

PACLINE™

OVERHEAD CONVEYORS

ISO 9001



Signature Overhead System
The **PAC-LINE™**

Enclosed Track Overhead Conveyor
INSTALLATION MANUAL

PACLINE™
OVERHEAD CONVEYORS
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Read All Instructions Carefully

- Proper installation is not difficult, and by adhering to the following procedures the conveyor will give long and trouble free service.
- In view of the fact that **Pacline Corp.** cannot be responsible for faulty installation, we urge you to study the following instructions carefully prior to commencement of the installation.
- Improper installation may result in irreparable damage to the conveyor or serious injury or death.
- **Pacline** would be glad to study all layouts and system requirements and submit our recommendations accordingly as to elevation changes, direction, rate of speed, load carried, suitable support structure, safety devices, etc.

Track Inspection points

- **Pacline** recommends that a track inspection section be located approximately every 150 to 200 feet of conveyor length, at a low elevation. This will allow easy access to the chain for inspection or any necessary maintenance or cleaning required.

Safety Procedures

- Proper safety equipment should be used at all times during an installation. Examples of such devices would be safety glasses when grinding and cutting and fall arrest safety belts when working overhead. Hard hats should be used at all times.
- Caution signs and caution tape should be used to indicate where work on conveyor is occurring.
- Care should be taken to avoid all potential pinch points in system.
- All applicable safety laws must be followed for the area in which the installation takes place.
- **Pacline** cannot be responsible for any accidents occurring due to a lack of safety awareness.

1) Cutting of Track

Methods: Chopsaw, Bandsaw, Pipe Cutter

- Measure or calculate length of track section required. If under 10 ft., cut section to required length, making sure cut is square to track. **Figure 1** shows chopsaw cutting method.
- Remove burrs on track at cut with a file.

2) Welding of Flanges

- See **Figure 2**
- Attach flange (TF-204) to existing flanged track section (template) using vise grips to clamp in position. Use bolts to help line up flanges, making sure bottom edges are aligned.
- Place cut track into flange making sure it is straight and square. A chisel should be used to align the slots. Both sections should be placed into a 2" x 2" x 1/4" angle iron on a flat surface, to support the track during this process.
- Tack weld flange to cut section of track .
- Do not weld complete flange at this point.
- Release vise grips and separate two track sections.
- Check flange location and if suitable, continue to weld flange around track by rotating track in angle iron support.
- Care should be taken not to allow weld to burn through track and form on inside.
- **NOTE:** Welding fumes can be dangerous. The use of a respirator or welding in a well ventilated area is recommended.

