

8. MAINTENANCE DIAGNOSTICS

NOTE: Refer to section 3 SAFETY RECOMMENDATIONS prior to any servicing.

Dealer or customer personnel performing service work to any part of the shear must exercise good safe work practices. Ensure that other personnel are made aware that the shear is not in service by adequate machine lockout procedures and/or warning signs to prevent inadvertent shear operation when service is being carried out. Service personnel should have diagnostic tools such as an electrical multimeter for diagnosing electrical control problems and a pressure-sensing device to diagnose hydraulic problems.

Service personnel attempting to operate the shear using manual override actuators on the hydraulic directional must observe extreme caution to prevent personal injury or damage to the shear blades, limit switches, and hydraulic cylinders due to overtravel by manual actuation.

The following schedule identifies possible mechanical, electrical, and hydraulic control malfunctions and suggested means to correct the fault.

8.1. TROUBLESHOOTING GUIDE - HYDRAULICS

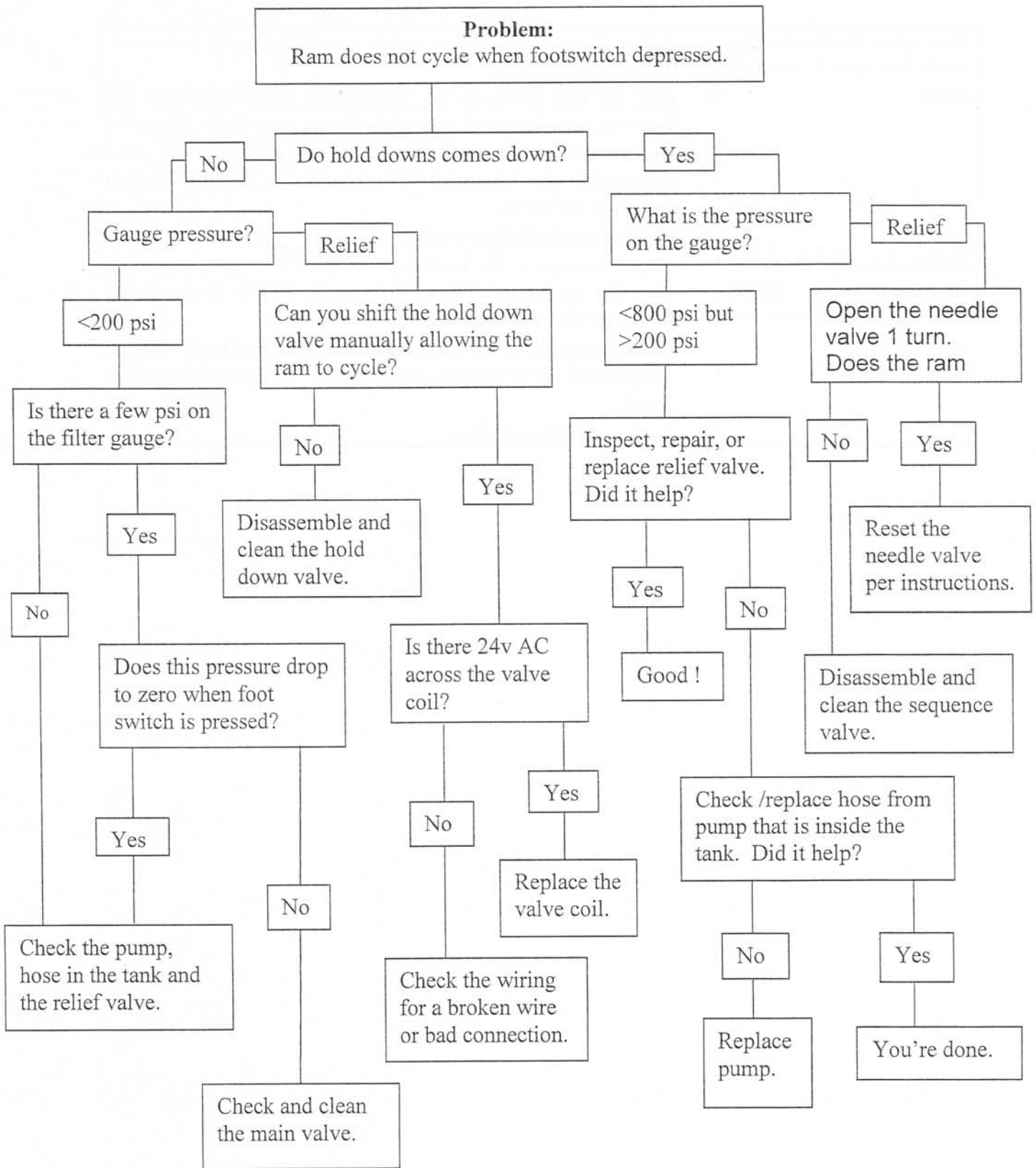
Problem:	Solution:
<p>Hydraulic pump drive motor runs, but shear ram will not cycle - no pressure on the gauge.</p>	<ul style="list-style-type: none"> • Turn the selector switch to the JOG position. Manually override the main valve down solenoid (rear). (See Figure 7.2-2) This requires a firm push. Gently push the other end of the spool at the same time to feel that this pilot valve spool is in fact moving. • If the pilot valve spool cannot be shifted manually, remove and disassemble the pilot valve (the top portion of the main valve). Clean the spool and remove any nicks or burrs with fine sandpaper. Use light oil when reassembling. The spool must be free to shift with fingertip pressure before the springs are installed. <p>If relief pressure shows on the gauge when the spool is shifted, go to Electrical tests.</p> <p>Hydraulic tests if there is no pressure:</p> <ul style="list-style-type: none"> • Check the oil level in the tank. • Verify correct main motor rotation. • Remove the relief valve and replace any defective O-rings. Make sure the sliding spool covers the holes near the inner end of the valve. Replace the valve if defective.

