ELECTRICAL TROUBLESHOOTING CAUTION: A QUALIFIED TECHNICIAN IS RECOMMENDED

FAULT	DESCRIPTION	INVESTIGATION	CORRECTIVE ACTION	
No power	HMI does not turn on and console controls fail to operate	Is there balanced 3 phase VAC to the machine?	No	1. Check 3 phase VAC connection to machine at line side of circuit breaker CB-1. If the 3 phase lines are not balance or voltage is missing, the problem is the 3 phase service line to the machine.
			Yes	1. Check 3 phase VAC at load side of circuit breaker CB-1. If no voltage is present check if circuit breaker CB-1 is turned off or tripped. If tripped, reset circuit breaker CB-1. 2. If circuit breaker CB-1 continues to trip, check load side circuits for grounds and shorts or call KRB. 3. Check if CB-7 is tripped. If tripped, reset CB-7. If CB-7 continues to trip, check DC power supply line side and load side for shorts. 4. If CB-7 is OK, check if CB-8 is tripped. If tripped, reset CB-8. If CB-8 continues to trip, check load side of CB-8 for grounds and shorts or call KRB. 5. If CB-8 is OK, turn off CB-8 and check the output of the power supply for 24 VDC. If 24 VDC is missing, the power supply is probably defective. Replace the power supply.
	HMI does not turn on but console controls function properly	Is there 24 VDC to the HMI?	No	1. Check if circuit breaker CB-5 is tripped. If tripped, reset CB-5. 2. If circuit breaker CB-5 continues to trip, check load side circuits for grounds and shorts or call KRB. 3. If circuit breaker CB-5 is not tripped, check for 24 VDC coming from the Control Power Start selector switch. If voltage is not present, check the contacts of the selector switch. 4. If 24 VDC is present at the load side of CB-5, check for 24 VDC at the HMI power connector. If 24 VDC is not present, check HMI wiring and connections for opens.
			Yes	1. If 24 VDC is present at the HMI power connector, the HMI may be defective. Call KRB for assistance.
	HMI turns on but console controls fail to operate	Are the safety relay LEDs turned on?	No	1. Check if 24 VDC is at the A1 to A2 terminals of the safety relay. If 24 VDC is missing, check the 24 VDC power circuits from the power supply. 2. If 24 VDC is present at the A1 to A2 terminals of the safety relay but the LEDs do not turn on, go to step 3. If the LEDS are lit, go to step 4. 3. If K1 and/or K2 LEDs are not lit on the safety relay, check all series stop circuit contacts for continuity from terminal 20 to terminal 22A. Address any open contacts or wiring. 4. If the Stop circuit checks OK and 24 VDC is present at inputs S21, S12, S11 and S14, the safety relay may be defective. Replace the safety relay.
			Yes	1. If both K1 and K2 LEDs are lit on the safety relay, check for 24 VDC at the safety relay output terminals 14, 24 and 34. If 24VDC is missing on any of these safety relay terminals, the safety relay is probably defective. Replace the safety relay. 2. Call KRB for assistance.

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FAULT	DESCRIPTION	INVESTIGATION		CORRECTIVE ACTION
Motor(s) fail to operate	HMI turns on but all or some motors fail to operate	Is there 3 phase VAC at the load side of contactor C-2B?	No	1. If the safety relay checks OK, check that C-2A and C-2B contactor coils are energized. 2. If both coils are energized, the contacts are pulled in and there is no 3 phase voltage at the load side of C-2B contacts, then one or both contactor contacts are defective. 3. Check the load side contacts of C-2A energized contactor for balanced 3 phase VAC. If improper voltage is present or voltage is missing, the contacts are defective, replace the contactor. 4. To check the contacts of contactor C-2B, disconnect the 24 VDC coil of C-2A at terminal 28. With C-2A coil disconnected and de-energized, energize contactor C-2B. Check for continuity across each set of contacts of contactor C2-B. If the contacts test poor continuity or open, the contacts are defective, replace the contactor. 5. Check for 24 VDC at both contactor coils C-2A and C-2B. If 24 VDC is present at the coil(s) and the contactor does not energize, the coil(s) is defective. Replace the contactor coil.
			Yes	1. If the safety relay checks OK, the conveyor motors operate, but either or both of the bending motors and/or the travel motor fails to operate, go to step 2. If any of the conveyor motors fail to operate, go to step 5. 2. Check the failing Inverter Amplifier for faults. Take note of the error codes and call KRB for assistance. 3. If either or both bending motors fail to operate and/or the travel motor fails to operate, check for a tripped circuit breaker to the respective motor drive: CB-2, CB-3 and CB-4. Reset the tripped circuit breaker. 4. If the circuit breaker continues to trip, check the 3 phase load side for grounds and shorts. Check for any mechanical restrictions at the motor output. If motor failure is suspected, call KRB for assistance. 5. If the safety relay checks OK, but one or more of the conveyor motors fails to operate, check if the associated MSP is tripped. Reset the tripped MSP. 6. If the MSP continues to trip, check the motor side for grounds and shorts. Check for any mechanical restrictions at the motor output. If motor failure is suspected, call KRB for assistance. 7. If the associated MSP(s) is not tripped, check for 3 phase VAC at the line side of the MSP coming from the reversing contactors. 8. If 3 phase VAC is not present or is not balanced at the load side of either or both reversing contactors, but 3 phase VAC coming from C-2B checks OK, the associated contacts are defective or the associated contactor coil is not energized. Performance of all conveyor motors will be affected.

