Dual-Blade Shear Cutting

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Product Description and Capabilities

Dual-Blade Shear Cutting Technology

Dual-Blade Shear Cutting Machine cuts round, square, and rectangular precise lengths automatically and rapidly. Each cut is performed in two steps.

1. A horizontal cut, made with the “Nick Blade”, shaves a flat groove across the top of the tube.

2. A vertical cut, made with the “Cut Blade”, shears through the tube at the groove.

The Dual-Blade Shear Cutting Machine can trim off the rough, leading edge of each tube. This cut is called a “Crop Cut”. The following cuts are made at the selected length until the end of the tube passes a sensor which tells the Loader to provide a new tube. A new cutting cycle then begins with a crop cut.
### Specifications and Requirements

<table>
<thead>
<tr>
<th>Electrical:</th>
<th>230v3Ph 380v3Ph 480v3Ph 575v3Ph 120 Amp 70 Amp 60 Amp 50 Amp</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong> (water cooled option only):</td>
<td>5-15 GPM at 40 PSIG (20-60 liters/min at 2.8 bar)</td>
</tr>
<tr>
<td><strong>Air</strong>:</td>
<td>80-100 PSIG, 5 SCFM (5.5-7.0 Bar, 0.15 m^3/min)</td>
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<tr>
<td><strong>Hydraulic Capacity &amp; Fluid</strong>:</td>
<td>Model 871/3/4:100 gal. (379 Ltr) of industrial anti-wear hydraulic oil</td>
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<tr>
<td><strong>Grease</strong>:</td>
<td>High Pressure grease MOBILITH AW2 or equivalent</td>
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<tr>
<td><strong>Oil For Machine Slides</strong>:</td>
<td>TEXACO WAYLUBE #220 or equivalent</td>
</tr>
<tr>
<td><strong>Air Line Lubrication</strong>:</td>
<td>TEXACO REGAL “A” R&amp;O or equivalent</td>
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</table>
| **Blade Coolant**:   | FLOOD: Water/cutting oil mixture.  
Ratio 15:1 (wall thickness 0.070” (1.8mm) or greater  
Ratio 20:1 (wall thickness less than 0.070” (1.8mm)  
MIST: As directed by manufacturer of mist spray equipment |

*If input supply voltage must be changed, the following must be done:*
- Rewire all motors
- Change jumpers on main transformer
- Adjust or replace overloads on all motors
- Change fuses as is needed to meet area codes

**Note:** Proper grounding practice must be followed. Electrical interference on the ground line may result in controller system malfunction.
Learn all of these safety instructions **before turning electrical power ON to the machine.**

1. Always **lockout** (lockout pin) and de-energize hydraulic system before reaching into the die area.
2. Always **lockout** (lockout pin) before changing or tightening dies or blades.
3. Do not push tubes by hand into running feedrolls.
4. Frequently check blades, bolt, and dies for tightness. Verify that mounting bolts enter holes at least 1-1/2x the bolt diameter.
5. Replace all guards after machine maintenance or die/blade setup.
6. **Never** place your hand or head between the machine and the Tube Stop when electrical power ON.
8. Turn power OFF before leaving the machine unattended.
9. If the machine overheats and shuts down, correct the problem before continuing to run the machine.
10. Prior to electrical checks that require power **ON**, always retract the cut cylinder to the end of the stroke and insert lockout pin through the side plates and vertical slide. Electrical contacts may cause unexpected motion.
Pre-Operation Adjustments

Checking and Adjusting Hydraulic Pressure

The following pressure ratings are set in the factory:

**Model 873, 874 and 875 Tube Cut Machines**
- Pump Low Pressure: 1800 psi (12414 kPa)
- Pump High Pressure: 2800 psi (19310 kPa)
- Clamp Pressure: 1500 psi (10345 kPa)

**Model 871 Tube Cut Machine**
- Pump Single Pressure: 2000 psi (13793 kPa)
- Die Pressure: 1500 psi (10345 kPa)

1. Checking Pressures (see Fig. 1)
   a. Feedroll and Die Pressure ---- depress the button below the gauge
   b. Pump Idle Standby Pressure (system is Power ON, but no devices have been activated)
      • depress the button below the gauge.
   c. Pump High Pressure
      • Power ON system
      • Select MANUAL MODE from the Manual Menu
      • Select CLOSE DIES
      • Select HOME CUT CYL from the manual Menu. When the cylinder reaches end of stroke position, press and HOLD again the HOME CUT CYL to switch the system into High Pressure.
      • Have an assistant depress the button below the High Pressure Gauge to read the pump pressure.

2. Valve Identification (see Figure 2)
   a. PPDB- feedrolls & Die Clamp (Preset at factory at 1500 psi)
   b. RDFA-Safety Pressure Relief (Preset at factory at 3000 psi)
   c. RPCC- Idle Pressure (Preset at factory at 1800 psi)
   d. DLDA-High Pressure control valve.