	<ul style="list-style-type: none"> • Remove the two caps from the main valve lower spool. Check that the spool shifts freely. If sticky, remove the spool and clean it. Use light oil when reassembling. • Lift the motor/pump assembly several inches. <ul style="list-style-type: none"> ▪ Inspect the pump/motor coupling and shaft keys. Be sure the pump is turning. ▪ Check for a defective pressure hose running from the pump to the manifold. Replace if leaking. ▪ Check that the cooler bypass valve is properly located on a short pipe below the manifold. To test the operation of the valve, remove the main valve from the manifold. Insert a long 1/8" – 1/4" rod into the port immediately adjacent to the hose going to the cooler. You should be able to push the rod up and down against the poppet spring. If the rod goes all the way to the bottom of the tank, the valve has failed. Replace it. ▪ Check the pump. <p>Electrical tests: (all tests are with respect to ground)</p> <ul style="list-style-type: none"> • Make sure the back and front gauges work properly. The control will not allow the shear to cycle unless the gauges are at target position. • Check mechanical action of footswitch. Listen for two distinct 'clicks' as the footswitch is actuated. Check cord for damage. • Increase the stroke control setting to a longer stroke. • Check the stroke control transducer and its wiring. • Remove the gauge control panel from the front console. <ul style="list-style-type: none"> ▪ Check the following footswitch AC voltage inputs. Footswitch up: CB1-5 25v, CB1-7 0v Footswitch down: CB1-5 0v, CB1-7 25v ▪ If not correct, check the footswitch and its wiring. ▪ Check the control output to the valves. With the footswitch down, CB1-8 should have 25v. ▪ If input voltages are correct but there is no output, the control board may be defective. • Check the wiring to the valve solenoids. • Test for 25v at the valve solenoid. If present, the solenoid may be defective
<p>Hydraulics are at relief pressure when the footswitch is activated, but no ram or holddown movement.</p>	<ul style="list-style-type: none"> • Check that the holddown valve spool moves freely. If seized, remove and clean. • Manually override the holddown valve and depress the footswitch. If the shear cycles, check the wiring to the holddown valve.

