

## Sequence of Operation

### Section 7

Note: some functions or features may not be available on all machines.

#### Power-Up:

1. Pull the PUSH/PULL button to turn control power on.
2. The control power button will illuminate.
3. Push the PUSH/PULL button to turn control power off.

It is recommended that the machine be purged if it has been sitting idle for fifteen minutes or more.

#### Clamping Cycle:

1. Press the BOOST or CLAMP (TOP) button; this will clamp the frame for glazing. If the frame is not clamped properly, push CLAMP or RESET button and re-adjust. Repeat the clamp step.
2. Press the BOOST or CLAMP (TOP) button to unclamp after the glazing cycle. If the Auto Unclamp feature is enabled (see parameters), the sweep clamp will automatically release at the end of the glazing (backbedding) cycle.

#### Glazing Cycle:

1. Position the nozzle over the inside of the glazing surface.
2. Press the CYCLE (BOTTOM) button.
3. The nozzle lowers to the glazing surface. On machines that have preset nozzle heights option, the Nozzle Height is adjusted according to the product via pneumatic switches located on the gantry.
4. Move the nozzle to the desired starting position. For the best results, start in the middle of a straight edge, and not in a corner.
5. Press the CYCLE (BOTTOM) button.
6. A small amount of sealant will be dispensed (pre-started). The sealant prestart helps attach the bead of sealant prior to moving the X or Y axes.
7. Keeping the nozzle in contact with the frame (if applicable), guide the nozzle around the frame. When approaching a corner, a smooth transition in and out will improve glazing results.  
Optional: If additional sealant is required in certain areas, such as corners, the boost function may be triggered by pressing the CLAMP (TOP) button. It is active during the glazing cycle only.
8. When returning to the starting point, push and release the CYCLE (BOTTOM) button and move the nozzle beyond the starting point slightly.
9. The pump reverses slightly, creating a "suckback" to help break the sealant bead the glazed sealant.
10. Press the CYCLE (BOTTOM) button.
11. The nozzle raises, completing the cycle.

#### Probe Option: (Depth Sensing)

1. Turn the depth sensing selector switch to the ON position.
  2. Position the nozzle over the glazing surface.
  3. Press the CYCLE (BOTTOM) Button.
  4. The probe cylinder will extend.
  5. Press the CYCLE (BOTTOM) Button.
  6. The nozzle will lower until the Probe cylinder has retracted far enough to actuate the Probe at Height Hall Effect switch or the Nozzle Lowered timer has timed out (see Parameters).
  7. The NOZZLE LOWER STOP valve will energize, preventing the nozzle from traveling toward the glazing surface any further.
- Continue Glazing Cycle from Step 4.

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Note: some functions or features may not be available on all machines.

#### **Lift Rail Option:**

Press the trigger button to bring the lift rail up. Press again to bring it down.

#### **Manual Boost Option:**

1. While glazing, press the BOOST (TOP) button. Additional sealant will be dispensed as long as the BOOST button is pressed.

#### **Indexing Nozzle Option:**

1. Upon enabling control power, the index axis will home, orientating itself in a cardinal direction.
2. When in the glazing cycle, the INDEX trigger is pulled, the nozzle will rotate 90 degrees. The direction of rotation of the nozzle determines the direction that the operator must travel. There is no software adjustment of the direction of rotation.
3. (If applicable) While indexing, the nozzle will boost, dispensing more sealant as it rotates.

#### **Gantry Brake Option:**

1. Pulling the INDEX trigger will enable the brake sequence. One brake will enable itself, preventing motion in that direction (for example, X or parallel to the front of the table).
  2. Pulling the INDEX trigger again will switch brake axes.
    - The second brake enables.
    - The first brake releases after a short time delay.
- Repeat as necessary.

Note: when not in cycle, the INDEX trigger may be pulled, locking both brakes. Pulling the INDEX trigger a second time will release both brakes.

#### **Heated Sealant Option:**

NOTE: Control power must be enabled for the heaters to come up to temp. Disabling control power will also disable the heaters.

NOTE: There may be a time delay after the heat zones have reached the desired temperature before the machine will function. This feature is used to make sure that the entire zone and that all the sealant has properly reached dispensing temperatures. See operator interface display.

