GED Integrated Solutions	Glass Equipment Development, Inc. 9280 Dutton Drive Twinsburg, Oh 44087	Document No.: APN-0099 Revision: A	Date: 4/20/05

Description: Smart Extruder Setup Procedure			
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Revision History:	Release No.:	Changed By:	Date:
Rev A Orginal Release	ER-03590	KAC	4/20/05

1.0 Scope

This procedure provides step by step instructions for rebuilding and setup of a GED Smart Extruder.

2.0 Applicable Documents

APN-00085 (Bottom Nozzle Head Rebuild Procedure)

APN-00086 (Side Nozzle Head Rebuild Procedure)

IM-0040 Smart Extruder Manual for setup and adjustment instructions

APN-0054 Smart Extruder Nozzle Tips seating and re-seating

3.0 Tools and Materials

Combination wrench set

Hex wrench set

Fishing line (8lb. test) Yellow is preferred for visibility

GED gauge P/N 3-1226 or adjustable parallels set to .515”

Needle nose pliers

Mineral Spirits or equivalent

Shop rags

Arbor press and a 1.100“sleeve

Level

3/8” diameter pin punch

Anti-seize compound

High temperature O-ring lube such as Loctite Krytox RFE

Steel hammer

Small screwdriver

Straight edge or parallel (8”-12” in length)

4.0 Extruder Disassembly

4.1 Extruder Shut Down

NOTE:

Maintenance should be performed while the extruder is warm. Heat the extruder to operating temperature prior to disassembly.

1. Turn off and lock out the main air supply to material pump.
2. Bleed the pressure off of the heads by running a spacer or two through the extruder with the material pump air supplies off.
3. Verify the pressures have been relieved by viewing the pressures in the Remake screen.
4. Move the conveyor width to Max.
5. Press the Emergency Stop button on the HMI.
6. Turn off the main air supply to the extruder and bleed the pressure off the holding tank by opening the ball valve on the.

NOTE:

Mark the location of the air lines for reinstallation.

7. Remove air lines to the center hold down wheel air cylinder, bottom head, and side heads. **NOTE:** *Mark their location for reinstallation.*

4.2 Hold Down Wheel Bracket Removal

1. Remove the sealant and matrix jam sensor cables from there respective sensor.
2. Remove the 3/8” -16 x 1” socket head cap screws (SHCS) that fasten the hold down wheel assemblies to the support posts.
3. Remove the center hold down wheel assembly from the adjacent hold down wheel assemblies and set it on the back of the electrical enclosure.
4. Remove all three hold down wheel assemblies.

4.3 Side Head Removal & Nozzle Tip Removal

Reference: *GED Application Note APN-0086 Section 4.2*

1. Verify that the air supply to the material pumps and the Smart Extruder are turned off and locked out.

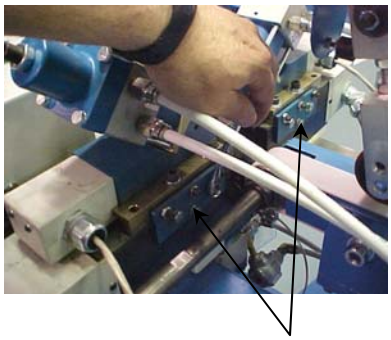
2. Bleed off any remaining pressure on the system by opening the ball valve on the bottom of the material manifold. The pressures may be viewed from the Remake Screen on the HMI.
3. Remove the guards on the non-operator side of the extruder to gain access to the jackscrew plate and the gib for the non-operator side head.
4. Remove the four 1/4”-20 x 3” cap screws which secure the two side head assemblies to the ball screw assembly.
5. Disconnect the side head hoses (Co-Extruder only).
6. Remove the six 1/4"-20 hex screws that secure the two jackscrew plates on the exit side of the side heads.

Remove Guards

NOTE:

Do not remove or loosen the jackscrews.