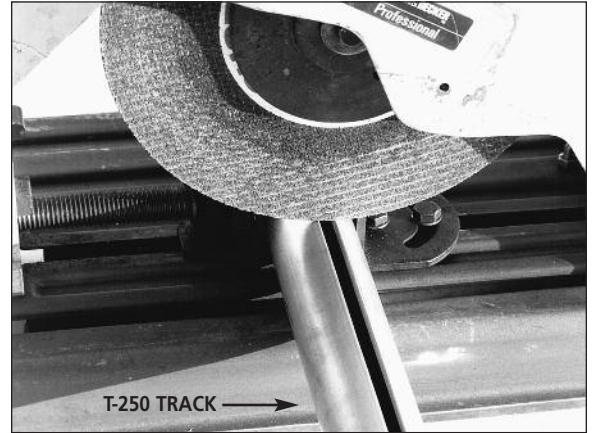


Figure 1

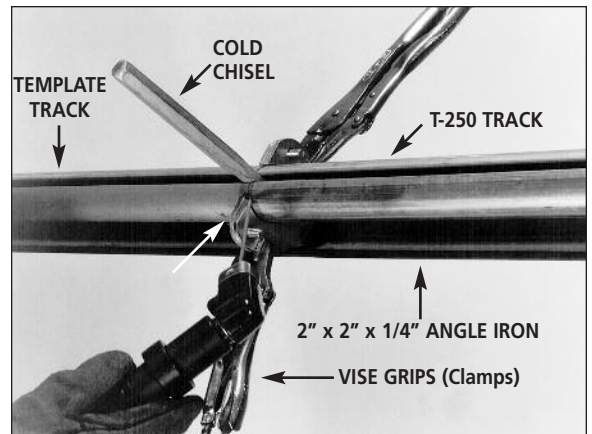


Figure 2

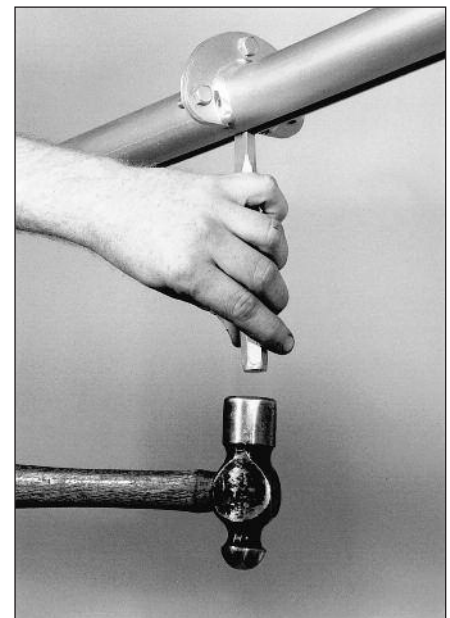


Figure 3

3) Joining Track Lengths

- Use 5/16" x 7/8" lg. bolts c/w lock nut. See **Figure 3**.
- Bolt two adjoining sections of conveyor together. Before tightening the bolts, make sure the slots are aligned. Use a chisel to help align the slots. **Figure 3**.
- Tighten bolts.

4) Take-Up & Drive Unit

- Installation should start with the take-up if possible. It should be located at the lowest position in the system, after a decline curve, following the drive unit and as near to the drive as possible.
- The take-up should not be at the top of a rise, near or in a washer, spray booth or oven.
- Standard width take-ups should be suspended at four points with appropriate sway bracing, using methods explained in the following track hanging sections.
- Make sure take-up is level.
- The drive unit should be placed at the highest possible point in the system and where it will be convenient for service and maintenance.
- Drive should not be located in or near a washer, spray booth or oven.
- Drive should pull chain and not push it.
- When facing the direction of travel (away from you) the motor and reducer should be on the left hand side of the conveyor track.
- Motor wiring always determines the direction of the drive pull, thus a qualified electrician should be used.

NOTE: All electrical hook ups should be done by a qualified electrician as complicated wiring situations exist.

Pacline will not be responsible for errors in wiring caused by failure to read all equipment specifications and manuals.

- Conveyor chain should travel through the drive towards the take up.
- Install the drive using SL-300 track hanger sleeves or TR-200 threaded rods on each corner (see **Figure 13**) and use the methods explained in the following track hanging sections.
- Sway brace as necessary, and make sure drive is level.
- Use a forklift to raise drive if possible as it is the heaviest system component.

Multiple Drives

- Wherever multiple drives are necessary, make sure each unit has a corresponding take-up unit and be sure that each unit is pulling the same load.
- The units should also be as evenly spaced as possible.
- Make sure they are wired to pull in the same direction.
- Controller should have the capacity to handle all drives.
- To start up a system with multiple drives, do the following:
 - i) Disconnect all but one drive by removing drive chain between reducer and caterpillar assembly.
 - ii) Start system using one drive and allow conveyor to make at least two revolutions.
 - iii) Adjust all take-ups while conveyor is running. (Remove 6" of chain if necessary).
 - iv) Reconnect drives after chain tension adjustment.
 - v) Check that the current limiting adjustment in the variable speed controller is correctly set and operating.

5) Hanging of Track

- **Figures 4-7** show different hanging methods using 3/4" I.D. schedule 40 pipe.
- **Figure 4** shows the use of standard components to hang from a trussed ceiling but not

