

Chapter 8: Troubleshooting

8.1 Abnormal Display

When an abnormal condition is detected by the system, the affected press stops and lights the ABNORMAL LED. For ease of troubleshooting the nature of the abnormal, the system provides an abnormal code in the [PARM] display and an abnormal sub-code in the [D-NO] display.

- **Abnormal code display.**

When an Abnormal condition occurs (ABNORMAL LED is lit), the display mode will automatically change to the STATUS mode. (If the display is not in the STATUS mode, depress the MODE button until a blinking "A" appears in the [PARM] display area) A code number appears at the right side of the blinking character. This code refers to some specific type of failure detailed in the tables shown in the following sections.

- **Abnormal Sub-code display.**

The number shown at the most right position in the [D-NO] display area is a sub-code that can be used in conjunction with the Abnormal failure code to further narrow down the cause of the fault. See the following sections.



The main Abnormal codes are:

| ABNORMAL CODE | DESCRIPTION |
|---------------|------------------------------|
| 1 | Load Cell Error. |
| 2 | Offset Load Error. |
| 3 | Tool EEPROM error. |
| 4 | System Memory Error. |
| 5 | Servo Amplifier Reply Error. |
| 6 | Servo Type Mismatch Error. |
| 7 | Internal Error. |
| 8 | Servo Amplifier Error. |
| 9 | Parameter Error. |

Abnormal sub-codes and specific actions for troubleshooting are detailed in the following section.

8.2 Load Cell Abnormals [A1_*]

• Code A1_0 - LOAD CELL / ZERO VOLTAGE ERROR

Zero level does not match master level read from tool EEPROM during power on initialization.

CAUSE:

1. When the tool load cell is sensing excessive force due to forces on the press shaft.
2. If the controller or the load cell cable is located in an electric or magnetic noise field.
3. When the load cell, load cell cable or the controller malfunctions.

RECOVERY:

1. Check that the press shaft has no external force applied to it. (Nothing touching the press shaft assembly or that anything mounted to it does not bind.)
2. Verify that the cable or controller are not located near any high voltage transient power sources. Relocate as required and reinitialize.
3. Exchange load cell cable, tool and/or controller with known working units. Reinitialize the system after each exchange, and make note of any change in the location of the abnormal.
4. Replace the defective component.

• Code A1_1 - LOAD CELL / CAL VOLTAGE ERROR

Calibration voltage error during power on initialization.

CAUSE:

1. When the tool load cell is sensing excessive load due to forces on the press shaft.
2. If the controller or the load cell cable is located in an electric or magnetic noise field.
3. When the load cell, load cell cable or the controller malfunctions.

RECOVERY:

1. Check that the press shaft has no external force applied to it. (Nothing touching the press shaft assembly)
2. Verify that the cable or controller are not located near any high voltage transient power sources. Relocate as required and reinitialize.
3. Exchange load cell cable, tool and/or controller with known working units. Reinitialize the system after each exchange, and make note of any change in the location of the abnormal.
4. Replace the defective component.

• Code A1_2 - LOAD CELL / ZERO CHECK ERROR

Zero level voltage loaded to memory from tool EEPROM during initialization does not match the actual zero level during a self check (while the self check function is DISABLED).

CAUSE:

1. When the tool load cell is sensing excessive force due to pressure or vibration during the press cycle start.
2. If the controller or the load cell cable is located in an electric or magnetic noise field.
3. When the load cell, load cell cable or the controller malfunctions.

RECOVERY:

1. Check that the press shaft has no external force applied to it.
2. Verify the tool mounting bolts are tight and nothing is causing excessive vibration to the tool.
3. Verify that the cable or controller are not located near any high voltage transient power sources. Relocate as required and attempt again the press start input.
4. Exchange load cell cable, tool and/or controller with known working units. Input the start signal after each exchange, and make note of any change in the location of the abnormal.
5. Replace the defective component.

• Code A1_3 - LOAD CELL / CAL SELF CHECK ERROR

Calibration level voltage error after a press start was attempted.

CAUSE:

1. When the load cell is sensing excessive force due to pressure or vibration during the press cycle start.
2. If the controller or the load cell cable is located in an electric or magnetic noise field.
3. When the load cell, load cell cable or the controller malfunctions.