7. Remove the four 5/16”-18 x 1 1/4" cap screws which secure the two adjustable brass gibs.
8. Turn off the main electrical disconnect and lock out.
9. Disconnect the side head power cables from the side of the extruder main electrical cabinet.
10. Remove the side heads from the heater block and discard the cup seal 150-5881 (Standard Smart Extruder only).
11. Remove the Intercept spacer hold-down caps (if applicable) and the side head nozzle tips.
12. Remove the air fittings from the nozzle heads.
13. Follow APN-0086 for side head rebuild instructions.


Remove Screws

4.4 Belt Removal

CAUTION:

Do not loosen the locking screw handle while the belt is off. Never stand in front of the yoke when it is compressed.

1. Loosen the locking screw handle at the end of the conveyors. This will enable the yoke spring to be compressed.

2. Compress the spring by placing your hand between the belt and the underside of the conveyor and pushing down on the bottom side of the belt.
3. Tighten the locking screw handle to hold the yoke in place after the spring has been fully compressed.
4. Remove the other belt in the same manor.

4.5 Bottom Nozzle Plate Removal

1. Remove the four (4) SHCS 10-32 x 1/2" which secure the bottom nozzle to the heater plate and remove the bottom nozzle from the heater plate.
2. Remove and discard the O-ring (250-0338) from the bottom nozzle.
3. Remove the SHCS 6-32 which secures the bushing (3-6359) to the bottom nozzle.
4. Mount the bottom nozzle in a soft jawed vise with the bushing facing up. Grasp the bushing with a pair of Channel-Lock® pliers and remove it from the bottom nozzle.

TECHNIQUE: Twist and pull upward.

CAUTION:

Be careful not to damage O-ring seat or sealing area of bottom nozzle. Discard the bushing.

5. Invert the bottom nozzle plate in the vice.
6. Line up a small screwdriver in the slot at a slight angle and tap on the screwdriver with a hammer. Once the dowel pin begins to come out, twist the screwdriver to pry the dowel pin up on one side.
7. Use pliers to remove the dowel pin all the way. See Figure 1.

TECHNIQUE: *Rock back and forth while pulling on the dowel pin.*

It is possible to damage the bottom of the trough with the screwdriver. Inspect the bottom of the trough for damage. Remove any burrs or bottom deviation with an angled jewelers file.

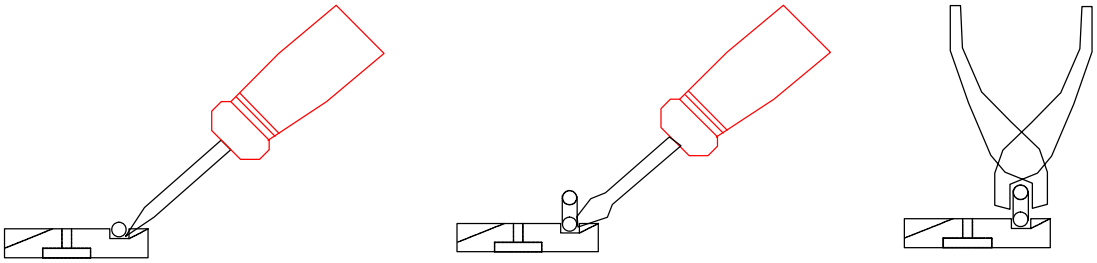


Figure 1

4.6 Drive Belt Removal

1. Verify the applicable guards have been removed in Step 3 of Section 4.3 to gain access to the drive belt.
2. Loosen the two bolts that secure the idler wheel.
3. Pivot the idler wheel assembly and remove the drive belt.

4.7 Bottom Nozzle Head Removal & Installation

Reference: *GED Application Note APN-0085 Bottom Head Rebuild Procedure*

4.8 Drive Pulley Removal

1. With the drive belt cover removed, loosen and remove the two bolts that secure the drive shaft support bracket on the non-operator side of the conveyor.
2. Pull the drive pulley bracket along with the drive pulley assembly until the shaft slides out of the opposite bracket.
3. Maneuver the drive pulley assembly and bracket out of the machine. See Section 7.1 for assembly rebuild instructions
4. Measure the distance from the end of the shaft to the drive pulley before removing the bearing and pulley.
5. Remove the bearing from the end of the drive shaft with a brass drift or arbor press.
6. Break loose the taper lock bushing that secures the drive pulley and remove the drive pulley.
7. Clean the pulley and drive shaft thoroughly.