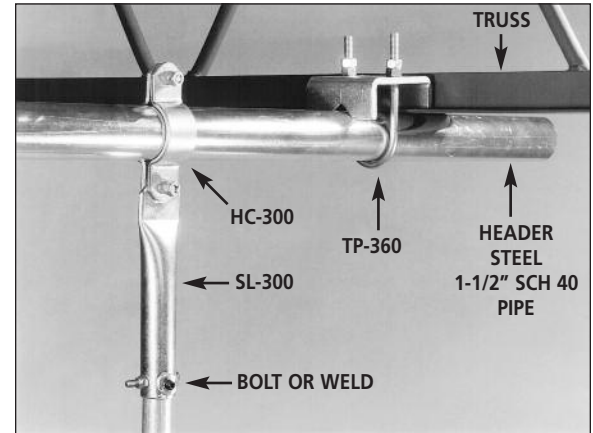


Figure 4

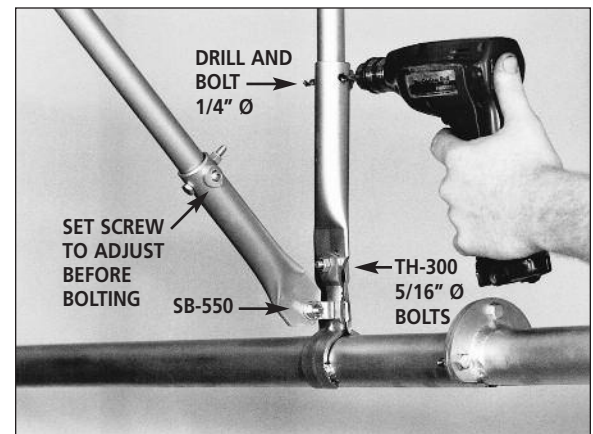


Figure 5

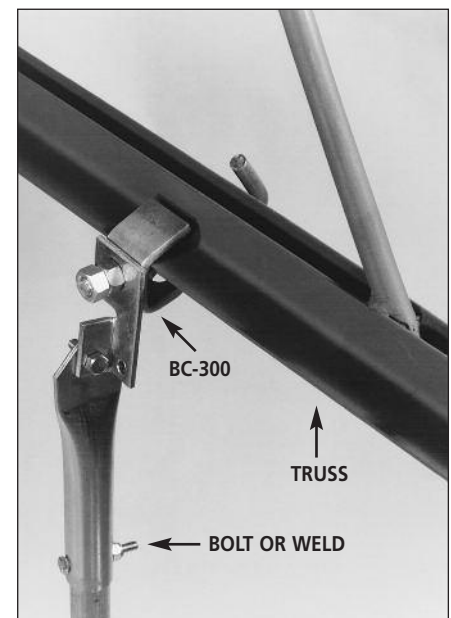


Figure 6

directly under a truss. 1-1/2" I.D. schedule 40 pipe is used as a header between trusses. TP-350 U-bolts and truss plates are used on each end of the header and HC-300 header clamps are used to support the 3/4" I.D. hanger pipe. SL-300 sleeves can be welded onto pipe (or bolted) at ground level before installing.

NOTE: All bolts use double nuts, Loctite or lock nuts.

- **Figure 5** shows TH-300 track hanger clamp and SB-550 sway brace. SL-300 sleeves allow height adjustment of the hanger using set screws. Once the track is installed at the correct height, hangers **MUST** be drilled and bolted with 1/4" x 1-1/2" long bolts.
- Sway braces are attached to TH-300 track hanger clamps and are braced to either the ceiling, a wall, existing equipment or a parallel track section. Sway braces should be on every other track hanger and every curve.
- **Figure 6** shows BC-300 beam clamp on a standard truss.
- **Figure 7** shows method of hanging directly under a truss where possible. A TR-200 threaded rod is passed directly up through the truss and secured.
- Supports should be as follows:

Load Per Foot	Maximum Distance Between Supports
1-35 lbs.	10 ft.
35-65 lbs.	7 ft.
over 65 lbs.	5 ft.

- Supports must be placed at top and bottom of elevation changes and on each end and middle of horizontal curves, take-up unit and 4 corners of drive unit.

6) **Alternative Supporting Method**

- TH-200 track hanger clamps can be used with AC-120 angle clips and attached to 1-1/2" x 1 1/2" x 3/16" angle iron instead of using 3/4" I.D. pipe. (Refer to Engineering Manual)
- The hanging method follows the same procedure as with 3/4" I.D. pipe.
- Threaded rod can be used for short hangers instead of pipe or angle.
- Wherever possible, hang from a TF-204 track flange by using a SL-300 track hanger sleeve or a TR-200 threaded rod.
- After all track is installed, check for stability and add extra track hangers and/or sway braces if necessary.
- Floorstands can also be used to install the conveyor. Consult **Pacline**.
- The **Pacline** overhead conveyor is not a precision manufactured product. Due to the various manufacturing processes that each track section must encounter, occasional warping or distortion may occur. These can usually be corrected with minimal work. All track slotting should be parallel to the floor. If a slot is twisted to one side or the other, simply apply a pipe wrench to bring it back to parallel and then tighten the appropriate track hangers to hold it in position.
- This must be done before tack welding of the track hangers. (Section 8)

