AVW Dual Belt Conveyor Installation Instructions

Pre-Installation Checks

1. As soon as the concrete is poured, measure the actual length of the conveyor trench at its shortest point top-to-bottom and side-to-side. Report the length to AVW so your conveyor fits without modification.
2. At the same time, measure the width of the trench over its entire length.
    a. The trench width cannot be less than 8'-4" (Dual 30" Belt) or 10'-4" (Dual 42" Belt) at any point, and the pit walls must be straight. Check with a plumb line. Measure the width at the top of the wall and at the floor of the trench.
        i. Check not only for a single crooked wall, but two (or more) bulges that make an s-shaped trench (two or more bulges on opposite sides of the trench at different lengths along the trench).
        ii. Any narrow spots or excessively crooked walls must be corrected by the concrete contractor. The conveyor is 8'-2" wide and must be straight.
    b. Also check the depth of the conveyor shelves in the trench. They must be at least 25" everywhere; pay special attention to the ends of the trench.
    c. Check slopes per the AVW drawings.
    d. You will be able to correct or compensate for most errors in a car wash – but not a bad concrete pour.
3. Check the slope of the entrance and exit slabs.
    a. The concrete slope of the entrance slab should be at a minimum of 2% and a maximum of 5% (more is better up to 5%) for 10 feet onto the conveyor to "push" the vehicles onto the conveyor.
    b. The exit slope should be flat for 5 feet immediately following the conveyor, and then downward at a minimum of 2% and a maximum of 5% (more is better up to 5%) for 10 feet to "pull" the vehicle off the conveyor.
    c. These requirements are just as important as the trench dimensions and are essential to the conveyor's optimum contribution to the productivity of the wash. The car wash's maximum volume throughput and maintenance costs are directly affected by these parameters.
    d. Failure to implement these requirements without consulting AVW for an alternative solution is the cause of a substantial portion of conveyor operational problems and maintenance issues and may void the conveyor warranty.

Install the Conveyor Frame

4. Locate the conveyor.
    a. Find the narrowest part of the trench.
    b. At that point, using the 8'-2" (for a Dual 30" Belt) or 10'-2" (for a Dual 42" Belt) width dimension of the conveyor, mark the precise location of the centerline of the conveyor on the pit floor. This "location point" determines the left (driver) to right (passenger) location of the entire conveyor.

c. Using a plumb line or laser over the entire length of the trench, project the location point to the end walls of the trench while keeping the projection line parallel to the direction of the trench, and mark the projection points. These will be your reference points to center the take-up and drive sections of the conveyor.
d. Check that the projection points have not been rotated around the location point. Both ends of the conveyor should have the same bias left or right of trench center as the location point (that is, both are biased left or both are biased right, not one left and the other right to make the conveyor crooked in the trench).

5. Drop the conveyor sections into the end of the trench and roll them into place on a dolly or piece of pipe. Leave the shortest middle piece of conveyor out of the trench to give yourself some room to work.
6. A Dual Belt Conveyor's slope and elevation **do not follow the floor** of the car wash. The slope of the conveyor is consistent over the length of the conveyor from beginning to end regardless of what the car wash floor does. The Dual Belt Conveyor should be perfectly level from side-to-side. Do not use the floor of the car wash or the floor of the trench as a reference point. The only elevation reference points are the elevations of the steel bullnose at the entrance and the exit end of the trench.
    a. The entrance edge of the top of the take-up end of the conveyor frame should be installed ¾" below the edge of the bullnose at the entrance end of the trench. The objective is to make as smooth a transition as possible from the entrance concrete over the transfer plate and onto the top of the ¾" belt on top of the conveyor frame, so the ¾" dimension is critical. At the entrance, err on the "down" side if necessary so that the vehicle rolls **down** from the concrete onto the belt, never up.
    b. The exit edge of the top of the drive end of the conveyor frame should be installed ½" below the edge of the bullnose at the exit end of the trench. The objective is to make as smooth a transition as possible from the top of the ¾" belt on top of the conveyor frame onto the ¼" transfer plate and onto the exit concrete, so the ½" dimension is critical. At the exit, err slightly on the "up" side if necessary so that the vehicle rolls **down** from the conveyor belt onto the concrete, never up.
7. Start the installation at the entrance end of the conveyor.
    a. Use the marks on the end trench walls from Step 3 to establish a plumb line or laser line on the **inside** of the driver or passenger side of the conveyor frame. Use the line to center the take-up section side-to-side.
    b. Use jacks to adjust and hold the conveyor take-up section in position. Make sure that the conveyor section is braced and stable when on the jacks. Do not allow anyone in the trench to stand alongside the frame until it is tacked in place to avoid injury, stand PAST the end of the conveyor when doing all positioning adjustments.
    c. Use the entrance end bullnose elevation to set the elevation of the take-up section as described in 6.a.
    d. Use a long level to level the take-up section from side-to-side.