3. Adjusting High Pressure Valve (see Figure 3)
   a. The high pressure can be adjusted at the compensator of the primary piston pump.
      There are two adjustments. DO NOT adjust the outer control valve.
   b. The adjustment nearest the centerline of the pump sets the 2800 psi (19310 kPa)
   c. Adjust clockwise to increase pressure; counter-clockwise to decrease pressure.
      Pressure can only be read when the DLDA valve is energized either manually or electrically.
Pre-Operation Adjustments

Feedrolls Speed Adjustment

The feedrolls are now completely processor controlled by an analog output module that is used to feed a varying +/- 10vdc to the proportional control valve.

Speed adjustments are done by altering the percentage of valve opening setpoints located on the password protected feedroll setup screen. Go to Setup, Master setup, enter 4 digit password, press Secure Setup button, and select FEEDROLL SPEEDS. This will take you to a screen where you can adjust the presets for Decel, Crop-Cut and Reverse speed setting.

Default settings:
- Decel Speed: 30%
- Crop-cut Speed: 27%
- Reverse Speed: 30%

Any change of the Crop-Cut speed will alter the amount of tube removed during the Crop-Cut procedure.

To adjust a replacement valve. On the top of the valve is an access plug. Remove this plug and inside the valve are trim pots. As marked on the valve cover, one is Ramp and one is Zero. Adjust the Ramp counter clockwise approx. 5-6 turns. This sets the valve to no Ramp. Go to the above screen and set the FWD. and REV. speeds to 15%. Adjust the ZERO trim pot until both speeds are the same when jogging forward and backward from the Manual screen. When finished, replace the cover and change the Reverse speed setting back to 30%.
Pre-Operation Adjustments

Burning in Feedrolls

1. Feedrolls surface contours must match the outside contour of the tube.
   - Feedroll groove width should be ¼ to 1/3 of tube O.D.
   - Oily tubes may require a wider, deeper groove.
   - Tubing less than ¾” (19mm) diameter may distort during the burn process. Use a solid bar with the same tube O.D. as a burn in tool.
   - Large diameter, thin wall tubing may cause the same problem. Use a heavier wall tubing for burn.

*To speed up the Feedroll Burn-in process, use the end of a setup tube to cut the majority of the roll contour. Complete the Burn-in process by burnishing the rolls with the setup tube.

1. Make a Burn-in set up tube.
   - Install corresponding cutting tools for desired tube diameter. (See Appendix B)
   - Install a set of new Feedrolls (no contour)
   - Close all guards and Power ON machine
   - Select Manual Menu from the Main Menu
   - Select Manual Mode (Machine Status will change to Manual)
   - Select HOME CUT CYL. (send cutting cylinder to end of stroke position)
   - Select the center function label to enter the Cut Screen
   - Place a tube in the dies and extend 36” to 40” (1-meter) beyond the blade centerline (See Fig.1)
   - Select CLOSE DIES
   - Select JOG BACK or JOG FRONT (opposite of Cut Cylinder Status) to cut the tube
   - Select DIES OPEN to release the setup tube
Pre-Operation Adjustments

Burning in Feedrolls  (continued)

2. Cut contour in the first set of Feedrolls
   • Clamp the setup tube in the dies with the trailing end slightly forward of the Feedroll centerline. (See Fig. 1)
   • Activate the Feedroll rotation by pressing the FEEDROLL BURN-IN label for 5 seconds
   • Use the Feedroll hand wheel to adjust the rolls toward the setup tube
   • Continue adjusting handwheel until desired contour depth is achieved
   • Back off the handwheel; push CYCLE STOP

3. Cut contour in the second set of Feedrolls
   • See Fig. 2 and repeat Step #2.
Pre-Operation Adjustments

Burning in Feedrolls (continued)

4. Burn-in Feedrolls
   - Select DIES OPEN from the Cut Screen
   - Slide the setup tube through the Feedrolls and the Front Guide Rolls (See Fig.3)
   - Select CLOSE DIES
   - Select CLOSE FDROLL
   - Adjust the Front Guide Roll to support the tube
   - Use the handwheel to adjust the Feedrolls to contact sides of setup tube
   - Press and hold FEEDROLL BURN-IN for 5 seconds for continuous run
   - Use handwheel to gradually move Feedrolls against the setup tube. The Burn-in process is complete when proper contour on all rolls is verified.
   - Move the Feedroll back while still rotating
   - Select CYCLE STOP Main Panel
   - Select DIE OPEN and remove setup tube.

NOTE: Using a paint pen, mark each roll with its corresponding spindle position and the tube diameter.
Pre-Operation Adjustments

Feedroll Changeover
1. To Install feed rolls
   a. From the Burn-in process, the Feedrolls should have been
      marked with their corresponding tube diameter and assembly position.
   b. Install the Feedrolls into the same position as they are marked.
      The Feedroll Box has an identification stamp by each spindle; 1,2,3,4
   c. Lock the Feedrolls into position with the Retaining Pins.

Safety Pin Removal
1. Remove Lockout Pin
   a. The Tube Stop guard has to remain open to remove pin.
      NOTE: If unable to remove the pin, the main cylinder has drifted down
      and is resting on the pin.
   b. CLOSE ALL GUARDS; Power ON; Select MANUAL MODE from
      the Manual Menu; Select HOME CUT CYL
   c. OPEN the Tube Stop guard (the power will automatically Power
      OFF)
   d. Remove the Lockout Pin
Pre-Operation Adjustments

Clamp Die Adjustment

When the Clamp Dies are open, the clearance between the dies and the tube is important. The amount of clearance should be kept to a minimum without allowing the tube to come in contact with the dies as it passes through: thus avoiding scratches.