7) **Eliminating Track Misalignment**

- When track misalignment occurs, it can be removed by:
 - File
 - Chisel (driven sideways through slot)
 - Hand Grinder c/w maximum 1/8" thick disc.
- **Figure 8** shows typical misalignment.
- By removing the sharp edges to allow a smooth transition, chain jamming is eliminated.
- Another misalignment may occur whereby the slots at a joint are not level with each other. There are three ways to correct this:
 - i) loosen bolts and re-align two track sections.
 - ii) Insert a chisel into the slot of the higher track section and pry the slot down on both sides until it is level with the mating track.
 - iii) Use a hammer to carefully hit lower track slot upwards to align with mating track.

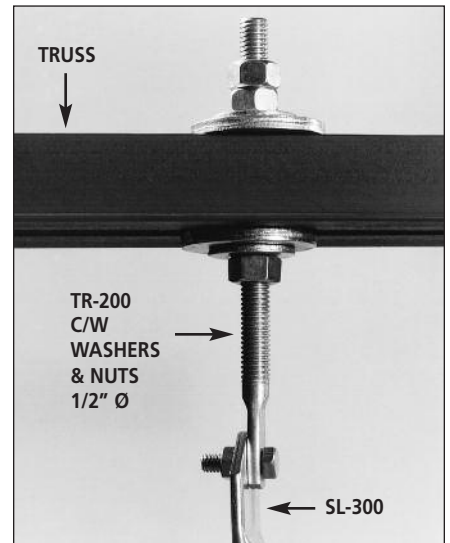


Figure 7

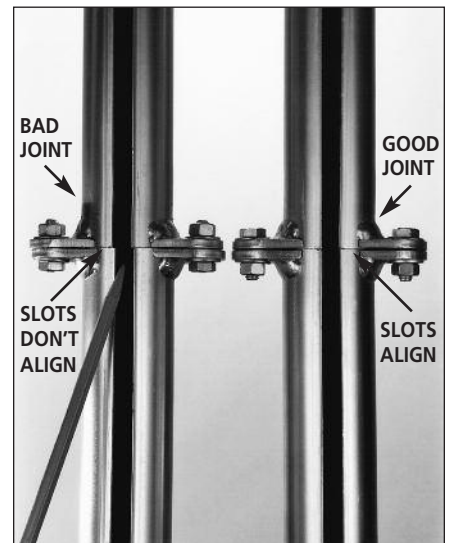


Figure 8

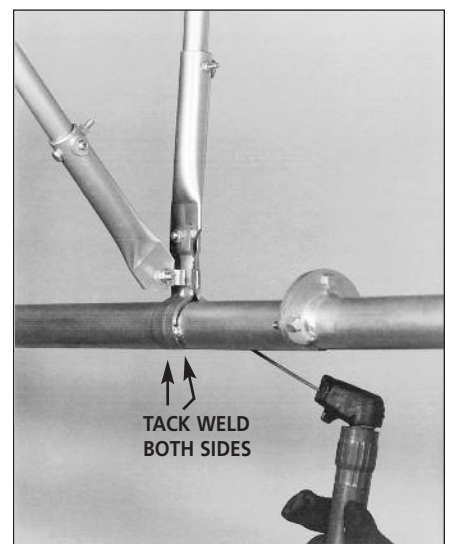


Figure 9

- All slot joints in the system should be checked prior to inserting the conveyor chain.
- Pull a 10 ft. section of chain through entire system to make sure the conveyor path is smooth (see **Figure 10**, Section 9 on Feeding Chain).

8) Tack Welding Hanger Clamps

- After all track is in place and after 10 ft. of chain is pulled through the system, all TH-300, TH-200, TH-210 track hanger clamps can be welded in place. (See **Figure 9**)

NOTE: Do not use high amperage when welding as it may burn through the track or even warp and distort it. Do not tack weld track hanger clamps inside ovens as to allow for track expansion.

9) Feeding Chain

- Keep chain free of dust, dirt, water, etc. before putting into track.
- Assemble 10 ft. sections with all pendants facing down. Use the supplied clevis and cotter pins.
- Feed the chain into the track inspection section on the input end of the drive as shown in **Figure 10**. Attach a rope to the first chain pendant and pull while a second person feeds the chain into the inspection section.
- Pull the chain as it is fed in until it reaches the drive unit.
- You are now ready to pull chain through drive unit.