<p>Hydraulic system at relief pressure and holddowns clamp when footswitch is activated, but shear ram will not cycle.</p>	<ul style="list-style-type: none"> • Check sequence valve pressure setting. The valve spool cannot shift to allow the shear ram to cycle if the adjustment is set to maximum. (See section 7.2.4.2.) • Disassemble sequence valve and check for foreign particles or seized spool.
<p>Hydraulic pump drive motor will not start.</p>	<ul style="list-style-type: none"> • Turn disconnect switch to “ON”. • Check incoming power supply. • Check for a tripped overload or blown fuses, determine the cause, and reset the overload or replace the fuses. • Check for electrical control wiring continuity using a multimeter and the control schematic.
<p>Hydraulic pump drive motor running, but shear ram will not return to the UP position.</p>	<ul style="list-style-type: none"> • Verify that the selector switch is set to MAN or AUTO. • Check the stroke transducer and its wiring. • Turn the selector switch to JOG. Manually override the main valve up solenoid (front). <ul style="list-style-type: none"> ▪ If ram does not rise and there is no pressure, see “Hydraulic tests” above. ▪ If the ram does go up, see “Electrical tests” above. With the footswitch up, CB1-6 should have 25v. If there is no output, the control board may be defective. If output is correct, check the wiring to the valve solenoid and the solenoid itself. ▪ If the ram does not rise but there is an increase in pressure, one of the main cylinders may have failed. If the hydraulics are hot, allow the system to cool. Then start the shear, turn the selector switch to MAN, and run the shear until the hydraulic system warms up. If a cylinder is defective the oil will flow through it and warm with the system. The cold cylinder will be the good one.
<p>Hydraulic system displays relief pressure at top of stroke.</p>	<ul style="list-style-type: none"> • Adjust the UP limit to prevent the ram cylinders from bottoming out. (See section 7.3.2.1) • Check the stroke transducer and its wiring. Make sure there is no short in the wiring in the plug. • Replace the control board.
<p>Hydraulic system seems to overheat. (Measure oil temp with a thermometer - up to 160° F. (70° C.) is acceptable.)</p>	<ul style="list-style-type: none"> • If the system shows relief pressure when idling, see box above. • Ensure that material thickness is within the capacity of the shear. • Check operation of oil cooler. • Check oil level.

<p>Hydraulic pump is noisy.</p>	<ul style="list-style-type: none"> • Check fluid level when ram is in the “UP” position and add fluid if required. • Check fluid condition. Replace hydraulic strainer, filter, and fluid as required. • Inspect coupler between motor and pump and replace as required. See “Hydraulic tests” above. • Check the pump, especially if the noise is much worse at higher pressure.
<p>Holddowns will not clamp when footswitch is activated or holddowns will not release when footswitch is released.</p>	<ul style="list-style-type: none"> • Remove holddown valve, disassemble, clean with solvent and compressed air to remove contaminant. Re-assemble and re-install. • Replace holddown valve.
<p>Shear ram will not remain in the up position, but regularly resets back up to the UP limit while the shear is idling.</p> <p>Note: It is normal for the ram to slowly drift down and reset upward every couple of minutes.</p>	<ul style="list-style-type: none"> • Increase the counterbalance pressure setting. CAUTION: Excessive counterbalance pressure can cause hydraulic failure. (See section 7.2.4.5.) • Run the ram down to the mechanical stops built into the frame or support shear ram with blocks or a jack. Remove the counterbalance valve. Clean it with solvent and compressed air. Check all ‘O’ ring seals for damage prior to replacing the valve. • Replace main cylinder seals.
<p>Ram starts down before holddowns are clamped.</p>	<ul style="list-style-type: none"> • Increase the counterbalance valve setting by turning the adjusting screw out slightly. (See section 7.2.4.5.) • Run the ram down to the mechanical stops built into the frame or support shear ram with blocks or a jack. Remove the counterbalance valve and check the ‘O’ rings. Clean and replace the valve. • Replace counterbalance valve. • Check operation of the sequence valve.
<p>Shear will not cut rated capacity.</p>	<ul style="list-style-type: none"> • Check material hardness and thickness. Try cutting a different plate. • Check relief valve setting and readjust to nameplate value if necessary. (See section 7.2.4.4.) If pressure is questionable, replace the pressure gauge. • Check blade clearance setting. A setting either too large or too close takes more cutting tonnage. (See section 6.5) • Check blade edge condition. Dull blades require more cutting pressure. • Observe pressure on the gauge while attempting to make a cut. If it’s significantly less than relief pressure, look for an internal leak in one of the main cylinders. Run the shear at this pressure until the oil becomes noticeably hotter. Feel the main cylinders - the hot one will be leaking.

<p>Hydraulics chatter rapidly while the ram is moving down.</p>	<ul style="list-style-type: none"> • Adjust the counterbalance valve a small amount in or out. (See section 7.2.4.5.) • Run the ram down to the mechanical stops built into the frame or support shear ram with blocks or a jack. Remove the counterbalance valve. Clean it with solvent and compressed air. Check all 'O' ring seals for damage prior to replacing the valve. • Replace counterbalance valve.
<p>Hydraulics chatter at the beginning of a stroke while the holddowns are coming down.</p>	<ul style="list-style-type: none"> • Check voltage at the holddown valve. Voltage must be at least 24v for the valve to shift properly. If low check wiring for a poor connection. • Remove holddown valve, disassemble, clean with solvent and compressed air to remove contaminant. Re-assemble and re-install. • Replace holddown valve.