#### **Purge Sequence:**

1. The operator presses PURGE button.
2. The sealant valve opens.
3. The sealant pump dispenses sealant as long as the PURGE button is held.
4. The operator releases the PURGE button.
5. The pump reverses slightly, creating a "suckback" to match the normal cycle conditions.

#### **Reset Sequence:**

1. The operator presses RESET button.
2. Any errors are reset.
3. The servo drive is reset.
4. The sweep clamp unclamps.
5. On machines with Depth Probe, NOZZLE LOWER STOP valve will be energized for a short time delay. This allows pressure to build up on the raise side of the NOZZLE LOWER cylinder so that the nozzle does not drop before raising.

## Troubleshooting

### Section 8.1

**CAUTION:** **DISABLE ALL MACHINE POWER AND OBSERVE LOCKOUT PROCEDURES PRIOR TO MAKING ANY ADJUSTMENTS TO THE MACHINE. FAILURE TO DO SO COULD RESULT IN SEVERE INJURY OR DEATH.**

**Note:**

As with any machine, unstable electrical power, poor grounding, dirty air, maintenance neglect, and misuse can and will affect how the machine operates over time.

**PROBLEM:** Frame seems to move around while glazing.

**SOLUTION:** 1. Clamp beam air pressure low. Adjust Clamp solenoid regulator to proper pressure as necessary.

**PROBLEM:** Probe does not stop nozzle from lowering onto product.

**SOLUTION:** 1. Move the switch lower on the cylinder to stop the nozzle lower sooner.  
2. Check the oil level in the oil reservoir. Low oil will cause poor performance.  
3. Check that the hall effect switch is working properly by turning the air off and running the probe up and down by hand. If the light turns on when the magnet passes the switch, the eye has power. Use the STATUS screen and check that the correct input is enabled when the switch is actuated. This indicates that the signal is reaching the PLC.  
4. Check to see that the solenoid is being fired by the output card by going to the STATUS screen. If the PLC is enabling the output but the solenoid is not actuating, check proper wiring and correct valve functioning.

**PROBLEM:** Nozzle does not properly stop at the correct height (machines with the probe option only).

**SOLUTION:** 1. NOZZLE LOWER STOP switch not properly adjusted. Move the switch lower on the cylinder to stop the nozzle lower sooner.  
2. NOZZLE LOWER STOP switch not does not work. To check that the switch is working properly, turn off the air supply and run the probe up and down in the cylinder. If light on the switch fails to turn on when the magnet passes the switch, replace switch.  
3. PLC not receiving signal from NOZZLE LOWER STOP switch. Go to the STATUS F7 screen and then to the INPUTS F6 screen. Manually actuate the switch. If the input status for the switch does not change on the screen, check the wiring.  
4. NOZZLE LOWER STOP VALVE not actuating. Go to the STATUS F7 screen and then to the OUTPUTS F7 screen. Manually actuate the valve by pressing the appropriate function key. If the valve does not actuate, check wiring and replace as necessary.

**PROBLEM:** Probe retracts before nozzle has finished lowering (machines with the probe option only).

**SOLUTION:** 1. Nozzle lowered time delay set to low; increase. (see parameters).

**PROBLEM:** When raising the nozzle at the end of cycle or after a reset, the nozzle drops a little before it begins to raise. (machines with the probe option only).

## Troubleshooting

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**SOLUTION:** 1. Nozzle raise started time delay set to low; increase. (see parameters).

**PROBLEM:** An indexing nozzle does not rotate to the correct angle.

**SOLUTION:** 1. Nozzle not originally properly oriented. The nozzle must be initially mounted so that, after homing, it is pointed in one of the cardinal directions. There is no software adjustment for the home position of the nozzle.  
2. Index parameters out of adjustment. (see params)

**PROBLEM:** Coupling between servo motor and sealant pump turns when the machine is in cycle but gantry is not moving.

**SOLUTION:** Analog offset out of adjustment; adjust. (see params)

**PROBLEM:** POWER ON lamp will not illuminate.

1. Check that main power is on.
2. Surge protector has tripped. Check & replace as necessary.
3. Check E-STOP.
4. Check circuit breakers or fuses.
5. Check for correct voltages.
6. Light bulb in button burnt out; replace.