10) Drive Dog Must Engage with Horizontal Bearing

- Make sure drive chain between gear reducer and driven shaft is disconnected (See **Figure 12**).
- Feed the chain into the drive unit making sure the horizontal bearing engages the drive dog as shown in **Figure 11**. Damage will result if this is not done properly.

11) Reconnecting Drive Chain

- Reconnect drive chain gear reducer and driven shaft on drive unit (See **Figure 12**.)
- Make sure chain is aligned and tensioned properly by adjusting reducer position using the slack tensioning bolts.

12) Chain Tension

- Make sure take-up is totally collapsed by winding in the shipping nuts to compress the springs.
- By securing the chain in the inspection section where it was loaded, the reducer input shaft can be rotated to pull the chain tight throughout the system. See **Figure 13**. The proper length of chain required can now be cut by grinding off the appropriate rivet and punching it out. Make sure an increment of 6" is kept between pendants. A horizontal chain link must always connect to a vertical link. With the chain still tensioned, connect the ends together.
- Remove the screwdriver that was securing the chain.

13) Take-up Adjustment

- After loading the chain into the system and joining the ends, the take-up can be released.
- Loosen shipping nut out to end of threaded rod as shown in **Figure 15**.
- Check the chain tension as in **Figure 14**. If tension is insufficient, take-up

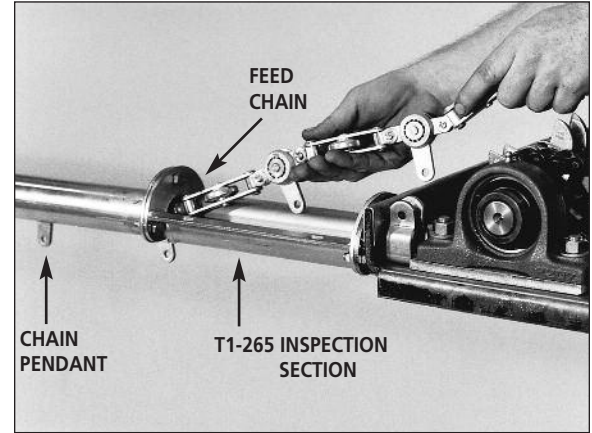


Figure 10

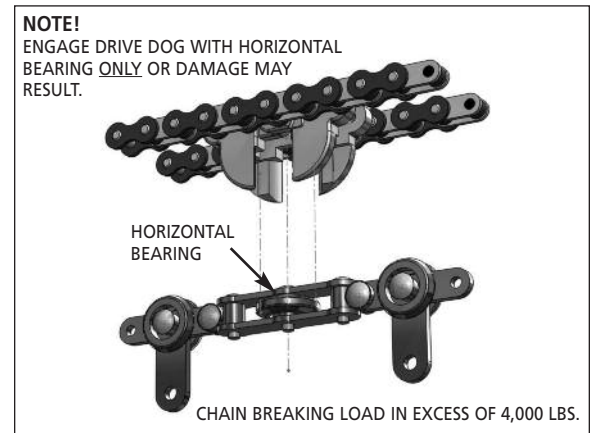


Figure 11

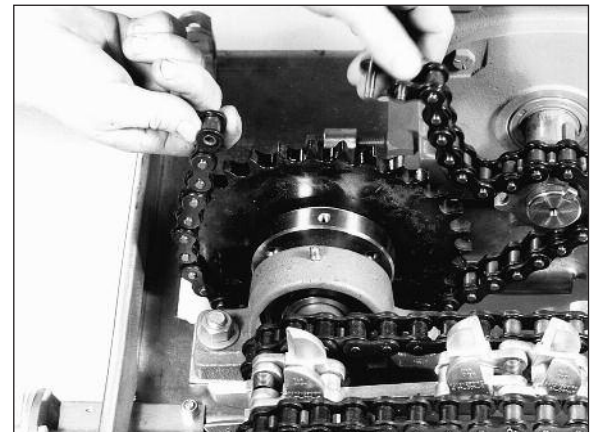


Figure 12

can be adjusted tighter by compressing the spring with the spring tension nuts, see **Figure 15**.