e. Check that the take-up section is perpendicular to the length of the conveyor. The entrance trench wall is not always necessarily "square", but the building's entrance walls are usually a better (though sometimes also flawed) reference. This will be checked and adjusted if necessary a little later.
f. Check the entrance end of the conveyor to make sure that **both sides** are at least ¾" below the bullnose. If the concrete is not level side-to-side, set the elevation of the take-up section by using the lower side of the concrete as the starting conveyor elevation.
g. Weld the entrance end of the take-up conveyor section in place using "ties" to fasten the section to the entrance bullnose. Use flat steel lying horizontally so that it can flex and act as a hinge when you establish the slope of the conveyor. Then making sure that the exit end of the take-up section is securely supported so that it cannot fall, weld cleats at the bottom of the legs at the entrance end, but do not weld them to the floor yet. Allow them to slide on the floor until the slope of the section is established.

8. To monitor the slope of the conveyor:
   a. Use a laser line. Very convenient. Spot a line from ¾" below the entrance bullnose elevation to ½" below the exit bullnose elevation and install the conveyor frame to the elevation and slope of that line.
   b. If you do not have a laser line, use a 10' straight board or steel profile, a long level, and a tape measure. Given the overall slope of the trench, calculate the precise rise over a 10' section of conveyor. Use your level to level the board, and measure the rise of the top of the conveyor section and match it to your target.
   c. Since the measurement error on each conveyor section in Step 8.b. is cumulative, establish checkpoints along the way by using a transit if available or by using lengths of taught plumb line over a fractional length of the conveyor. Check the reference point **from both ends** of the trench.
9. At 3'-7", the take-up end of the conveyor is too short to establish the slope of the conveyor.
   a. Weld a center section of conveyor firmly to the take-up section on the same side as your plumb line, making sure that the top of the two sections are flush. This then makes a 13'-7" long section with which to establish slope.
   b. Check the alignment of the combined section with your plumb line and re-align the take-up section to square it with the trench if necessary.
   c. Weld everything in place.
10. Continue down the trench, checking the progressive elevation as well as side-to-side level at each section.
11. Make sure to weld the back legs (by the wall) as well as the front legs (by the pit) and tie the sections to the steel bullnose at the top of the side wall.

Install the Take-up Drum, Guide Rollers, and Return Rollers

12. Install the take-up bearings, shafts and rollers. Orient the bearing zerk fittings and set screws for ease of access. Align the take-up rollers perpendicular to the direction of conveyor travel as

closely as possible. Shim the bearings so that the surface of the roller is level with the deck of the conveyor **with a glide plate in place**. **This is absolutely critical**; if the belt slides up from the roller onto the conveyor, the glides plate will wear very fast and the belt may be severely damaged.

13. Install the return rollers. Check that the spacing of the "grooves" within the rollers and the depth of the "grooves" in the rollers fits the pusher pattern of the belt. There should be one return roller at the end and "middle" of every 10' conveyor section, i.e., a return roller every 5' on average.
    a. Pay special attention to the end of the conveyor. There should be a regular return roller like all the others installed in the very first location nearest both the drive sprockets and the take-up roller. This is called the "pinch roller" and is necessary for proper operation of the belt. Failure to install these pinch rollers will result in premature belt and sprocket wear at the drive end and may cause belt breaks at the entrance end.
14. Install the guide rollers on the inside of the legs near the take-up end. These rollers guard against belt drift on the take-up drum and resultant damage at the entrance end.