FAULT	DESCRIPTION	INVESTIGATION		CORRECTICVE ACTION
Motor(s) fail to operate (continued)	HMI turns on but all or some motors fail to operate (continued)	Is there 3 phase VAC at the load side of contactor C-2B? (continued)	Yes	(continued) 9. Check the C3-F and C3-R contactor coils for 24 VDC. If 24 VDC is present at the coil, but the contactor is not energized. Replace the coil. If the contactor is energized, but the contacts fail to transfer 3 phase VAC to the line side of the MSPs, replace the defective contactor. Call KRB for assistance.
Movable Bender trolley does not travel Properly	The Movable Bender trolley does not move. The motor 3 phase power circuits check OK	Does the Movable Bender trolley move in Manual mode?	No	1. In Manual Mode, press and hold the Travel Override push button while operating the Travel selector switch left or right to move the movable bender trolley. If it moves, go to step 2. If it does not move, go to step 3. 2. Place the machine in Auto to test. If it does not move in Auto, check if the Overtravel limit switch is being actuated or damaged. The contacts are normally closed when not actuated. Check for 24 VDC at terminal 89 to energize CR-5 for normal operation. Call KRB for assistance. 3. Check for mechanical issues, obstructions or restrictions at the motor and track that may not have tripped CB-4. 4. Operate the Travel selector switch and check for 24 VDC on terminal 92 for Right direction and terminal 93 for Left direction. 5. If 24 VDC is found on one direction but not the other direction, check the selector switch contact blocks for proper operation. 6. If no voltage is found for both directions, check for 24 VDC at terminal 91. If voltage is missing, check that CR-5 is energized. 7. If CR-5 is energized but voltage is missing at terminal 91 and/or terminal 94, then CR-5 contacts are probably defective. Replace CR-5. *Steps 8 and 9 below apply to Magnabend 211 Only:* 8. Check Bend Mode selector switch is in Normal position and CR-4 is energized. If it is not energized, check for 24 VDC across the coil. If voltage is present, the coil may be defective. Replace CR-4. Call KRB for assistance. 9. With CR-4 energized, check that the contacts are closed from 94B to 94C. If not, the contacts may be defective. Replace CR-4.
			Yes	1. With the selector switch in Auto position, Check that CR-1 and CR-1A are energized. If not energized, go to step 2. If energized, call KRB for assistance. 2. Check for 24 VDC at 30. If voltage is present, one or both of the coils do not energize, the coil(s) may be defective. Replace the relay(s). 3. If voltage is not present, check voltage at terminal 30. If 24 VDC is present, check the selector switch contacts for proper operation. 4. If 24 VDC is not present at terminal 30, check that contactors C-2A and C-2B are energized. If one or both contactors are not energized, then voltage will not be present at terminal 30. Check for 24 VDC at C-2A and C-2B coils for proper operation. Call KRB for assistance.

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FAULT	DESCRIPTION	INVESTIGATION		CORRECTIVE ACTION
Movable Bender trolley does not travel Properly (continued)	The Movable Bender trolley does not move. The motor 3 phase power circuits check OK (continued)	*For models supplied with Safety Beam Curtain only:* Are the Light Grid LEDs lit?	No	1. Check sensor alignments. Make mechanical adjustments until the sensor LEDs are lit. 2. Check the 24 VDC power to the sensors. If 24 VDC is missing at the sensors, check associated wiring and connections.
			Yes	1. Check for presence of the 24 VDC outputs from the Movable Receiver Top at terminal 110, and the Stationary Receiver Bottom at terminal 113 in the starter box. 2. If voltage is not present, check the signal wiring coming from the associated sensor. If the output is not present, the sensor is probably defective. Call KRB for assistance. 3. If voltage is present at the terminal(s), check that CR6 is energized. If CR-6 is not energized, call KRB for assistance. 4. If CR-6 is energized, check that CR-7 and CR-8 are energized. If either or both relays are not energized, call KRB for assistance.
	The Movable Bender trolley does not move to the correct position in Auto mode	Are pulse counts changing with the trolley movement?	No	1. Check the Travel encoder, encoder conditioner (if applicable) and electrical connector for damage. Check the belt for proper tension, wear or damage. 2. Check encoder cable for damage. Check cable connection to the GPIO3 card at connector J2. 3. Call KRB for assistance.
			Yes	1. Check Distance Calibration. Refer to Operator's manual or call KRB for assistance. 2. If calibration is not possible due to pulse counts varying with referenced distance, the encoder and/or the conditioner may be defective or the belt may be slipping. 3. Adjust proper belt tension. Replace the defective component. Call KRB for assistance.
Bend table does not operate	Bend table fails to rotate in either direction	Is the Inverter Drive turned on?	No	1. Go to Power Troubleshooting section above for checking power to the Inverter Drive.
			Yes	1. If the Inverter Drive is displaying a fault, take note of the error code and call KRB for assistance. 2. If Auto and Manual Bend operations fail, check all control connections and wiring to the Inverter Drive. Call KRB for assistance. 3. If only Manual operation fails, check Bend selector switch contacts, wiring and connections to the Inverter Drive. 4. If only Auto operation fails, check if relay CR-1A has 24 VDC across the coil and is energized. If no voltage, check CR-1 is energized and operating properly. If 24 VDC is not present at CR-1 check Auto/Manual switch contacts, circuit wiring and connections. Check if contactors C-2A and C-2B are energized. Call KRB for assistance.