8.2. MF

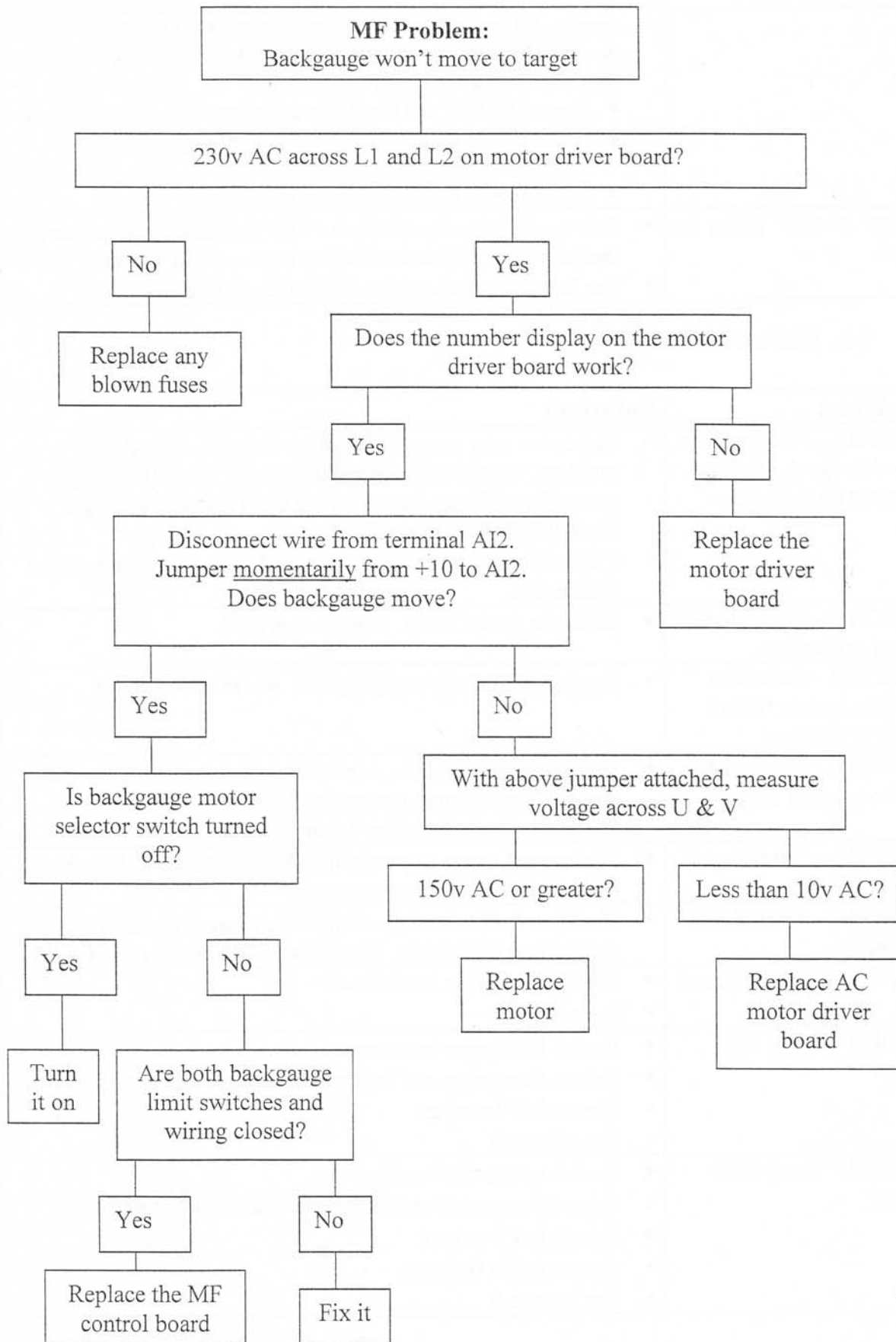
Problem:	Solution:
The 15 amp fuses burn out regularly.	<ul style="list-style-type: none"> • Verify that the gauges are clear of debris or obstruction. Make sure the gauge leadscrews are greased. • Do not use the gauges to move plate. They are not designed to move plate. • Check for a short in the wiring to the motor, and in the motor itself. • Avoid immediately restarting the shear after the STOP button has been pushed. Allow at least 10 seconds before restarting.
No digital display.	<ul style="list-style-type: none"> • Replace the 3/4 amp fuse on the control board. • Check supply voltage. With shear running CB2-1 and CB1-3 should both have 25v with respect to ground. • Replace the control board.
Backgauge does not move to target when [GOTO] is pressed - display reads Error 1.	<ul style="list-style-type: none"> • Set selector switch to HOLD or RETRACT ON. • Check for gauge obstruction. • Check calibration of gauge. It may have tripped a limit switch • Remove fuses and check. Be sure there is 230v AC across L1 and L2 on the motor driver board. • Test operation of the motor driver board. See section 7.3.4.5. • Make sure that the control board is outputting a DC voltage signal to the motor driver board. Note that if the gauge is not moving, this signal will only be present for about 2 seconds before the system shuts down and the Error 1 message is displayed. Position the voltmeter probes on the motor driver board terminals. Have someone enter a target and press [GOTO]. Voltage should read about ±5v DC. If there is no signal replace the control board. • If the input signal to the motor driver board is correct, check the output to the motor. Position the voltmeter probes on motor driver board terminals U and V. Have someone press [GOTO] as above. Voltage should read about 100v AC. If the input is correct but there is no output, replace the motor driver board. • If the motor driver board has proper output, check the motor. Check wiring and connections to gauge motor. Replace the motor if defective.
Frontgauge does not move to target when [GOTO] is pressed - display reads Error 1.	<ul style="list-style-type: none"> • Set selector switch to HOLD or RETRACT ON. • Check for gauge obstruction. • Check calibration of gauge. It may have tripped a limit switch