Drive Installation

15. Slide the gearbox shaft with the key into the gearbox. Set the gearmotor in place and bolt it down, finger tight only. Slide one chain coupling flange and key onto each end of the gearbox shaft.
16. Assemble the drive shafts.
    a. Loosen the screws on the sprockets and slide the sprockets on the shafts. There should be 10 sprockets on a Dual 30" drive shaft and 14 sprockets on a Dual 42" drive shaft. Somewhere near the ends, **but not on the ends**, insert the sprocket retaining collars between two sprockets. Leave all of the screws on the sprockets and the retaining collars loose for now.
    b. Slide the bearings onto the shafts. Orient the zerk fittings and the set screws for easy access. Slide a chain coupling flange and key onto one end of each drive shaft.
    c. Drop the assembled drive shafts into place.
    d. Place a glide plate onto the end of the conveyor frame.
17. Shim the bearings to obtain the proper shaft height. The belt should never slide down off the glide plate onto the sprockets. Shim the bearings so that the sprocket at the base of the teeth is level with the deck of the conveyor or slightly (up to ¼") higher **with a glide plate in place**. **This is absolutely critical**; if the belt slides down from the glide plate onto the sprocket, the glide plate will wear very fast and the belt may be severely damaged.
    a.
        i. For a 2-1/2" shaft, the flat of the shaft should be 3-5/16" or less below the top of the glide plate.
        ii. For a 3-1/2' shaft, the flat of the shaft should be 2-13/16" or less below the sop of the glide plate.
        iii. Shim the gearbox to match the shaft height.

b. Join the flanges with the coupling chain.

18. Align the drive shafts and the gearbox shaft to each other and perpendicular to the conveyor direction of travel.
    a. Tighten down the gearbox.
    b. Tighten the shaft bearings. Insert pieces of steel between the end of the bearing and the conveyor frame to keep the bearings from slipping under belt tension.
    c. Tighten all the set screws on the coupling flanges and the bearings.
    d. Lube all the bearings on the drive and take-up ends.
    e. **Fill the gearbox with the proper grade and quantity of oil**. See the gearbox tag and operating instructions. SEW Eurodrive specifications for KA97 series gearboxes is ISO 150 , and for the M1A position (upright mounted on the feet) the fill volume is 7.0 liters (7.33 quarts). Check the fill level at the oil plug.
    f. Have the electrician wire the gearmotor and motor control center.

Stainless Guide Rail and Glide Plates

19. Install the belt guide rail.
    a. Mount the guide rail channel 15-3/4" (30" Belt) or 21-3/4" (42" Belt) on each side of the centerline of each section. This leaves a nominal ¾" gap on each side of the belt. This gap is functional; do not try to "tighten it up" for the appearance of precision or because the operator doesn't like it. Weld the guide rail channel to the conveyor frame only **on the outside of the c-channel guide rail** (away from the belt). If you weld the inside of the channel, you will have to grind all the welds smooth (virtually off). Welding the inside of the channel or installing the channel tighter than ¾" to the belt may damage or excessively wear the edge of the belt and disable its disassembly, and increase the drag, prematurely wearing the belt and the drive system.
    b. The rails must be straight and the inside edge against the belt must be flush so that the belt does not catch an edge.
    c. This is often done after the belt is installed. However, since the fit is generous and not critical, and since there is a risk of belt damage due to weld spatter, AVW recommends that the guide rail be installed prior to belt installation.
20. Place all glide plates on the frame per the diagram in the Packing List.

Belt Installation

21. Assemble the belt on the surface of the conveyor. Roll out the sections and lay them flat. Open the "door" on the end of the belt sections with a screwdriver, mesh the sections together, insert a pin and close the door.
    a. Check each section and assemble them correctly to obtain the appropriate pusher spacing on the driver side. If the pusher pattern is not symmetrical side-to-side, check the direction of the belt to make sure the pushers are oriented toward the correct side.

b. Slide the sections toward the take-up end and feed the belt underneath the conveyor and over the return rollers as you go. The belt is heavy and it will be difficult to slide it manually if you assemble a long length on top of the conveyor.