**PROBLEM:** Master control relay buzzes loudly.

**SOLUTION:** 1. A buzzing relay is not an immediate problem. However, it is an indication of pending failure. Replace as part of preventative maintenance.

**PROBLEM:** The machine will not cycle.

**SOLUTION:** 1. No power. Check that main power is on.  
2. Check circuit breakers or fuses.  
3. Surge protector has tripped. Check & replace as necessary.  
4. Check for correct voltages.  
5. Control power not enabled. Check E-STOP.  
6. Air is not connected or main shut-off valve is closed. Check air gauges. Attach air and open valves as necessary.  
7. Hotmelt not to temp (as applicable). Check temperature controllers & operator interface display. Make sure that the heaters are enabled.  
Please Note: There may be a time delay after the heat zones have reached the desired temperature before the machine will function. This feature is used to make sure that the entire zone and that all the sealant has properly reached dispensing temperatures. See operator interface display.  
8. Servo drive faulted. Check operator interface & servo drive indicator lights. Reset as necessary.  
9. No sealant pressure (machines with sealant pressure switches only). Check sealant pressure gauges & supply. Adjust as necessary.

## Troubleshooting

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10. PLC not receiving signal from cycle buttons. Go to the STATUS F7 screen and then to the INPUTS F6 screen. Manually actuate the switch. If the input status does not change on the screen, check the wiring.

11. Operator pressing the wrong buttons. Read the manual.

**PROBLEM:** Surge indicator light has gone. (if applicable)

**SOLUTION:** 1. There has been a power surge in the line that has tripped the surge protector. The machine will continue to operate but will not be protected against the next surge without replacing the module. Replace as necessary.  
2. The 24V surge indicator light has burned out.

**PROBLEM:** Machine unintentionally cycles by bumping the handle.

**SOLUTION:** 1. Check button wiring for handle. Check for loose connections and terminals or shorted wires. Replace or fix as necessary.

**PROBLEM:** Machine drops out of cycle when glazing.

**SOLUTION:** 1. Check button wiring for handle. Check for loose connections and terminals or shorted wires. Replace or fix as necessary.  
2. Check incoming power to the machine. Make sure there is no noise and that the voltage is above 110 VAC. Incoming power that is below 110VAC may cause unexpected results.  
3. Servo drive faulted. Check operator interface & servo drive indicator lights. Reset as necessary.

**PROBLEM:** Machine will not cycle or the sweep will not clamp.

**SOLUTION:** 1. Check button wiring for handle. Check for loose connections and terminals or shorted wires. Replace or fix as necessary.  
2. Check incoming power to the machine. Make sure there is no noise and that the voltage is above 110 VAC. Incoming power that is below 110VAC may cause unexpected results.  
3. Servo drive faulted. Check operator interface & servo drive indicator lights. Reset as necessary.

**PROBLEM:** DC power supply drops out at power up or fails to supply power.

**SOLUTION:** There is a short between 24v and COM or Ground. Find short; fix.

**PROBLEM:** Function buttons on the operator interface do not work.

**SOLUTION:** 2. Verify that the OK and RUN lights are illuminated on the PLC. If one or both lights are out, switch the PLC to PROG to RUN several times.  
3. Check to see that all components (including the electrical cabinet) are properly grounded.

**PROBLEM:** Operator interface screen is not illuminated.

## Troubleshooting

### Section 8.1

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**SOLUTION:** 1. Check fuses and incoming power.  
2. Check to see that the 24vdc power supply is on and not shorted.  
3. Check the incoming power (24vdc) at the operator interface terminals.

**PROBLEM:** Servo drive recently replaced. Servo will not turn.

**SOLUTION:** See servo drive replacement guide.

**PROBLEM:** Servo motor runs away after dispensing begins.

**SOLUTION:** 3. Servo drive faulted. Sealant pump driven by supply pressure. Check for drive faults. Reset as necessary.