4.9 Idler Pulley Assembly Removal

1. Remove the idler pulleys from the ends of the conveyors by pulling the Idler pulley assembly straight out. **NOTE:** It may be necessary to carefully pry the idler pulley assembly from the yoke with a screwdriver.
2. Remove the belt tracking set screws.
3. Remove two (2) thrust bearings.
4. Remove the axle.
5. Drive out the bearings by tapping on the inner race with a 3/8” diameter pin punch.
6. Clean the idler pulley thoroughly.
7. See Section 7.9 for rebuild and installation.

4.10 Fiber Optic Removal (Corner and Spacer Sense)

1. Remove two (2) SHCS which fastens the corner and spacer sense fiber optic bracket to the conveyor tube.
2. Set the bracket off to the side.

5.0 Parts Cleaning

Butyl is easier to clean off of objects when it is warm. Remove the majority of the butyl while it is still warm. A hot knife is useful when there is caked on butyl. If the butyl is warm and stuck to an object, it can be dabbed off using a small portion of cold butyl. The remaining thin coating of butyl can be removed with solvent such as mineral spirits and a rag. Small parts can be submerged in solvent. An agitator in the solvent tank can speed up the process.

Clean:

Sealant Manifold Block
Conveyors
Hold Down Wheels
Drive Pulleys
Idler Pulleys

6.0 Inspection

Visually inspect the following parts:

Dowel Pin ..... *check for flat spots*
Drive Belt ..... *check for wear or damage*
Bearings ..... *should be replaced if they have been contaminated with butyl*
Drive and Idler Pulleys *check for burrs after the bearing has been removed*
Hold-Down Wheels *check for excessive wear from the intercept spacer*
Hold-Down Brackets *check for excessive wear*
Belts..... *check for excessive fraying or gouges*

7.0 Assembly and Alignment Procedure

7.1 Drive Pulley Rebuild and Installation Procedure

NOTE:

It may be necessary to heat or soak the assembly in solvent prior to performing the following steps.

1. Install drive pulley and taper lock bushing in the same location as measured during disassembly in Section 4.8.
2. Apply anti-seize to the inner race of the new bearing (150-4594) and press bearing on drive shaft.

3. Apply anti-seize to the outer race of the new bearing and install the drive assembly into the bearing support bracket on the conveyor tube.
4. Loosely install the two bolts into the support bracket on the non-operators side of the machine.
5. Level the drive shaft and position it so that it is parallel to the sealant manifold.
6. Verify that the drive pulley is just slightly above the top of the conveyor tube to avoid cutting the back of the belt.
7. Tighten the two support bracket bolts and verify that the assembly didn't move.

7.2 Conveyor Alignment Procedure

A scribe line should be visible on the bottom nozzle plate and each end of both conveyor tubes from the manufacturer as shown in Figure 3. If not, scribe a line in the center of the bottom nozzle plate as shown in Figure 2 and in the center of the conveyor tubes as shown in Figure 3.

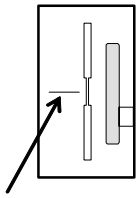


Figure 2

NOTE:

Do not scribe the line all the way to the hour glass shaped opening. This will cause a line to appear on the application of the butyl.