To adjust the die opening:

- Loosen the Locking Handle located behind the Tube Cut Head (See image below)
- Select MANUAL MODE from the Manual Menu
- Select CLOSE DIES
- Turn the Adjusting Bolt clockwise to increase the space between the dies. The objective is to create a 1/8” (3mm) gauge block to check gap
- Repeat process until the gap is achieved
- Tighten the Locking Handle to secure the Adjusting Bolt position
Adjust the loader “V” roll height and the Loader escapement to change tube diameter or shape.

1. Set two tubes above the escapement stop.

2. Adjust the height of the top tube guides:
   - 1/8” (3.2mm) clearance between the top of the tube and the lower surface of the top guide.

3. Adjust the Escapement Stop to match the tube diameter:
   - Use the Escapement Adjustment Stop Handwheel to move the Escapement Stop toward the front (larger tubes) or to the rear (smaller tubes). Adjust until the tube is allowed to clear the Top Tube Guides and so that the Loader Escapement only picks up one tube.

4. Set the Loader V-Rolls height using the V-Rolls Adjustment Handwheel. Align the tube with the Feedrolls and the Cutoff Clamp Dies.

Adjust Up and Down travel of the Loader Belts

1. To adjust travel:
   - Remove the cover from the rotary limit switch.
   - Follow instructions inside the cover. The hex adjustment wrench is inside the enclosure.
   - Take up individual belt stretch at the rear belt mount.
Crop Cut Setup

End Trim (Crop Cut)

END TRIM (CROP CUT) operates when:
1. The Tube Cut machine is in AUTOMATIC mode.
2. CYCLE START is on.
3. The CROP CUT function is on.
   -- Select CROP CUT SETUP from Setup Screen
   -- Select CROP CUT ON
   -- Set requested crop amount

ENSURE OPERATOR AND BY-STANDER SAFETY. THE MACHINE WILL CYCLE UNEXPECTEDLY BEFORE THE TUBE CONTACTS THE TUBE STOP TARGET.

The following instructions are for the initial setup of the Crop Cut

Crop-Cut and End Trim are one and the same. Crop-Cut is achieved by measuring the tube’s movement thru the feedrolls up to and past the blade. Then stopping and cutting the deformed leading end from the tube.

As a new tube enters the feedroll area, either by hand or automatically from a loader, it first contacts an encoder wheel. This is used to do the measuring. As the tube contacts the first feedroll it is now running at a fixed speed known as crop-cut speed. As the tube moves forward it passes thru a laser thru-beam that resets the count value from the encoder and starts measuring the tube from that point. A requested Crop-Cut dimension has been added to the fixed distance from thru-beam to blade. When this value exceeds the preset the feedrolls stop and a cut sequence initiated. This cut sequence is NOT counted as a cut part. Because of the cutting methodology, the crop-cut or end trim should not be less than 50% of the tube diameter.

Note: Variations in the Crop Cut can be caused by:
   a. feedrolls speed   d. surface roughness of the tubes
   b. Tube weight       e. Contour of the feedrolls
   c. Oiliness of the tubes f. Controller or valve lag times

Make adjustments for these conditions for consistent CROP CUT lengths.
Adjusting the Length Deceleration

The PLC is pre-programmed to calculate the length that a tube will decelerate prior to contacting the Tube Stop target.

To override the pre-programmed value:
• Select DECEL TUBE SETUP from the Setup Menu.
• Select and hold INC DECEL OR DEC DECEL to change the decel value.
• The scale is divided into 0.1" (2.54mm) increments.

NOTE:
• A tube should not hit the Tube Stop target at high speed
• A banging noise indicates a lower set point (longer decel length) is needed.
• A visibly slow tube approach indicates a higher set point (shorter decel length) is needed.
Short Part Option, Tube Cut

When cutting tubes less than 4.0" (102mm) long, the machine operates in Short Part mode.

1. Corresponding sequence of operation:
   a. The tube will feed forward until the CROP CUT DECEL point is reached; the target lifts.
   b. Tube continues forward until the Crop-Cut set point is reached. The tube stops and cuts if CROP CUT is on or stops and waits 1 second if off for scrap table movement.
   c. The tube moves forward a programmed distance to eject the crop cut piece as scrap.
   d. The Feedrolls stop and the tube position counter is reset.
   e. The tube retracts to the Crop Cut position.
   f. The Tube Stop Target lowers and the machine returns to normal operation.

NOTE:

1. Use the SHORT PART OPTION for lengths from 2" to 4 " (51mm to 102mm). The out going clamp die length should be 50% the length of the tube being cut.
2. The decel speed is turned off in this mode of operation.

Length Control Screen

Tube stop target
Multi-Cut Mode of Operation

Use the Multi-Cut mode to cut a tube into equal segments without crop cutting or leaving a tag end. IE: Cut three 7-FT pieces out of a 21-FT raw tube.