RECOVERY:

1. Check that the press shaft has no external force applied to it.
2. Verify the tool mounting bolts are tight and nothing is causing excessive vibration to the tool.
3. Verify that the cable or controller are not located near any high voltage transient power sources. Relocate as required and attempt again a press start input.
4. Exchange load cell cable, tool and/or controller with known working units. Input the start signal after each exchange, and make note of any change in the location of the abnormal.
5. Replace the defective component.

• Code A1_4 - LOAD CELL / STARTED ON ZERO ERROR CONDITION

The start signal was input while a Zero voltage abnormal condition existed.

RECOVERY:

1. Interlock the PLC circuit to disable the start signal during an existing abnormal condition.
2. Follow the *ZERO VOLTAGE ERROR* abnormal help procedure.

• Code A1_5 - LOAD CELL / STARTED ON CAL ERROR CONDITION

The start signal was input while a Cal voltage abnormal condition existed.

RECOVERY:

1. Interlock the PLC circuit to disable the start signal during an existing abnormal condition.
2. Follow the *CAL VOLTAGE ERROR* abnormal help procedure.

• Code A1_6 - LOAD CELL / ZERO LEVEL SELF CHECK ERROR

Zero level voltage loaded to memory from tool EEPROM during initialization does not match the actual zero level during a self check with the self check function enabled.

CAUSE:

1. When the load cell is sensing excessive force due to pressure on the press shaft.
2. If the controller or the load cell cable is located in an electric or magnetic noise field.
3. When the load cell, load cell cable or the controller malfunctions.

RECOVERY:

1. Check that the press shaft has no external force applied to it.
2. Verify that the cable or controller are not located near any high voltage transient power sources. Relocate as required and reinitialize.
3. Exchange load cell cable, tool and/or controller with known working units. Reinitialize the system after each exchange, and make note of any change in the location of the abnormal.
4. Replace the defective component.

8.3 Offset Load Abnormals [A2_*]

- Code A2_0 - OFFSET LOAD ABNORMAL

High load was detected during an initial stage of press.

CAUSE:

1. Excessive binding in the press shaft or press fixture.
2. The load cell is sensing excessive force due to pressure or vibration during the initial stage of press cycle.
3. The controller or the load cell cable is located in an electric or magnetic noise field.

RECOVERY:

1. Repair or replace mechanism which is binding.
2. Check that the press shaft has no external force applied to it.
3. Verify that the cable or controller are not located near any high voltage transient power sources. Relocate as required and reinitialize.

8.4 Preamplifier Errors [A3_*]

• Code A3_0 - PREAMPLIFIER / TOOL ID CHECKSUM ERROR

Communication data checksum error between the load cell preamplifier and the SAN Unit. Data is not reliable due to data error.

CAUSE:

1. If the controller or the load cell cable is located in an electric or magnetic noise field.
2. When the load cell, load cell cable or the controller malfunctions.

RECOVERY:

1. Verify that the cable or controller are not located near any high voltage transient power sources. Relocate as required and reinitialize the system.
2. Exchange load cell cable, tool and/or controller with known working units. Reinitialize the system after each exchange, and make note of any change in the location of the abnormal.
3. Replace the defective component.

• Code A3_1 - PREAMPLIFIER / TOOL TYPE ERROR

The connected tool type does not match the tool type programmed into the controller. This error may occur in the multi-tool type application or when controllers are replaced and not reprogrammed with the correct configuration.

RECOVERY:

1. Verify the tool type name from the tool identification tag
2. Compare the tool tag name with the setup value located on Data Display (see Page 6-24)
3. Program proper tool number into SAN Unit or change tool to proper tool.

• Code A3_2 - STARTED WITHOUT TOOL CONNECTED

The start signal was applied while a *TOOL IS NOT CONNECTED* abnormal condition existed.

RECOVERY:

1. Interlock the PLC circuit to disable the start signal during an existing abnormal condition.
2. Follow the *TOOL IS NOT CONNECTED* (Code 3-3) abnormal help procedure.

• Code A3_3 - PREAMPLIFIER / TOOL IS NOT CONNECTED

Communications error between the load cell preamplifier and the controller.

CAUSE:

1. The load cell cable is not connected
2. If the controller or the load cell cable is located in an electric or magnetic noise field.
3. When the load cell, load cell cable or the controller malfunctions.