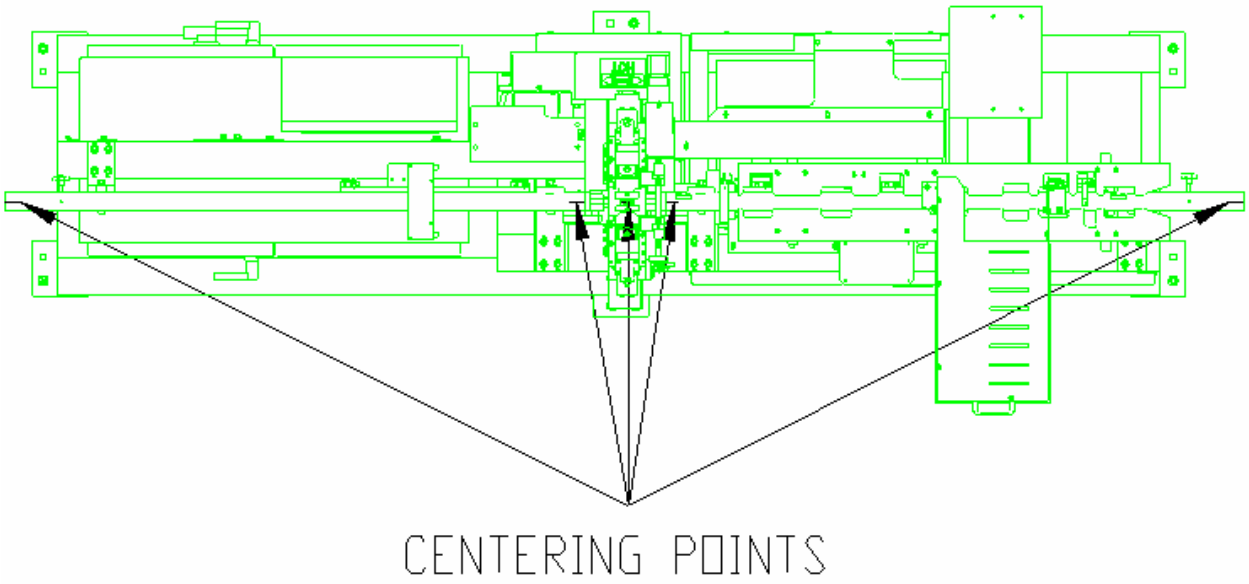


Figure 3

1. Drape a fishing line from the end of the entry conveyor to the end of the exit conveyor, resting the fishing line in the center notches located at the ends of the conveyor. The notches are filed into the conveyor during manufacturing.

2. Tie weights to the end of the fishing line suspending them above the floor.
3. Place two small pieces of key stock under the fishing line as shown in Figure 4.

