to run under observation.
2. Personnel should still be positioned at drive locations.
3. Inspect areas near tensioners and adjust accordingly. If the tensioner approaches maximum travel to eliminate slack, stop the conveyor and address the tensioner issue.

   Retract the tensioner, remove a length of chain, and join with Closing Rods and Security Elements.

   Pretension the chain according to the steps previously provided in *Section 3 Setting Chain Tension* and restart the system.

4. Refer to the *Troubleshooting* tables in this section for any start-up issues. Correct before proceeding.
5. Once the system is running consistently without slack or high tension issues and the chain is traveling through the entire system smoothly and without issue, begin to load product.
6. Adjust all transfers for smooth transitions on and off these locations.
7. As product advances through the system, follow the product looking for any issues occurring under load.
8. Start-up is now complete. It is critical that the *Break-in Procedures* now be employed before continued use of the system begins.

Break-in Inspection Table

Interval	Component	Key Observations
Hourly	Drive Units (Front, Mini, Transfer, Intermediate, Cantilever, and End Drives)	• Verify position of Discharge Wheel and Transfers • Monitor for unusual sounds and/or vibrations
	Tensioner Units (Front Drive, Transfer Drive, End Drive, Cantilever Drive, Bolt-In Tensioner, and End Piece)	• Verify proper tensioning, correct as needed

1. Special attention is required during the first few weeks of operation to make adjustments as needed to ensure the proper break-in of the system.
2. If a new component is added to the system, use the above table during the initial break-in period for that particular component.
3. *Break-in* periods vary based on load, run time, start/stop cycles, and other factors. As a general rule, *Break-in* is completed when tensioners do not require more than (1) one adjustment per day.

Troubleshooting Table

Component	Observation(s)	Action(s)
Chain	Surging/jumping when starting, operating at low speed, or under load	• Verify correct/adequate lubrication and correct operation of Drip Oiler(s) • Check for worn/damaged chain sliding profile • Check for bent/broken Chain Rods • Check for worn/damaged chain slideways on Drive Units • Check for worn/damaged Drive Sprockets on Drive Units • Verify operation of all Drive Units
	Oily Chain Rods	• Check Cleaning Brushes at Front Drive • Check for excessive chain oiling at Drip Oiler(s)
	Bent/Broken Chain Rods	• Check chain path through Drive Units and Bends • Check for chain chatter or popping at Drive Units • Check for damaged/missing Sliding Shoes on Connecting Parts
	Chain Breakage (Tension)	• Verify previous Drive Unit is operational if breakage occurred at a known location • Check for obstructions in chain path • Check for bent/broken Chain Rods • Check chain path through Drive Units • Check for worn/damaged Drive Sprockets on Drive Units • Verify Drive Unit quantity and locations to Layout Drawing

Component	Observation(s)	Action(s)
	Chain Breakage (Slack)	• Verify next Drive Unit is operational if breakage occurred at a known location • Check for worn/damaged Drive Sprockets on Drive Units
	Security Elements loose or missing	• Inspect Closing Rod for stretch • Troubleshoot as Chain Breakage (Tension) • Check for high tension locations within the system
General	Product Damage	• Check transfers onto and off the system • Check for obstructions along the entire system length • Check for bowing Chain Rods at Drive Units • Check for chain chatter or popping at Drive Units
Chain Tensioners (Front Drive, Transfer Drive, Cantilever Drive, Bolt-In Tensioner, or End Piece)	Excessive Slack	• Check nearest downstream bottom drive for proper gearbox/motor operation • New chain break-in period, remove excess chain • Verify number and placement of drives within the system • On extremely long conveyors, temperature variation may cause expansion/contraction of chain length

Component	Observation(s)	Action(s)
Chain Tensioners (Front Drive, Transfer Drive, Cantilever Drive, Bolt-In Tensioner, or End Piece)	Excessive Tension	• Check nearest upstream drive for proper gearbox/ motor operation • Verify number and placement of drives within the system • On extremely long conveyors, temperature variation may cause expansion/contraction of chain length
Discharge Wheels (Front Drive, Mini Drive, Idler Units, or Transfer Drives)	Misalignment, twisting, breakage, or movement	• Check for worn/damaged Drive Sprockets • Check for debris on the Conveyor Chain • Check for damaged/broken Closing Rods and/or Chain Rods • Inspect Transfers for proper setting/gap
Gearbox/Motor (any Drive Unit)	Excessive movement/rocking	• Check Bearings for wear • Check for loose fasteners • Check for worn/damaged Parallel Keys and/or Drive Shaft keyways
Transfers (Front Drive, Mini Drive, Transfer Drive, or Idler Unit)	Transfer Plate damage/breakage	• Verify proper gap between Conveyor Chain and Transfer Plate • Check for bent/broken Closing Rods and/or Chain Rods • Check for foreign objects/ debris on Conveyor Chain • Check downstream equipment for obstructions • Check for worn/damaged Drive Sprockets • Check for excessive slack in Conveyor Chain

Component	Observation(s)	Action(s)
Chain Lubrication	Oil starvation	• Verify oilers are filled with proper Chain Lubricant • Verify flow rate • Check for blockage within Supply Lines • Ensure oiler is not air-locked
	Excessive oiling	• Verify oilers are filled with proper Chain Lubricant • Verify flow rate • Check Supply Lines for damage • Check Oiler Solenoid for correct operation • Check for correct Drip Oiler orientation • Check for correct Drip Oiler location within the system
Motors (any Drive Unit)	Overloading/various electrical issues (Note: when using VFDs, use True RMS meter for accurate readings)	• If Bottom Drive, check nearest upstream Bottom Drive for correct gearbox/ motor operation • If Top Drive, check nearest upstream Top Drive for correct gearbox/motor operation • Check upstream conveyor for adequate lubrication • Check upstream conveyor for debris/foreign objects • Check upstream conveyor for damage • Verify correct electrical installation (wiring, phases, VFDs, etc.) • Verify correct motor specifications (rpm, FLA, phase, etc.) • Check for correct number and placement of drives within the system