- This adjustment should be made while running the system.
- Attach the motor and electrical system.

Chain Run-In

- Upon completion of the installation, the system can be run-in. If time allows, it is recommended that the system be run for several days prior to loading. During this period, the functioning of the take-up should be observed for the first hour of operation and daily for the first four days of operation so that the desired chain tension can be maintained and so that any accumulation of chain in the system, particularly at the outlet side of the drive unit, can be avoided.
- It is essential that the conveyor chain be lubricated immediately upon the start up, and before the system is loaded.
- During run-in, it may be necessary to shorten the chain to compensate for extra length due to the final working in and seating of the chain. The chain does lengthen under tension.
- The take-up may require adjustment from time to time. The chain should not be over tightened. (See **Section 12**, Chain Tension).
- When a system is operating satisfactorily, the chain tension should be noted for future reference.

Removing a Section of Chain

- At an inspection section, remove the cover and run chain until a connecting clevis pin appears. **KEEP FINGERS AWAY FROM CHAIN!** Lock out drive when the chain is in desired position.
- Compress the take-up completely by moving the shipping nuts in to compress spring.
- Remove pin and decide if 6" or 12" of chain needs to be removed (always 6" increments)
- Grind head off appropriate rivet and remove.
- Rejoin chain with clevis pin and replace cover.
- Re-adjust take-up unit to give proper chain tension.

Product Carriers

- Carriers should not have any "off-center" loading, so as to avoid any unnecessary rubbing of the pendant on the track slot. If off-center loading occurs due to design of carrier, use **Pacline** two-axis swivel, Part No. S-750.
- Carriers should be attached to the chain pendants either with lock nuts or fasteners with "Loctite" on them, and **SHOULD BE CHECKED REGULARLY FOR WEAR**. If worn, **REPLACE IMMEDIATELY** and monitor the replacement interval.

Lubricators

- Solenoid operated and drip type lubricators come complete with a mounting bracket that attaches to the inside of the appropriate track inspection section flange. The inspection section cover has a hole to allow the lubricator brush to pass through and contact the chain. (See **Figures 16 and 17**)
- Proper lubrication is essential to ensure the system operates as it was designed.
- The lubricator has an adjustment screw to regulate the amount of oil dripping onto the chain. The sight glass allows visual monitoring of the flow. Too much oil will cause oil dripping from the chain.