**PROBLEM:** Frequent Servo Errors. Position Error:

**SOLUTION:** 1. Position error tolerance set too low; see plc program. 2. Axis Torque Limit set too high; check & adjust - note: if the torque limit is set beneath a certain point (determined by the friction & inertia of the mechanical power-train) the motor will not be able to move. 3. Axis Accel / Decel / Speed set too high, check & adjust. 4. Poor Servo Cable connections; check motor & feedback cable connections at both the motor and drive sides. 5. Servo cable failure. Check & replace.

**PROBLEM:** Frequent Servo Errors. Position Error:

**SOLUTION:** 1. Position error tolerance set too low; see plc program. 2. Axis Torque Limit set too high; check & adjust - note: if the torque limit is set beneath a certain point (determined by the friction & inertia of the mechanical power-train) the motor will not be able to move. 3. Axis Accel / Decel / Speed set too high, check & adjust. 4. Poor Servo Cable connections; check motor & feedback cable connections at both the motor and drive sides. 5. Servo cable failure. Check & replace (if replacing, consider using 'high flex' cables). 6. Mechanical binding; check & clear.

**PROBLEM:** Frequent Servo Errors. Feedback Error; Encoder Fault.

**SOLUTION:** 1. Poor Servo Cable connections; check feedback cable connections at both the motor and drive sides. 2. Servo feedback cable failure. Check & replace (if replacing, consider using 'high flex' cables).

**PROBLEM:** Frequent Servo Errors. Hall Effect Error

**SOLUTION:** 1. Poor Servo Cable connections; check feedback cable connections at both the motor and drive sides. 2. Servo feedback cable failure. Check & replace (if replacing, consider using 'high flex' cables).

**PROBLEM:** Frequent Servo Errors. IPM Motor Fault / Over Temp / Over Current Fault

## **Troubleshooting**

### **Section 8.1**

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**SOLUTION:** 1. Poor Servo Cable connections; check motor cable connections at both the motor and drive sides. 2. Servo cable failure; check & replace (if replacing, consider using 'high flex' cables). 3. Drive failure; check and replace. 4. Stray wires shorting out terminals on drive; check and fix as necessary. 5: Binding during homing; check and clear any binding / blockages.

**PROBLEM:** For other problems not listed, please call.

**SOLUTION:** **CALL ERDMAN AUTOMATION AT 763-389-9475**

## Troubleshooting

### Section 8.2

**CAUTION:** **DISABLE ALL MACHINE POWER AND OBSERVE LOCKOUT PROCEDURES PRIOR TO MAKING ANY ADJUSTMENTS TO THE MACHINE. FAILURE TO DO SO COULD RESULT IN SEVERE INJURY OR DEATH.**

**PROBLEM:** Sealant does not dispense in either direction when in the glazing cycle.

**PROBLEM:** Coupling does not turn.

**PROBLEM:** Machine does not dispense while purging. (Purge speed not set to zero.)

**SOLUTION:**

1. Coupling set screws loose (even just very barely). Tighten.
2. Gearbox set screw or clamp collar loose. Tighten (like you mean it).

3. Servo drive faulted. Check for servo drive faults on both the operator interface and the indicator lights on the drive itself. Reset glazer. See below for servo faults.

4. Sealant cured in nozzle, gear pump or shutoff valve. Check for and clear any blockages.

5. Pump frozen, gearbox binding or motor just not spinning.

Remove the motor from the gear box. Again, purge - making sure that the motor is properly braced & the shaft is free to rotate (i.e. don't put your finger or other body parts on it).

If the motor does not turn, check to see if the servo drive has faulted by observing the indicator lights on the drive itself or the operator interface. Similarly, make sure that the drive is enabled.

If the motor turns, reconnect it to the gearbox. Disconnect the gearbox from the coupling. Repeat purge. If the output of the gearbox turns, the sealant in the pump has frozen or the pump itself has failed. If the output of the gearbox does not turn, replace the gear-box.

6. Encoders may not be functioning properly. From the STATUS F7 screen, monitor the X & Y encoder position while moving the glazing head.

7. Servo drive may not be receiving command signal. Verify that the analog card is sending voltage to the drive by measuring between wires analog command signal from the PLC (refer to controls schematics). The measured voltage should be between +10 & -10 vdc when glazing or purging. Compare with the display on the STATUS F7 screen.