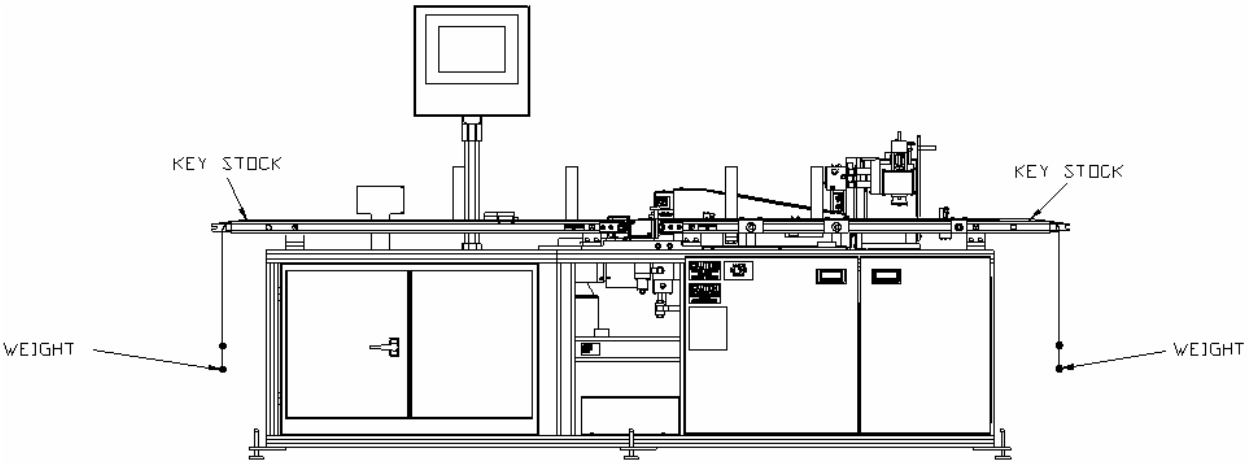


Figure 4

4. Loosen the conveyor support brackets as required to change the position of the conveyors. The objective is to end up with the conveyors:
    a. Centered to the scribe line on the bottom nozzle plate. See Figure 5**.**
    b. Perpendicular to the main sealant manifold. See Figure 3**.**
    c. Centered under the string at all scribe lines.

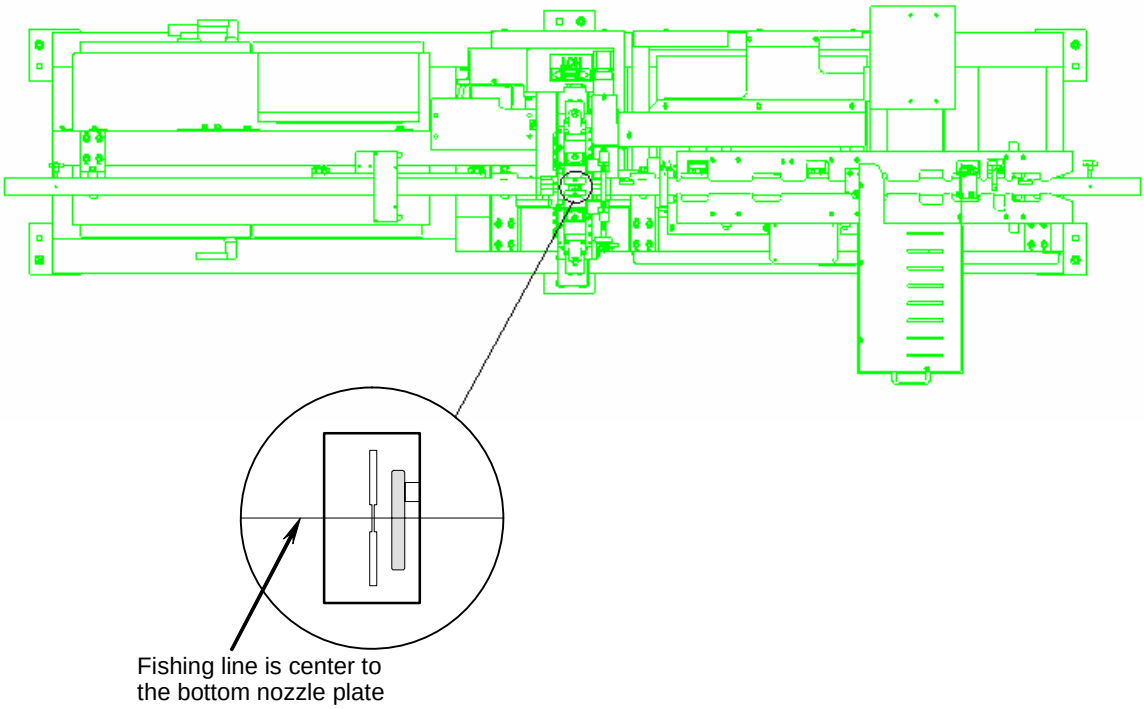


Figure 5

NOTE:

The sealant manifold should be perpendicular to the frame. This is aligned during manufacturing.

5. Align the entry conveyor so both ends are equidistant from the frame.
6. Align the exit end of the exit conveyor so the fishing line is centered above both scribe marks in the entry conveyor.
7. Move the entry end of the exit conveyor so it is below the fishing line.
8. Repeat steps 6 & 7 until all four scribes in the two conveyors are in line.
9. If the bottom nozzle is not below the fishing line then repeat step 5 moving the entry conveyor in/out by the amount of offset. Repeat steps 6 - 8.
10. All scribes should be under the fishing line at this time.
11. Leave the fishing line in place for nozzle tip and guide plate adjustments.