1. Setup for Multi-Cut.
   - Select CROP CUT SETUP from the Setup Menu
   - Select CROP CUT OFF from the Crop Cut Screen
   - Select LENGTH SETUP from the Setup Menu
   - Select MULTI-CUT from the Length Setup Screen
   - Return to AUTOMODE

2. Sequence of operation
   - The new tube enters the machine and passes thru the thru-beam at the feedrolls. This initiates a reset of the encoder, and allows the tube to a fixed decel point for crop-cut. At this point the target lifts and the remaining tube is pushed out of the dies.
   - The tube moves until the Crop-Cut set point is reached at which time the Target lowers to the ready position.
   - The tube advances to the Target and activates the cut cycle; piece #1 is produced.
   - The tube advances again and is cut; piece #2 is produced.
   - The tube advances again and comes out of the Feedrolls, but does not strike the Target.
   - A new tube is fed from the loader and pushes the existing tube forward toward the Target.
   - The reaches the Crop-Cut decel point and the Target raises.
   - The last piece of cut tube is now pushed past the Target and out of the machine; piece #3 is produced.
   - The new tube advances and comes off the Crop Cut set point; the Target drops into position; the new tube strikes the Target; piece #1 of the new tube is cut. The new tube’s reaching the Crop-Cut point increments the part counter as the third part.
1. Prepare tools and tubes for changeover
   • Have all changeover tools properly sharpened and available at the machine prior to finishing the current production run.
   • Have the next bundle of tubes available at the machine.
   • Provide the setup person with a detailed changeover tool chart for each production part number.

2. Prepare machine for changeover
   • Turn machine Power ON; select MANUAL MODE from the Manual Menu
   • Cycle the cutting head cylinder to the end of stroke position (see Page 28)
   • Lock out the cylinder with the Lockout Pin; the Lockout Pin Hole is located on the exit side of the head.
   • Select DIES OPEN from the Manual Menu
   • Power Off the machine. NEVER perform this procedure without the Power Off and the Lockout Pin in place.

3. Change Dies, Spacers and Step Keys
   • Loosen the bolts and remove the dies and spacers

   NOTE: For a Haven Model #873 Cutoff, only the two center bolts need to be removed to extract the front and rear die assemblies.
   • Wipe die nest area clean with cloth before replacing with new dies. Do NOT use compressed air to clean the die nest area.
   • Check the Spacers and Sep Keys for proper clearance marking. Use the same clearance amount for both the Spacers and Step Keys.

   NOTE: The clearance is dependent on the tube wall thickness and the corresponding shear blade used. SEE Appendix B for the recommended combinations.
   • Install the correct tools; tighten bolts according to the following chart:

<table>
<thead>
<tr>
<th>Model #871</th>
<th>Model #873</th>
<th>Model #874, #875</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top---15 ft-lb</td>
<td>T &amp; B --- 60 ft-lb</td>
<td>T &amp; B --- 60 ft-lb</td>
</tr>
<tr>
<td>Bottom --- 60 ft-lb</td>
<td>Center---15 ft-lb</td>
<td>Center---15ft-lb</td>
</tr>
</tbody>
</table>
3. To install the horizontal blade:
   a. Loosen the horizontal blade bolt.
   b. Verify horizontal blade clamp matches the blade thickness to be used (engraved on the holder). To change holder, remove the 4 bolts that hold it to the horizontal slide assembly and replace with the proper size.
   c. Insert the blade into the slot in the holder and clamp.
   d. Set the depth with the horizontal blade gauge and tighten the bolt holding the blade in place.
   e. Remove the blade gauge.

   If the blade clamp and blade do not match in size, the blade will fall through or the clamp will not be flat against the holder.

4. To install the vertical blade:
   a. Remove the two bolts holding the Vertical blade clamp and remove the clamp.
   b. Insert the blade in the clamp. Notice the three holes in the clamp: the center hole is closer to the edge on one side.
   c. There are three holes in the blade gauge that coincide with the holes on the blade clamp. The center hole is slightly higher than the outer holes on the gauge. The blade must go into the clamp that way.
   d. Install the blade and clamp into the cutting head assembly.
   e. Insert two bolts and tighten to 60 ft-lb torque. The blade must be flat against holder.
   f. The blades, spacers and step keys must match. See Appendix B.
Vertical Blade Selection

Selection is determined by tube wall thickness, outside diameter, shape (round, square or rectangular) and the quantity of pieces to be cut. Improper blade selection may cause dimpling.

1. See Blade Selection Chart.

2. Blade angle at cutting tip: Choose a balance between ease of penetration and tip strength. Use a tip angle of 90 degrees for light-wall tubing.

   Heavier walls may require the more blunt (more force required to penetrate), but stronger (more metal near the blade tip) 120 degree blade. In general, a 90-degree included angle blade is used for round tubing, while a 120-degree blade is used for square tubing.

3. Use the Haven Blade Gauge to determine proper blade length for tube diameters. This method applies to all Dual-Blade Shear models. The holes in the top of the Blade Gauge correspond to the bolt holes in the vertical blade.

   a. The center hole is for the single mounting hole in a 1-3/4" (44.5mm) wide blade (Model #871 and #873).

   b. The outer holes are for the two mounting holes in a 3-1/2" (89mm) wide blade (Model #873).

   c. Models #874 and #875 also use the two outer holes for their respective Blade Gauges.

   d. Put a blade on top of the Blade Gauge, aligning the holes.