If the measured voltage differs wildly from the displayed value, turn main power off and disconnect the 50 pin Servo I/O cable from the servo drive. Turn main power back on & repeat test.

If the measured voltage continues to differ, check the wiring to the analog card.

If the measured voltage now matches the displayed voltage, check drive & i/o cable.

8. Servo drive not enabled. If there is voltage coming from the analog card and the encoders are working, check for 24vdc at the SERVO ENABLE output of the plc while glazing or purging. (refer to controls schematics). Motor torque cannot be applied unless the enable input is active.

9. Servo I/O cable not plugged in or is loose. Make sure that the servo I/O cable is properly plugged in. (refer to controls schematics).

## Troubleshooting

### Section 8.2

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10. Servo drive faulted. Sealant pump driven by supply pressure. Check for drive faults. Reset as necessary.

11. Servo drive replaced but now will not turn. See servo drive replacement guide.

**PROBLEM:** Sealant does not dispense in either direction when in the glazing cycle.

**PROBLEM:** Coupling does not turn.

**PROBLEM:** Machine dispenses while purging.

**SOLUTION:**

1. Coupling set screws loose (even just very barely). Tighten.
2. Gearbox set screw or clamp collar loose. Tighten (like you mean it).
3. Check the bead diameter parameters
4. Check both encoders & connections.

**PROBLEM:** Sealant does not dispense in either direction when in the glazing cycle.

**PROBLEM:** Machine does not dispense while purging. (Purge speed not set to zero.)

**PROBLEM:** Coupling does turn.

**SOLUTION:**

1. No sealant supplied to sealant pump. Check the pressure gauge; if at "0" make sure the supply pump is on. If the gauge still reads "0" the supply hose may be plugged. Remove air from the supply pump, replace the hose.
2. Not enough sealant supplied to sealant pump. Monitor the pressure gauge while attempting to glaze. If supply pressure drops to zero, the sealant pump may starve or cavitate. This will damage the pump unit - do not operate glazer until supply problem is corrected.
3. Sealant valve not actuating. Check sealant valve air lines. Pressing the purge button will actuate the valve; it should move inward to open the sealant valve.
4. Sealant pump rotating incorrect direction. Monitor the pressure gauge while attempting to glaze or purge. If the supply pressure increases, stop immediately! Reverse the direction of the sealant pump (see parameters).
5. Servo drive faulted. Sealant pump driven by supply pressure. Check for drive faults. Reset as necessary.
6. Servo drive replaced but now will not turn. See servo drive replacement guide.

**PROBLEM:** Machine does not dispense while purging.

**SOLUTION:**

1. Purge speed set to zero. Increase purge speed. (see parameters)
2. See above.

**PROBLEM:** Sealant pump coupling tends to jerk around or move erratically while glazing.

**PROBLEM:** Bead is skipping.

**SOLUTION:**

1. Coupling set screws loose (even just very barely). Tighten.
2. Gearbox set screw or clamp collar loose. Tighten (like you mean it).
3. Operator is very spirited and is moving the nozzle faster than the sealant pump can respond. Channel extra energy for good, not evil. **The operator interface will indicate that an "OverSpeed" error has occurred.**

## Troubleshooting

### Section 8.2

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4. Sealant cured in nozzle, gear pump or shutoff valve. Check for and clear any blockages.
5. BEAD DIAMETER PARAMETER is set to high. Check the parameter by selecting the desired bead profile from the main screen and adjusting the associated parameters by using the BEAD F5 key.
6. Wrong bead size selected. The bead diameter selected is too big for the pump size. Reselect proper bead size from the main screen.
7. Encoder wheel may be skipping; this will normally happen in only one axis of motion. Make sure the encoder wheels are in contact with the surface they ride on. Clean the surfaces and check to make sure the cables are tight. If the encoder has failed, sealant will only dispense sealant in one axis of motion.
8. Sealant cured in nozzle, gear pump or shutoff valve. Check for and clear any blockages.