	<ul style="list-style-type: none"> • Remove fuses and check. Be sure there is 230v AC across L1 and L2 on the motor driver board. • Test operation of the motor driver board. See section 7.3.4.5 • Make sure that the control board is outputting a DC voltage signal to the motor driver board. Note that if the gauge is not moving, this signal will only be present for about 2 seconds before the system shuts down and the Error 1 message is displayed. Position the voltmeter probes on the motor driver board terminals. Have someone enter a target and press [GOTO]. Voltage should read about $\pm 5v$ DC. If there is no signal replace the control board. • If the input signal to the motor driver board is correct, check the output to the motor. Position the voltmeter probes on motor driver board terminals U and V. Have someone press [GOTO] as above. Voltage should read at least 100v AC. If the input is correct but there is no output, replace the motor driver board. • If the motor driver board has proper output, check the motor. Check wiring and connections to gauge motor. Replace the motor if defective.
Gauge moves only a short distance to target when [GOTO] is pressed – display reads Error 1.	<ul style="list-style-type: none"> • Check encoder set screws, cable, and plug. Replace encoder if defective. • Replace the control board located in the front console.
Keypad is inoperative.	<ul style="list-style-type: none"> • Check the ribbon cable and the plug connection to the control board. • Replace the control board.
Gauge position does not match the LED display.	<ul style="list-style-type: none"> • Refer to calibration procedure. See section 4.3.4 • Check the encoder and its wiring to the control board.
Gauge oscillates or hunts back and forth at the target.	<ul style="list-style-type: none"> • With the gauge motor selector switch OFF, set the output voltage on FB1-1 with respect to FB1-2 to 0v DC ± 1 millivolt by adjusting the “offset” potentiometer. (Use millivolt scale.) See section 7.3.4.2 • There are three special functions that can be adjusted to control overshooting the target: <ul style="list-style-type: none"> ▪ For Frontgauge: <ul style="list-style-type: none"> - Gain, [FUNC][70] - Offset, [FUNC][71] - Min Speed, [FUNC][72] ▪ For Backgauge: <ul style="list-style-type: none"> - Gain, [FUNC][60] - Offset, [FUNC][61] - Min Speed, [FUNC][62] <p>To reduce overshooting the target, do one or more of the following: decrease gain, increase offset, or decrease min</p>

	<p>speed. All settings are sensitive – usually a change of one or two numbers on one of the functions will be sufficient. Use the following steps to adjust:</p> <ul style="list-style-type: none"> ▪ Press [FUNC] and the desired number. ▪ Hold [PRST] until display starts blinking. ▪ Change to the desired number. ▪ Hold [PRST] until display stops blinking.
Gauge is slow going to target.	<ul style="list-style-type: none"> • See special functions above. To decrease time to target: increase gain, decrease offset, or increase min speed. • See instructions above to change these values.