7.3 Bottom Nozzle Head Installation

***Reference**: GED Application Note APN-0085 Bottom Head Rebuild Procedure*

7.4 Side Head Installation

***Reference**: GED Application Note APN-0086 Section 4.4.3*

7.5 Nozzle Tip Installation

***Reference**: GED Application Notes APN-0054 and APN-0086 Section 4.4.4*

7.6 Air Line Installation

1. Re-connect the air lines to the bottom and side heads.
2. Close the ball valve on the reserve tank.
3. Turn on the air and set regulator to 90 PSI.

7.7 Side Head Alignment

7.7.1 Adjusting Side Head Wobble

1. Verify that there is pressure on the heads as outlined in APN-0054 and that the materials are up to operating temperature.
2. Disable the conveyor width motor in the Conveyor Width screen in WinExtrude.
3. Using a wrench on the flats of the end of the conveyor width ballscrew, move the side heads in and out assuring that they don't have excessive side to side wobble or binding (one heads starts moving before the other when changing direction). This should be checked with pressure on the side heads.

4. If adjustment is necessary, slightly loosen the cap screws that secure the brass gibs.

NOTE:

The cap screws securing the gibs must be loosened slightly but not too much which would cause the cup seal in the bottom of the side head to blowout.

5. Loosen the jam nuts on the applicable jackscrews and adjust the jackscrews to move the gibs on the exit side of the side heads while simultaneously turning the ballscrew back and forth.
6. Once satisfied with the alignment, hold the jackscrew while tightening the jam nut.

7.7.2 Centering the Side Heads

1. Turn the ballscrew counterclockwise until the nozzle tips are past the narrow area of the bottom nozzle orifice (or hourglass shape).
2. Slowly turn the ballscrew clockwise while watching the side nozzle tip. Assure that they come to the narrow area of the hourglass at the same time.
3. If necessary, loosen the set screw on one of the ballscrews and turn the ballscrew in/out to adjust the position of the respective side head.
4. Repeat steps 3-5 until the side nozzles touch the narrow area of the hourglass at the same time. Snug the ballscrew set screw. See Figure 6.

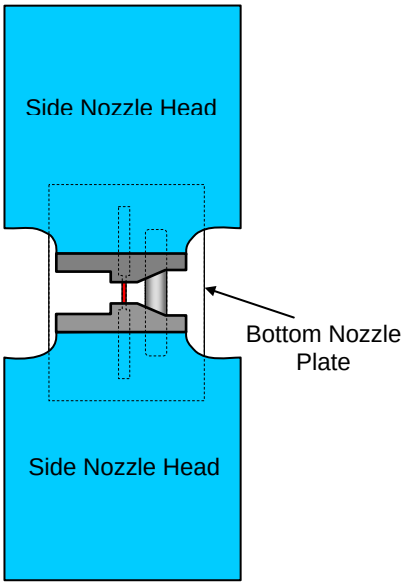


Figure 6

5. Tighten the set screw on the ballscrew.

7.8 Guide Plate Centering

1. Using the fishing line from the conveyor alignment steps, bring the heads together until the nozzle tips pinch the fishing line. The tips should touch the fishing line simultaneously if the conveyors and heads are centered properly.
2. Adjust the guide plates so each side of the plate is near the edge of the fishing line. There should be a gap of approximately .020” when done correctly.
    a. Loosen the set screw underneath the ball screw that needs adjustment
    b. Twist the ball nut clockwise or counter-clockwise to make the guide plates parallel and .020” apart.
    c. Tighten the set screw underneath the ball screw that was adjusted.

7.9 Idler Pulley Rebuild and Installation Procedure

NOTE:

It may be necessary to heat or soak the assembly in solvent prior to performing the following steps.