**PROBLEM:** Sealant leaks from nozzle prior to glazing.

- SOLUTION:**
1. Sealant valve leaking, dried material in valve; disassemble and clean.
  2. Line pressure for sealant supply pump set too high. Pump pressure must not exceed 1500psi.
  3. Air pressure is too low to actuate the sealant valve reliably. (80 psi minimum).
  4. Sealant supply has air dissolved into it. See attached manual supplement.

**PROBLEM:** Sealant leaves large puddle at start-up of bead.

- SOLUTION:**
1. Prestart value set too high.
  2. Sealant valve leaking, dried material in valve; disassemble and clean.
  3. Air pressure is too low to actuate the sealant valve reliably. (80 psi minimum).
  4. Servo drive faulted. Sealant pump driven by supply pressure. Check for drive faults. Reset as necessary.

**PROBLEM:** Sealant leaves a gap at start up of bead.

- SOLUTION:** PUMP PRESTART PARAMETER set too low. Check and adjust.

**PROBLEM:** Sealant leaves large puddle at end of bead.

- SOLUTION:**
1. SUCK BACK PARAMETER set too low. Check and adjust.
  2. Servo drive faulted. Sealant pump driven by supply pressure. Check for drive faults. Reset as necessary.
  3. Servo drive replaced but now will not turn. See servo drive replacement guide.

**PROBLEM:** Amount of sealant dispensed does not vary with the speed that the nozzle is moved. Sealant amount dispensed increases in corners.

- SOLUTION:**
1. Coupling set screws loose (even just very barely). Tighten.
  2. Gearbox set screw or clamp collar loose. Tighten (like you mean it).

## Troubleshooting

### Section 8.2

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3. Servo drive faulted. Sealant pump driven by supply pressure. Check for drive faults. Reset as necessary.

4. Servo drive replaced but now will not turn. See servo drive replacement guide.

**PROBLEM:** Incorrect bead diameter.

**SOLUTION:** 1. BEAD DIAMETER PARAMETER set incorrectly in the BEAD F5 screen.  
2. Wrong bead selected from main screen.

**PROBLEM:** For other problems not listed, please call.

**SOLUTION:** **CALL ERDMAN AUTOMATION AT 763-389-9475**

## Manual Supplement for Hand Assist and Automated Glazers

### **Air in Sealant Supply**

If there is air in the sealant supply (as a result of a recent sealant pail change, lack of maintenance to extrusion pump, leaks in supply, or inconsistency of product), many dispensing problems may result.

Dispensing problems may include: sealant leaking from nozzle when not in cycle, sealant leaking from nozzle while in cycle but not dispensing, sealant puddling when dispensing but not moving, excessive puddling in corners, gaps or narrowing of bead when coming out of corners.

Indications of air in sealant may include: any of the above mentioned problems, crackling sound when dispensing, bubbles in sealant (which may take several minutes to become visible, or may be too small to ever be seen), inconsistent pressure on nozzle side of pump when purging, erratic pressure on supply side of metering pump, or the piston of the extrusion pump moves more than 1/2" after dispensing has stopped. (A good way to determine if there is air is to purge the sealant onto a paper towel held up to the nozzle. Sealant free of air will have smooth pressure. Sealant with air or irregularities will have noticeable bumps and jumps in pressure that can be felt by the hand holding the towel.)

After dispensing from the metering pump has stopped, the piston of the extrusion pump will continue to move to rebuild pressure (a pressure drop from 1000 psi to 100 - 200 psi while dispensing is not uncommon). The further (1/2" to 1-1/2") that the piston of the extrusion pump moves after dispensing, the more air is likely to be in the sealant line.

#### **If it is determined that there is air in the sealant supply:**

Purge sealant supply until the air has been purged from the supply or no more symptoms of air are noticeable.

It is best to purge for a short period and then stop before purging again. Purging continuously will not effectively remove air trapped in the line or pump.

#### **To avoid air in the sealant supply:**

Use larger sealant supplies. It is easiest for air to accidentally get into the system when changing the sealant pail. Thus, a 55 gallon barrel will have fewer problems with air than eleven 5 gallon pails.

Have experienced employees change the sealant barrels or pails.

Use sealants less prone to absorbing air or being affected by it. For example, silicone is less problematic than urethanes.

Take care to eliminate air when it is determined that it is a problem. Problems with air may go away on their own, but this is not always the case.