8.3. DISPLAY MESSAGES

Problem:	Solution:
ERROR 1 – No change in encoder signal, or gauge does not go to target.	<ul style="list-style-type: none"> • Determine why gauge does not go to target. See above problem “Gauge does not move to target when [GOTO] is pressed” or “Gauge moves only a short distance to target when [GOTO] is pressed” • Check encoder set screws, cable, and plug. Replace encoder if defective.
ERROR 2 – Stroke limits out of calibration.	<ul style="list-style-type: none"> • Reset the stroke limits. See section 7.3.2.
ERROR 3 – Auto start position greater than or equal to auto last.	<ul style="list-style-type: none"> • Reprogram the autostep program. See section 4.3.4.9.
ERROR 4 – Non-volatile memory out of range.	<ul style="list-style-type: none"> • On power up one of the stored values was out of its normal range. Check stored dimensions for numbers greater than 99.999 inches or less than 0.1 inch.
ERROR 5 – Target out of range.	<ul style="list-style-type: none"> • The entered target is greater than 99.999 inches or less than 0.1 inch. Reenter a proper target.
ERROR 6 – Control not calibrated.	<ul style="list-style-type: none"> • The front limit was tripped while the current position was greater than 1.8 inches. Recalibrate. See section 4.3.4.2.
LUBE 1 – Every 50 hours	<ul style="list-style-type: none"> • Grease backgauge leadscrews. • See section 0
LUBE 2 – Every 200 hours	<ul style="list-style-type: none"> • Grease backgauge leadscrews. • Grease frontgauge and backgauge leadscrew bearings. • Grease link bearings. • See section 0
LUBE 3 – Every 2000 hours	<ul style="list-style-type: none"> • Grease backgauge leadscrews. • Grease frontgauge and backgauge leadscrew bearings. • Grease link bearings. • Grease motor bearings. • See section 0



8.4. MECHANICAL

Problem:	Solution:
Thin gauge parts are excessively burred.	<ul style="list-style-type: none"> • Change the blade clearance to a thinner gauge setting. This is especially important for cutting stainless steel. • Check for dull blades. Rotate blades before they are excessively worn. • Check link bearings clearances. See section 7.1.9. • With the blade clearance lever set at the 22-gauge position, re-gap the blades to .002". See section 7.1.7.
Plate moves under holddowns while shearing.	<ul style="list-style-type: none"> • Check for dull blades. Rotate or sharpen blades if necessary. • Check for proper blade clearance. • Increase initial holddown pressure by turning the sequence valve adjusting screw in. See section 7.2.4.2.
Backgauge bar does not remain parallel to the lower knife.	<ul style="list-style-type: none"> • Check parallelism by cutting small parts at several places along the backgauge bar. Avoid test cutting with a long strip because the plate may be moving under the holddowns. (See above) • Check for end play in the lead screws. Tighten the rear double nut just enough to remove end play. • Tighten the anti-backlash nut just enough to remove wear in the acme nut/screw. • Check for proper backgauge bar height. If the bar sags down it also moves away from the blade.

9. TECHNICAL SPECIFICATIONS

9.1. ACCURSHEAR DESCRIPTION

Model	625010
Rated Capacity	1/4" Mild steel plate x 10 feet.
Total Weight	19,500 pounds

9.2. SPECIFICATIONS AND CAPACITIES

Drive Motor	20 hp, 256TC frame, 1800 rpm, 3ph
Drive Motor – High Speed	30 hp, 286TC frame, 1800 rpm, 3ph
Front/Backgauge Drive Motor	1.5 hp, 143T frame, 1800 rpm, 3ph
Main Hydraulic Cylinders	4" dia. x 5" stroke
Hydraulic Reservoir Capacity	64 gallons (U.S.)
Hydraulic Relief Pressure	3,500 psi
Control Voltage	24 volt AC
Backgauge Travel (std)	36 inch
Strokes/min. (full length)	3
Strokes/min. (full) – High Speed	39
Hydraulic Pump Flow	15 gpm
Hydraulic Pump Flow-High Speed	25 gpm

9.3. HYDRAULIC FLUID

Anti-wear Hydraulic Oil

Viscosity	- Normal Operation	ISO 46
	- High ambient temps and/or continuous heavy duty use	ISO 68
	- Cold temps and/or intermittent use	ISO 32

9.4. SHEAR BLADES

Size	124" x 3" x 1"
Minimum Blade Size	124" x 2.66" x .75"
Type	HCSR
Minimum Gap Setting	.001"
Normal Gap Setting	.002" - .003"
Rake Angle	1/4" per foot
Back Cut Angle	1/2 degree