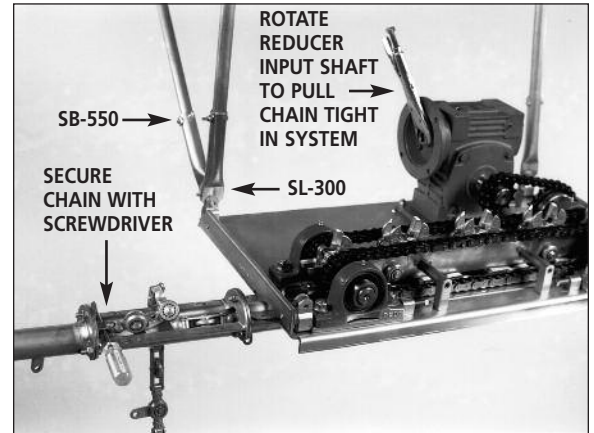


Figure 13

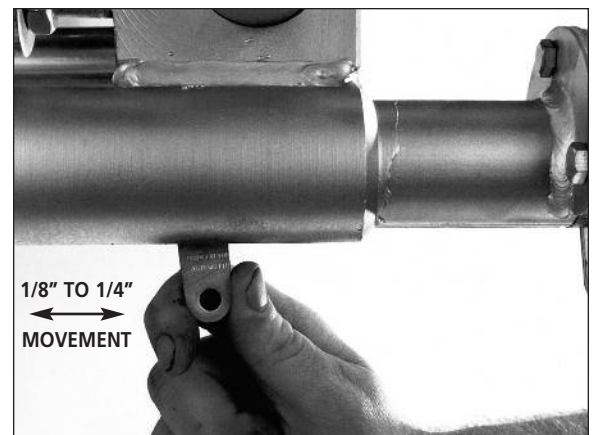


Figure 14

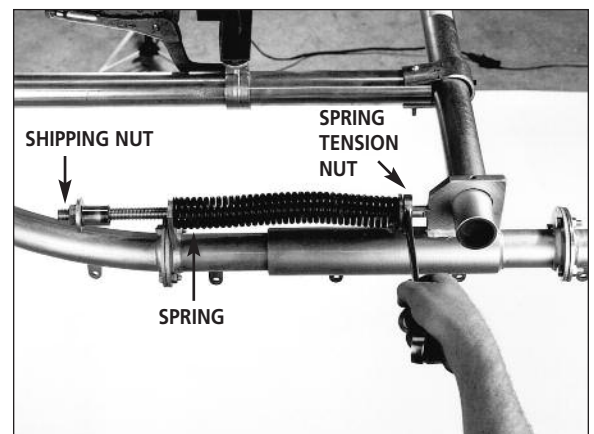


Figure 15

- It is recommended that the conveyor chain be manually lubricated at start up. A brush can be used to apply the lubricant to each side of the chain and into the rollers.
- We recommend a reputable lubricant engineer be consulted prior to start up when the conveyor is being used in an excessive or unusual condition.
- Chain lubricant is also available from **Pacline**.
- Shot or mist lubricators are recommended for long systems operating through ovens in excess of 200°F. **Pacline** model L-375, L-475, L-565 and L-575 can be used in these applications. (See **Figures 18 and 19**)

Safety Guarding

- **Pacline** recommends safety guarding on all elevated sections of conveyor, where a falling product could cause injury. All state or provincial laws should be followed for regulations regarding safety guarding.
- **SAFETY GUARDING OF ALL TYPES IS THE RESPONSIBILITY OF THE OWNER, AND IS ASSESSED WHEN THE CONVEYOR HAS BEEN INSTALLED BUT PRIOR TO RUNNING.**

TROUBLESHOOT LIST

1. Conveyor won't start

- Check that power is on, check for conveyor chain jam. (see **Section 2**). Check amperage draw of motor.
- Disconnect drive chain between reducer and caterpillar drive and test motor and electrical components.
- If motor does not run have electrician check fuses or overload trips in controller/starter, motor, etc. Check variable speed controller trouble shoot guide.
- If conveyor drive runs, check to ensure H.P. of motor is adequate for start-up conditions. Have electrician adjust acceleration rate on controller if applicable. Use a higher H.P. motor until lubrication reaches the inside of the wheel bearings. Remove all loads from conveyor!

2. Conveyor Chain Jammed

- Locate jam. Chain will be tight upstream of drive to point of jam. Chain will be loose downstream of drive to point of jam.
- If chain is caught on burr at track joint, grind burr smooth.
- If chain is caught on the inside top of track at up vertical curve or on inside bottom of track at down vertical curve, check for:
 - burrs or weld spatter on inside of track (use flashlight) – remove.
 - chain dragging in the down slope (caused by heavy load suspended from one chain pendant link) – add a P-701 Dual pendant Carrier to spread load across 2 chain pendants.
- Chain rivet caught in slot of track (usually located in vertical slot of “down” or “up” slope), check :
 - Item (c) (ii) above
 - chain tension-increase if necessary.
- If chain is jammed at output of drive unit, make sure hold down plate is on. Increase chain tension by adjusting take-up.
- Check for obstructions in the line (nuts, bolts, washers, etc.)
- Check for bad curves. This requires removing the chain from the system and pulling 10' of chain through the curves to find tight spots or drag points.