FAULT	DESCRIPTION	INVESTIGATION		CORRECTIVE ACTION
Bend table bend angles are incorrect	Head rotation does not rotate to the correct angle	Are the bend angles repetitive for each bend?	No	1. Check the encoder assembly for damage or wear. Check and adjust proper tension on the belt. Replace the belt if damaged or worn. 2. If the encoder is damaged and/or the pulse count value varies widely with each bend, the encoder is probably defective. Replace the encoder. Call KRB for assistance.
			Yes	1. Check bending pulse counter. If the pulse count value is very close to the same value for each bend, then the bender head needs recalibrated. Refer to the Calibration section in your Operator's Manual. Call KRB for assistance.
Bend table does not home properly	Homing proximity sensor is out of adjustment or defective	Does the sensor LED turn on and off when flagged with a screwdriver	No	1. Check sensor connector, cable and cable connections. 2. Check 12 VDC supply to the sensor: terminal 63 (+) to common on the Stationary Bender, terminal 83 (+) to common on the Movable Bender. 3. If Cable, connections and voltage are OK, replace the sensor. If cable and/or connector is damaged, repair or replace the cable and/or connector.
			Yes	1. Adjust sensor position to the proper distance from the homing pins. 2. Homing pins may be positioned too close to each other. Reposition as needed. 3. Check for 12 VDC signal to go LO when the sensing LED turns on at terminal 62 to terminal 0VDC on the Stationary Bender, terminal 82 to terminal 0VDC on the Movable Bender. If the signal stays HI, the sensor, the cable or the connector is probably defective. If the cable and connector check OK, replace the sensor.
Clamp fails to operate	The Clamp does not open and close in Auto	Does the Clamp operate in Manual Mode?	No	1. Check for air pressure at the solenoid valve. 2. If air pressure is present, press the manual actuator push button on the valve body. If the valve operates and the clamp actuates, the solenoid coil is probably defective, replace the solenoid. 3. If air pressure is present and pressing the actuator push button does not operate the clamp, look for mechanical obstructions or restrictions at the clamp. If the clamp is clear of mechanical restrictions, the valve is probably defective. Replace the valve.
			Yes	1. The output from the GPIO card may be defective. Call KRB for assistance.

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Squaring Stop fails to operate	The Squaring stop does not come up in Auto Mode	Does the Squaring Stop operate in Manual Mode?	No	1. Check for air pressure at the solenoid valve. 2. If air pressure is present, press the manual actuator push button on the valve body. If the valve operates and the Stop actuates, the problem is electrical. 3. While pressing the SQUARING STOP push button, verify 24 VDC at the solenoid connector. If (+)24 VDC is present at the connector then the solenoid coil is probably defective, replace the solenoid. 4. If air pressure is present and pressing the actuator push button does not operate the Stop, look for mechanical obstructions or restrictions at the Stop. If the Stop is clear of mechanical restrictions, the valve is probably defective. Replace the valve.
			Yes	1. The output from the GPIO card may be defective. Call KRB for assistance.
Lift Arms fail to operate	The Lift Arms fail to operate in Auto Mode	Do the Lift Arms operate in Manual Mode?	No	1. Check for air pressure at the solenoid valve(s). 2. If air pressure is present, press the manual actuator push button on the valve body. If the valve operates and the Arm actuates, the problem is electrical. 3. Place the ARMS selector switch in the UP or DOWN position. Verify (+)24 VDC at the solenoid connector. If voltage is present, then the solenoid coil is probably defective, replace the solenoid. 3. If air pressure is present and pressing the actuator push button does not operate the Arm, look for mechanical obstructions or restrictions at the Arm. If the Arm is clear of mechanical restrictions, the valve is probably defective. Replace the valve.
			Yes	1. The output from the GPIO card may be defective. Call KRB for assistance.