1. Push in two (2) new bearings (150-2116) until it they are flush with the outer surfaces of the pulley.
2. Insert the axle through the bearings.
3. Install two (2) thrust bearings on the axle, one (1) per side.
4. Install the belt tracking set screw until the tip of the screw is flush with the axle.

NOTE:

Adjust the set screws while the belt is turning to center the belt on the pulley.

7.10 Conveyor Belt Installation

1. Maneuver the belt in place with the silicone side facing out.
2. Loosen the locking screw handle.

CAUTION:

The belt will snap tight at this time so make sure your fingers are not between the belt and the conveyor tube.

3. Pull on the belt and yoke simultaneously and tighten the locking screw handle. This will insure the belt is tight.

7.11 Entry Conveyor Leveling Procedure

1. Loosen the two (2) SHCS that secure the encoder mounting bracket to the frame.
2. Loosen the two bolts that secure the conveyor tube to the support brackets.
3. Maneuver the conveyor so that it is level and .005” above the dowel pin in the bottom nozzle plate.

TECHNIQUE: Lay a straight edge on the belt and measure the distance from the dowel pin to the straight edge with a feeler gauge. See Figure 7**.**

NOTE:

Smart Extruders have an adjustment screw on the bottom of the support bracket to assist in leveling.

4. Tighten the two bolts that secure the conveyor tube to the support brackets.
5. Re-check the height of the conveyor and re-adjust as necessary.
6. Tighten the two (2) SHCS that secure the encoder mounting bracket to the frame.

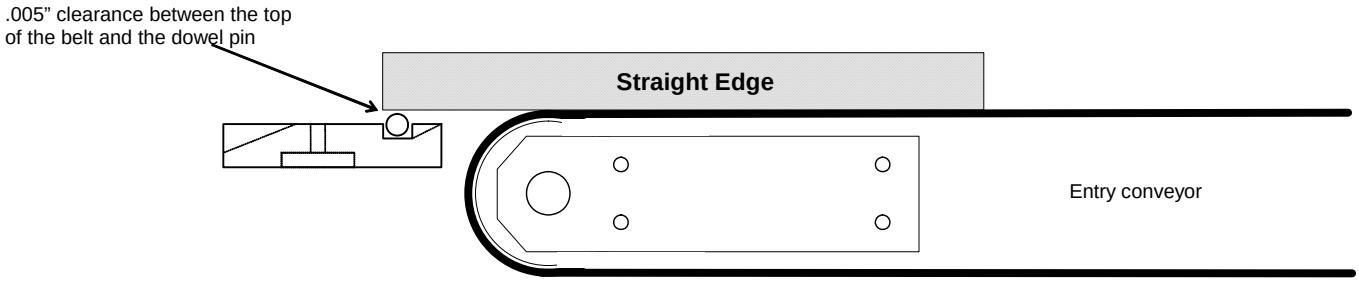


Figure 7

7.12 Exit Conveyor Leveling Procedure

1. Loosen the two bolts that secure the conveyor tube to the support brackets.
2. Maneuver the conveyor so that it is level and .005” above the bottom nozzle plate.

TECHNIQUE: Lay a straight edge on the belt and measure the distance from the bottom nozzle plate to the straight edge with a feeler gauge. See Figure 8.

NOTE:

Smart Extruders have an adjustment screw on the bottom of the support bracket to assist in leveling.

3. Tighten the two bolts that secure the conveyor tube to the support brackets.
4. Re-check the height of the conveyor and re-adjust as necessary.