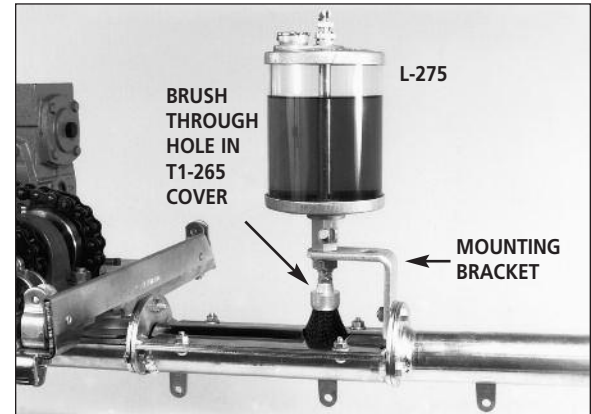


Figure 16

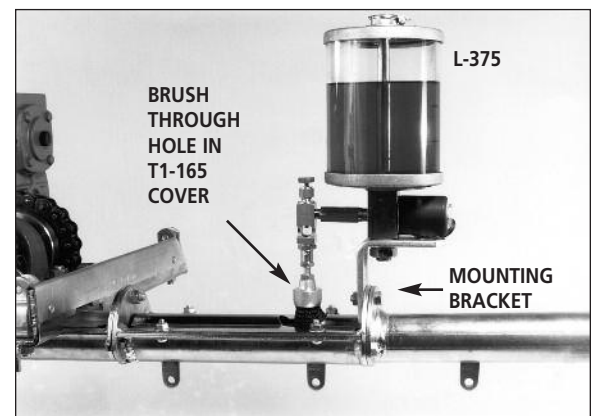


Figure 17

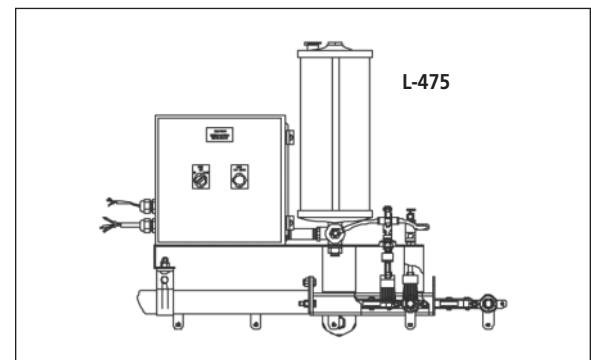


Figure 18

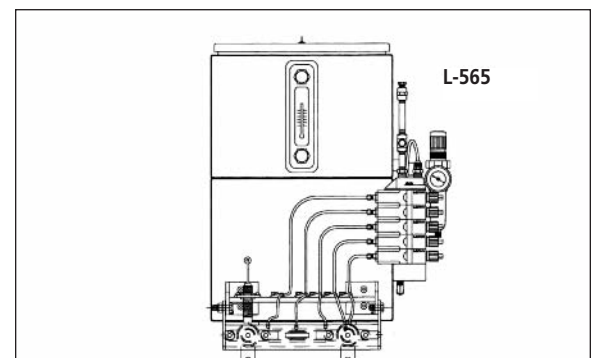


Figure 19

Preventive Maintenance

PACLINE Customer Support

Detailed installation and maintenance manuals



Design and simulation using Solidworks



Technical information on our website



Complete control capabilities



Worldwide installation



3. Other potential problems

- Check conveyor chain for faulty assembly of rivets or bearings. Check to ensure that a common bolt has not been used to join chain instead of a PJ-009 rivet.
- Check caterpillar drive dogs for broken springs.
- Thoroughly lubricate conveyor chain and allow system to run-in, unloaded. Check to see if lubricant has reached inner bearings.
- Check to see caterpillar drive dogs engaged on horizontal chain bearing.
- Check to see if bolt has been used to join chain in place of the proper PJ-009 chain joining rivet.

PREVENTATIVE MAINTENANCE

DRIVE:

- Check that drive dogs are engaged on horizontal bearing wheel.
- Check drive dog springs: Lift one half of the drive dog off of the pressure plate and release. If the drive dog snaps back, the springs are operating properly. If not, they must be replaced.
- Check that the drive dog rollers spin freely. If not, replace.
- Check gear box for proper oil level. Change oil after 2000 hours of operation.
- Check drive dogs for wear at the point where the dog contacts the horizontal bearing wheel. If wear is excessive, replace drive dogs.
- If uneven wear is present on the drive dog faces, the caterpillar chain and the conveyor chain are out of alignment. Re-align if necessary.
- Check pillow block bearings for wear.
- Check tension of caterpillar chain assembly. Total chain deflection should be approximately 1".
- Check tension of drive chain. Chain deflection should be 1/8" per foot.
- Check motor for excessive noise.

TRACK and CHAIN:

- If track slot exceeds 3/8", that portion of track should be replaced.
- Check chain tension. See **Figure 14**.
- Chain inspection. Remove cover from inspection port. While the conveyor is operating, observe the chain for any visible defects or irregularities. Observe that bearings turn freely and easily. **DO NOT STICK FINGERS IN CHAIN INSPECTION PORT!**
- Check for loose hardware, including support structure.
- Make sure chain is being properly lubricated. Top up lubricant.
- Check all product carrier bolts on a regular basis and replace as necessary.

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