4. The tip of the blade will cover one of the tube O.D. values and its corresponding diameter circle. The circles on the Blade Gauge are larger than actual tube diameters. They show the distance a blade must travel beyond the tube wall for a complete cut.

   A shorter blade is more rigid, has longer expected life. Select the shortest blade that the Blade Gauge shows.

   Blades can be sharpened and saved for use on progressively smaller diameter tubes.
# Blade and Spacer Selection Chart

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Inch</th>
<th>Metric (mm)</th>
<th>Inch</th>
<th>Metric (mm)</th>
<th>Inch</th>
<th>Metric (mm)</th>
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<td>0.028</td>
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</table>

**Note:**

1. Tube diameter and wall thickness ratios may effect blade thickness and included angle.
2. This chart is a Recommended Blade Selection; the customer may vary to suit needs.
Setting the Die Clearance

Haven standard clamp dies use die spacers and step keys for blade clearance of the material being cut. Set standard blade clearance at 10% of the wall thickness per side of the cutting blade. Change step keys and die spacers for clearance of different wall thickness. (See Page 42 and Appendix B)

The step key centers the blade clearance in the dies at the blade centerline. Die spacer thickness establishes total blade clearance. When re-sharpening dies, DO NOT GRIND STEP KEYS OR DIE SPACERS.
Resharpening Dies & Blades

Sharpening Dies

1. Remove all dies from the machine.

2. Set up all dies on a surface grinder with cutting faces up. (Fig. 1) Dress cutting surfaces until corners are sharp (flood coolant required).

3. Check the chip relief step. Recut (mill) this step to 1/8-inch (3.2mm) depth if it is less than 1/32 in (.8mm). The dies are now ready to reinstall. DO NOT GRIND THE STEP KEY OR THE DIE SPACERS.

NOTE: If more clamp-up pressure is required on the tube, grind a small amount from the die clamping surface. Remove no more that .002/.003” (.050/.076mm) at a time until desired fit is obtained. DO NOT OVER GRIND.

Sharpening Blades

Sharpen the blades only on the cutting edge. (Fig. 2) Sharpen using a surface grinder and according to the blade drawing. (flood coolant required). Alternatively, blades can be re-sharpened utilizing a wire EDM.

Figure 1

Clamping surface

Figure 2
1. Lock OFF the main electrical disconnect.
2. Disconnect hydraulic motor hoses on the side of the machine base.
3. Disconnect the air cylinder at front and back.
4. Remove M12 bolts that attach the feedroll assembly to the machine base. Using a sling, lift the feedroll assembly from the machine.
5. Place the feedroll assembly on a clean work surface with feedrolls down.
6. Unbolt and remove the linkage from the boxes.
7. Remove the shafts on which the boxes slide.
8. Unbolt and remove the hydraulic motors.
9. Unbolt and remove the transmission back plate; use jack bolts.
10. Unscrew tapered bushings and remove pulleys from feedroll shafts.
11. Remove the shafts through the front of the box and remove bearings.
12. Install new bearings, with snap rings to the inside.
13. Install the spacers between bearings and pulleys.
14. Place pulleys inside the belts and slide pulleys and belt simultaneously onto the shafts.
15. Pushing pulleys against the spacers, tighten the tapered bushings.
16. Install the back plate.
17. Bolt the hydraulic motors on the assembly.
18. Reassemble shafts, boxes and linkage.
19. Turn the assembly upright.
20. Using a sling, position the feedroll assembly on the machine base and bolt down.
21. Reconnect the air cylinder.
22. Reconnect the hydraulic motors.
## Troubleshooting

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Machine will not turn ON.</td>
<td>A. Main power OFF.</td>
<td>Turn disconnect ON</td>
</tr>
<tr>
<td></td>
<td>B. Guards open.</td>
<td>Close guards</td>
</tr>
<tr>
<td></td>
<td>C. Main fuse blown</td>
<td>Replace fuse</td>
</tr>
<tr>
<td></td>
<td>D. Starter overload open.</td>
<td>Reset overload</td>
</tr>
<tr>
<td></td>
<td>E. Temperature limit switch open.</td>
<td>Correct cause of overheating</td>
</tr>
<tr>
<td></td>
<td>F. Processor not running.</td>
<td>Reset processor to RUN mode</td>
</tr>
<tr>
<td></td>
<td>G. Temperature limit switch defective.</td>
<td>Replace switch</td>
</tr>
<tr>
<td></td>
<td>H. Transformer fuse blown</td>
<td>Replace fuse</td>
</tr>
<tr>
<td></td>
<td>I. Transformer defective.</td>
<td>Replace transformer</td>
</tr>
<tr>
<td>2. Pump running but no response.</td>
<td>A. Loss of 24VDC input power</td>
<td>Check wire #5 for 24DVC</td>
</tr>
<tr>
<td>to any operator controls</td>
<td>B. Panel View communication with processor</td>
<td>Possible shorted input</td>
</tr>
<tr>
<td></td>
<td>C. Grounding problems</td>
<td>Check communication cable</td>
</tr>
<tr>
<td>3. Pump running but no response</td>
<td>A. Check Mode selection</td>
<td>Go to Fault Screen to check for any faults that have occurred.</td>
</tr>
<tr>
<td>to some operator controls</td>
<td>B. MODE not selected</td>
<td>Select AUTO Mode.</td>
</tr>
<tr>
<td></td>
<td>C. Head end of stroke limit switch not made.</td>
<td>Select MANUAL mode.</td>
</tr>
<tr>
<td></td>
<td>D. 2nd machine not ready</td>
<td>Select CLAMP CLOSE jog head to end of stroke.</td>
</tr>
<tr>
<td></td>
<td>E. Batch completed</td>
<td>Replace switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Start 2nd machine. Reset batch</td>
</tr>
</tbody>
</table>
## Troubleshooting