22. When you have assembled all of the belt, tighten all of the screws on the sprockets after you have spaced them to fit the pockets on the underside of the belt and you have centered the whole sprocket group on the shaft. Push the retaining collars against the **outside** of an adjacent sprocket and tighten the screws on the collar.
    a. The collars will no longer move but the sprockets, though a little snug, will be able to "float" to line themselves up with the belt.
    b. The two sprockets restricted by the retaining collars keep the sprockets and belt from wandering side-to-side.
    c. "Hook" the belt onto the sprockets, making sure that **all** of the sprockets line up with the pockets in the underside of the belt, and making sure to wrap the belt all the way around the sprockets and up onto the glide plate. Only one sprocket out of place can push the belt up and off the other sprockets.
23. Attach the ends of the belt.
    a. Using C-clamps and wood blocks to "pinch" the belt over a portion of c-channel frame, or by parking the front wheels only of a 4-wheel drive vehicle (drive engaged and emergency brake applied) on the entrance end of the belt, "lock" the belt in place.
    b. "Bump" the belt **in reverse** to take up the slack in the belt and close the gap between the ends. Pull the short end of the belt by hand so the belt slack does not roll off the sprockets and under the conveyor deck, damaging the belt, sprockets, or other conveyor components.
    c. Fasten the two ends by installing the last pin.
    d. Remove the c-clamps or vehicle.
        i. Help the belt settle flat onto the top deck and check the length; the belt should not touch the floor anywhere. Shorten the belt if necessary.
24. Check the belt installation. Run the belt **slowly forward**.
    a. Check for proper operation of the drive system and sprockets. Adjust to correct any problems.
    b. Check for proper operation of the belt over the return rollers.
    c. Check for proper operation of the guide rollers. Adjust the height if necessary.
    d. Check for proper operation of the take-up drum.
    e. Check that all of the return rollers turn. If they do not, find and fix the problem. The UHMW will very rarely need lubrication on the stainless steel shafts, but if lubrication is required, do not use oil or grease. A small amount of WD40, silicone, or graphite applied to the inside of the UHMW will suffice.
    f. Check the belt length again so that there are loops in the belt, particularly at the drive end pinch roller, but also so that the belt **never** drags on the floor, anywhere. Shorten the belt if necessary.

Fit Transition Plates

25. Install transition plates at the entrance and exit to transfer the vehicle from the belt surface to the concrete.
    a. Use ¼" diamond plates.
    b. Match the top of the diamond plate to the top of the belt; shim if necessary. A slight downward step (down from plate to belt at entrance, down from belt to plate at exit) is acceptable as long as it does not appreciably accelerate the vehicle; err on the downward side. Never make the vehicle go up at these transitions.
    c. Bring the diamond plate within 1" of the belt at the entrance and exit.
        i. On the driver side, entrance and exit, cut slots that clear the pushers, but leave "fingers" that reach within 1" of the belt surface between the pushers.
    d. Bridge the gap between the concrete and the conveyor frame, always level to down, never up.

WARNING: Keep hands, fingers, feet, toes, shoes, clothing, tools, rags, towels, electrical cords, hoses and ropes away from the belt-to-plate transition whenever the conveyor is not locked out of operation. As with any machinery, rotating shafts and pinch points created by the transition plate in close proximity to the moving belt and pushers can cause severe injury.

a. Do not allow wash customers out of the vehicle near the conveyor while conveyor is in motion. Never allow children in the wash while in operation under any circumstances.
b. Train all employees in belt safety.
c. Do not work on the conveyor components unless the conveyor is locked out of operation.
d. **Never** stand on the belt or frame or in the pit near end of the belt while the conveyor is in operation. Never, ever.
e. Train all employees in the location and operation of emergency stop button stations.
f. Maintain startup signal devices and startup delays at all times. Advise employees of the meaning of the signal and train them in the appropriate actions and "all clear" signals.
g. Keep pit grating or cover plate over the drive section at all times while the conveyor is in operation.
h. Implement and enforce a zero tolerance policy toward practical jokes involving conveyor operation and horseplay around the conveyor.
i. Protect against unauthorized operation of the conveyor with restricted access (physical separation, keyed access, pass-code clearance, etc.) to conveyor operation.
j. Never attempt to prevent property damage by manual intervention while the conveyor is in operation. The first response to impending property damage is always shutdown. Instill in employees that no amount of property damage is worth the risk of bodily injury.