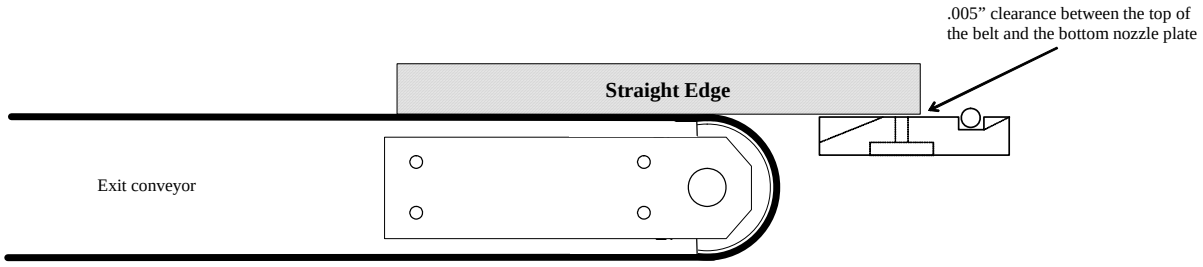


Figure 8

7.13 Drive Belt Installation

1. Loop the drive belt around the drive and idler sprockets per the assembly drawing.
2. Slide the idler against the belt applying only slight pressure. Assure that the idler bracket is level and will not interfere with the installation of the guard.
3. Tighten the two bolts securing the idler bracket.

7.14 Digital Display Setup

***Reference**: Calibration Wizard step #2 in the WinExtrude software.*

Run Step 2 of the Calibration Wizard prior to installing the Intercept Spacer hold down caps.

7.15 Nozzle Tip Spacer Hold-Down Installation

1. Install spacer hold-down blocks with one (1) 8-32 x 1/2” SHCS finger tight (extruders used for Intercept™ spacer frames only).

2. Bring the heads together by pressing the Home Motor button then press the Emergency Stop button and turn the ballscrew with a wrench until the hold down blocks touch.
3. Tighten the both SHCS

7.16 Hole Sensor Alignment

1. Loosen the two (2) SHCS that hold the hole sensor arm to the bracket.
2. Jog a spacer underneath the hole sensor using the jog switch on the entry conveyor.
3. Maneuver the hole sensor arm so that the beam of light is centered in the hole of the spacer and .020” - .250” away from the spacer and the light is focused to a fine point on the belt.
4. Tighten the two (2) SHCS that hold the hole sensor arm to the bracket.

7.17 Spacer/Corner Sensor Installation and Adjustment

1. Attach the bracket to the conveyor tube with two (2) SHCS (finger tight).
2. Slide the gauge GED P/N 3-1226 underneath the fiber-optic bracket.
3. Tighten the two (2) SHCS while holding the bracket down on the .515” portion of the gauge.

7.18 Fiber-Optic Adjustment Procedure

***Reference**: IM-0040 Smart Extruder Instruction Manual – Photoeye Amplifier Setup.*

7.19 Hold Down Wheel Bracket Installation

Install the socket head cap screws (SHCS) that fasten the hold down wheel brackets to the support posts.

NOTE:

V*erify the hold-down wheels are centered to the conveyor belt.*

7.20 Hold-Down Wheel Adjustment Procedure

***Reference**: IM-0040 Smart Extruder Instruction Manual – Hold Down Wheel Alignment.*

7.20.1 Hold-Down Wheel Angle

The hold-down wheels have bumper stops that hold the shafts at an angle. Set the bumper stops so shafts are approximately 18º from vertical.

7.20.2 Hold-Down Wheel Clearance

The proper distance between the top of the conveyor belt and the wheel should be:

- .20” for infeed conveyor.
- .25” for exit conveyor.

The following procedure explains how to adjust the hold-down wheel height.

1. Loosen the nut above the yoke.
2. Turn the wheel in 1/2 turn increments to lengthen or shorten the shaft as necessary until the proper setting is achieved.
3. Re-tighten the nut, locking the wheel in place and in line.
4. Re-check.

7.21 Sealant Application Adjustment

Use the set screw on the outer most ends of the nozzle heads to adjust the flow of material. The recommended starting point is 1 1/4 turns open from fully closed on the sides and 2 1/2 turns on the bottom head. The range is 0-3 turns from all the way close on the side heads and 0-4 turns on the bottom head.

NOTE:

To properly adjust the sealant application on the sides and bottom of the spacer you should run the Calibration Wizard steps 3 & 4 in the WinExtrude software.