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Blade stalls during cut.</td>
<td>A. Incorrect blade angle or blade too long</td>
<td>Install correct blade (Check with HAVEN blade gauge)</td>
</tr>
<tr>
<td></td>
<td>B. Dull blade or dies</td>
<td>Sharpen or replace (Pages 47)</td>
</tr>
<tr>
<td></td>
<td>C. Low hydraulic pressure</td>
<td>Check and Adjust pressure (Pages 20)</td>
</tr>
<tr>
<td></td>
<td>D. Incorrect blade clearance</td>
<td>Set CLEARANCE = 0.1xWall thickness each side (Page 46)</td>
</tr>
<tr>
<td></td>
<td>E. Mechanical bind</td>
<td>Check horizontal and vertical slides clearance. Repair as needed. Check pivots and linkage. Repair as needed.</td>
</tr>
<tr>
<td></td>
<td>F. Insufficient lubrication</td>
<td>Check Autolube and Autogrease (options) for lubricant and function. Repair or refill. Lubricate manually</td>
</tr>
<tr>
<td></td>
<td>G. Worn cylinder</td>
<td>Rebuild or replace (Page 48)</td>
</tr>
<tr>
<td>6. Overheating</td>
<td>A. No or low water flow to cooler</td>
<td>Turn water ON of repair supply</td>
</tr>
<tr>
<td></td>
<td>B. Water Valve defective</td>
<td>Clean, repair, or replace</td>
</tr>
<tr>
<td></td>
<td>C. Hydraulic Pressure Setting</td>
<td>Adjust (Page 20)</td>
</tr>
<tr>
<td></td>
<td>D. Relief valve out of adjustment</td>
<td>Adjust</td>
</tr>
<tr>
<td></td>
<td>E. Internal high pressure leak in cylinder or manifold</td>
<td>Repair or replace cylinder or manifold</td>
</tr>
<tr>
<td>7. Machine is slow</td>
<td>A. Worn pump</td>
<td>Repair or replace</td>
</tr>
<tr>
<td></td>
<td>B. Incorrect pressure settings</td>
<td>Repair or replace (Pages 20)</td>
</tr>
<tr>
<td></td>
<td>C. Decel occurs too early</td>
<td>Adjust CROP CUT DECEL switch position Adjust Decel counter setting upward</td>
</tr>
<tr>
<td></td>
<td>D. Cut Delay &quot;ON&quot;</td>
<td>Turn &quot;OFF&quot; or change delay time</td>
</tr>
<tr>
<td>8. Low Pressure</td>
<td>A. Relief valve RDFA out of adjustment</td>
<td>Adjust (Page 20)</td>
</tr>
<tr>
<td></td>
<td>B. Incorrect pressure settings</td>
<td>Adjust (page 20)</td>
</tr>
<tr>
<td></td>
<td>C. Piston pump worn or defective</td>
<td>Repair or replace</td>
</tr>
<tr>
<td>9. Decel not working or not</td>
<td>A. Tube is not contacting encoder wheel</td>
<td>Adjust spring loaded lower support &quot;V&quot; roller.</td>
</tr>
<tr>
<td></td>
<td>B. Feedrolls improperly adjusted or not aligned with dies.</td>
<td>Adjust, align, or re-burn contour (Page 22)</td>
</tr>
<tr>
<td></td>
<td>C. Crop Cut or Crop Cut Decel. switch loose, out of adjustment or defective.</td>
<td>Repair, adjust, or replace switch (Page 22)</td>
</tr>
<tr>
<td></td>
<td>D. Decel counter card defective</td>
<td>Replace counter card</td>
</tr>
<tr>
<td></td>
<td>E. Encoder, encoder wheel, or coupling</td>
<td>Repair or replace as needed defective</td>
</tr>
</tbody>
</table>
### Troubleshooting (continued)

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Wear on dies</td>
<td>A. Incorrect blade clearance</td>
<td>Check die spacer thickness</td>
</tr>
<tr>
<td></td>
<td>B. Dirt under blades, dies, or step keys</td>
<td>Clean blades, dies, step key and mounting surfaces</td>
</tr>
<tr>
<td></td>
<td>C. Blade not flat within 0.002 (0.05mm)</td>
<td>Repair or replace blade</td>
</tr>
<tr>
<td></td>
<td>D. Combination of A, B, &amp; C</td>
<td></td>
</tr>
<tr>
<td>11. Broken dies or blade clamp</td>
<td>A. Incorrect blade clearance</td>
<td>Regrind or replace dies</td>
</tr>
<tr>
<td></td>
<td>B. Dirt under blades, dies, or step keys</td>
<td>Remove, clean, reinstall</td>
</tr>
<tr>
<td></td>
<td>C. Blade not flat within 0.002 (0.05mm)</td>
<td>Repair or replace blade</td>
</tr>
<tr>
<td></td>
<td>D. Blade clamp screw or die bolt not tight.</td>
<td>Tighten to specified torque</td>
</tr>
<tr>
<td></td>
<td>E. Combination of A, B, C, &amp; D</td>
<td></td>
</tr>
<tr>
<td>12. Broken horizontal blade.</td>
<td>A. Incorrect blade clearance</td>
<td>Check spacers (Page 46)</td>
</tr>
<tr>
<td></td>
<td>B. Dirt under blades, dies, or step keys</td>
<td>Remove, clean reinstall</td>
</tr>
<tr>
<td></td>
<td>C. Blade not flat within 0.002 (0.05mm)</td>
<td>Repair or replace blade</td>
</tr>
<tr>
<td></td>
<td>D. Blade clamp screw or die bolt not tight.</td>
<td>Try a new blade</td>
</tr>
<tr>
<td></td>
<td>E. Tube rotating in dies</td>
<td>Tighten to specified torque</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Re grind dies for tighter fit or replace (Page 47)</td>
</tr>
</tbody>
</table>
# Troubleshooting (continued)

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedrolls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Feedrolls run away</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Loss of LVDT feedback signal to Proportional Card. at POWER UP</td>
<td>See schematic Page EL08 Proportional Card.</td>
<td></td>
</tr>
<tr>
<td>B. Reversed coil leads</td>
<td></td>
<td>Reconnect leads</td>
</tr>
<tr>
<td>C. Dirt in valve</td>
<td></td>
<td>Clean hydraulic system, filters, etc.</td>
</tr>
<tr>
<td>14. Feedrolls will not run either direction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. 3 amp fuse blown</td>
<td></td>
<td>Repair or replace power supply</td>
</tr>
<tr>
<td>B. 24 VDC power supply defective</td>
<td></td>
<td>Repair jumper; check B30, B32, to B28 for 10 vdc supply</td>
</tr>
<tr>
<td>C. Jumper not connected or poor connection, to terminals on Proportional Card</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Feedrolls run wrong direction</td>
<td></td>
<td>Disconnect and interchange hoses.</td>
</tr>
<tr>
<td>16. Feedrolls will not close</td>
<td></td>
<td>Open air shut off valve</td>
</tr>
<tr>
<td>A. No or low air pressure</td>
<td></td>
<td>Check pressure (80-100PSIG ) at main regulator, 30-80 PSIG at feedrolls regulator</td>
</tr>
<tr>
<td>B. Wrong mode selected</td>
<td></td>
<td>Make sure that machine is in MANUAL MODE.</td>
</tr>
<tr>
<td>C. Defective valve or cylinder</td>
<td></td>
<td>Repair or replace</td>
</tr>
<tr>
<td>17. Feedrolls will not run</td>
<td></td>
<td>Adjust or replace limit switch; move cut cyl. to end of stroke position.</td>
</tr>
<tr>
<td>A. End of stroke limit switch not made</td>
<td></td>
<td>Auxiliary machine is full.</td>
</tr>
<tr>
<td>B. Machine waiting for 2nd machine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Troubleshooting (continued)

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tube Stop</strong></td>
<td>A. Not in AUTO MODE</td>
<td>Select AUTO</td>
</tr>
<tr>
<td>18. No cut stroke occurs</td>
<td>B. Faulty Tube Stop limit switch</td>
<td>Replace switch</td>
</tr>
<tr>
<td></td>
<td>C. Defective wiring after tube strikes target</td>
<td>Check processor to see if the tube stop limit input LED is illuminated.</td>
</tr>
<tr>
<td><strong>19. Tube length too short or</strong></td>
<td>A. DECEL speed to high</td>
<td>Adjust feedrolls speed</td>
</tr>
<tr>
<td><strong>varies</strong></td>
<td>B. Tube Stop target limit switch</td>
<td>Adjust</td>
</tr>
<tr>
<td></td>
<td>C. Decel point not correct</td>
<td>Reset part length display to correct length</td>
</tr>
<tr>
<td></td>
<td>D. See 9.A through 9.E</td>
<td>Check for dies clamping on tube, with dies closed, a .005&quot; feeler gauge should fit in between the dies, if not replace.</td>
</tr>
<tr>
<td></td>
<td>E. Incorrect dies</td>
<td></td>
</tr>
<tr>
<td><strong>20. Tube length not consistent</strong></td>
<td>A. Feedrolls not properly adjusted or not burned in</td>
<td>See Page 22</td>
</tr>
<tr>
<td></td>
<td>B. Feedrolls speed wrong</td>
<td>Re-adjust speed on proportional card (Page 21)</td>
</tr>
<tr>
<td><strong>21. Tube length on last piece</strong></td>
<td>A. Tube runout guide not supporting last tube</td>
<td>Adjust runout guide to support the last piece</td>
</tr>
<tr>
<td><strong>too long</strong></td>
<td>B. Dies open too far</td>
<td>Adjust dies opening with stop bolt by loosening handle and turning bolt counterclockwise.</td>
</tr>
<tr>
<td><strong>22. Motor runs but target position</strong></td>
<td>A. Broken shear pin</td>
<td>Remove broken shear pin and replace</td>
</tr>
<tr>
<td>does not change.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Loader</strong></td>
<td>A. Overloads tripped out</td>
<td>Reset overloads</td>
</tr>
<tr>
<td>23. Belts will not run up or down</td>
<td>B. Defective thru beam</td>
<td>Replace or re-align emitter/receiver by loosening the two small bolts holding the thru beam to mount and slide beam holder until blocked by tube.</td>
</tr>
<tr>
<td>24. Escapement always up in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto cycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Escapement will not go down</td>
<td>A. No crop cut signal</td>
<td>Adjust or repair crop cut limit switch</td>
</tr>
</tbody>
</table>
### Troubleshooting (continued)

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel View</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Screen is blank</td>
<td>A. No power to unit</td>
<td>Check wires #25 and 0 at unit should be 24 VDC</td>
</tr>
<tr>
<td></td>
<td>B. Fuse blown</td>
<td>Check wiring or replace</td>
</tr>
<tr>
<td>27. Screen does not respond</td>
<td>A. Communications defective</td>
<td>Repair or replace cabling</td>
</tr>
<tr>
<td>to inputs</td>
<td>B. PLC not running</td>
<td>Reset PLC to RUN mode</td>
</tr>
<tr>
<td>28. Will not change pages</td>
<td>A. Fault has occurred and has not</td>
<td>The Panel View will continue to stay on the Fault screen or will go back to</td>
</tr>
<tr>
<td></td>
<td>been cleared</td>
<td>this screen until FAULT RESET has been pressed.</td>
</tr>
<tr>
<td>29. Unable to read screen</td>
<td>A. The CONTRAST function needs</td>
<td>Setup Menu; Master Setup (enter password; press upper left corner of screen – ‘GO TO’ Config. Screen (button will appear). Adjust contrast as required.</td>
</tr>
<tr>
<td></td>
<td>adjustment.</td>
<td></td>
</tr>
</tbody>
</table>

Appendix B – Blade and Spacer Selection Chart

Cutoff Operation & Changeover
Tips For Good Results

1. Keep tooling sharp.
2. Maintain proper blade/dies clearance for tubing wall thickness (approximately 10% of wall thickness per side). Use correct die spacers and step keys.
3. Use correct blade coolant oil/water mixture. **Make sure blade coolant is directed at vertical blade** (keeping the blade cool during machine operation reduces the risk of pulling up a chip from the tubing and deforming the outer surface of the tubing).
4. Use longer vertical blades for large tube diameters and reground (shorter) blades for small diameters.
5. Use the shortest possible vertical blade for heavy wall tubing. Shorter blades allow for more power on the cutting stroke by the cutting head linkage.
6. Adjust depth of horizontal cut to approximately 80% of wall thickness for tubing up to 0.070" (1.78mm) wall thickness, 50% of wall thickness for heavier tubing.
7. Use the thinnest blade suitable for the material to be cut.
8. Burn in feedrolls for better pulling power. The proper form can be burned into urethane rolls by clamping tubing in the dies, closing the feedrolls, and running feedrolls at high speed.
9. Check feedrolls periodically for proper adjustment.
Periodic Maintenance

Daily:

1. Drain accumulated condensation from airline filter.
2. Check way lube oil level and optional grease system level if present.
3. Check hydraulic oil level.
4. Check all guard switches for proper functionality by opening guards one at a time and then trying to start the hydraulics. A fault for that guard should appear on the HMI and the motor should not start. Clear the fault and try the next guard.

Weekly:

1. Check hydraulic pressures and have them adjusted if not correct.
2. Check for hydraulic leaks, worn or damaged hoses. Have faulty hoses replaced.
3. Check for loose or damaged components. Tighten or replace components as needed.
4. Check pneumatic system for leaks, worn or damaged hoses or fittings and repair or replace as needed.
5. Lubricate the Tube Stop slide and lead screw, also the feed roll box shafts as needed.
6. Lubricate the cutting head per the grease fitting location chart.

Monthly:

1. Check all way lube and grease lines located inside the cutting head. Replace or repair as required.
2. Inspect all external lube and grease lines for wear or damage, replace as required. A broken or damaged lube or grease line can, over time, cause severe damage to the cutting mechanism.

Other:

Every 1000 operating hours, replace the hydraulic return filter. Every 6 months grease the loader pillow block bearings and the bearings on the main hydraulic drive motor. Check machine anchoring to floor, if loose, relevel the machine and tighten anchors. Yearly, check hydraulic oil for contaminants and lubricity lose. Replace oil if needed and change the hydraulic return filter.