RECOVERY:

1. Verify that the load cell cable is connected
2. Verify that the cable or controller are not located near any high voltage transient power sources. Relocate as required and reinitialize the system.
3. Exchange load cell cable, tool and/or controller with known working units. Reinitialize the system after each exchange, and make note of any change in the location of the abnormal.
4. Replace the defective component.

- **Code A3_4 - CCW SENSOR POSITION ABNORMAL**

The resolver count is out of the 1000 ~ 3000 range after performing a Home Position Search. (See Section 7.2.3.2 for an explanation of Home Position Search)

Note: The press unit will still be able to operate with this abnormal but be warned that, if using Distance Control press methods, the distance value may fluctuate.

CAUSE:

1. The motor was changed and not “tuned” or tuned incorrectly.
2. The RETURNED switch (CCW) has moved.
3. An offset value was entered in the “Resolver Position” System Parameter [00-09] that caused the resolver count to become out of range.
4. If using a DPS or DPM series tool, the belt tension may need adjustment.

RECOVERY:

1. Perform a “tuning” procedure on the motor. (See Section 7.2.3.3)
2. Verify that the RETURNED switch (CCW) mounting screws are tight. If loose, tighten and perform a “tuning” procedure on the motor.
3. Enter a value of zero into the “Resolver Position” System Parameter [00-09] and download to the controller. Perform a Home Position Search and verify that the resolver count is between 1000 ~ 3000. If it is slightly out of range, an offset value may be entered in the “Resolver Position” System Parameter [00-09]. (See Section 6.4.5.1 for an explanation of the “Resolver Position” System Parameter [00-09])
4. Verify that the motor fixing bolts on the DPS or DPM tool are tight and the belt is at the correct tension. (See Section 7.1.1.3)

- **Code A3_5 - ORIGIN SEARCH TIMEOUT**

The Home Position Search operation did not finish in the time specified in System Parameter 00-30. (See Section 7.2.3.2 for an explanation of Home Position Search)

RECOVERY:

1. Increase the Home Position Search Time Out specified in System Parameter 00-30. (See Page 6-21)
2. Increase the Home Position Search Speed specified in System Parameter 00-31.
3. Verify that the Home Position Sensor setting specified in System Parameter 00-36 is set correctly.

8.5 System Memory Errors [A4_*]

- **Code A4_0 - SYSTEM MEMORY ERROR / FLASH ROM WRITE ERROR**

Communications error to internal SAN Flash ROM during WRITE attempt.

CAUSE:

1. Metal chips and/or debris have migrated inside SAN Unit through vent holes.
2. Flash ROM IC chip has malfunctioned.

RECOVERY:

1. Remove SAN Unit and blow or shake out debris.
2. Replace and return unit to FEC for repair.

- **Code A4_1 - SYSTEM MEMORY ERROR / FLASH ROM READ ERROR**

Communications error to internal SAN Flash ROM during READ attempt.

CAUSE:

1. Metal chips and/or debris have migrated inside SAN Unit through vent holes.
2. Flash ROM IC chip has malfunctioned.

RECOVERY:

1. Remove SAN Unit and blow or shake out debris.
2. Replace and return unit to FEC for repair.

- **Code A4_2 - SYSTEM MEMORY ERROR / SERVO AMP FLASH ROM ERROR**

Communications error to internal SAN Servo Amp flash ROM.

CAUSE:

1. Metal chips and/or debris have migrated inside SAN Unit through vent holes.
2. Flash ROM IC chip has malfunctioned.

RECOVERY:

1. Remove SAN Unit and blow or shake out debris.
2. Replace and return unit to FEC for repair.

8.6 Servo Amplifier Response Errors [A5_*]

• Code A5_0 - SERVO AMPLIFIER REPLY ERROR / NO REPLY FROM RESOLVER

The controller is attempting to turn the motor, but is not receiving any signals back from the resolver to indicate that the tool is actually turning.

CAUSE:

1. The motor/resolver cable is damaged or not connected
2. When the resolver, motor, or the controller malfunctions.
3. If there is excessive binding in the transmission or the press shaft assembly keeping the motor from turning.
4. System Parameter 00-06 (No Load Current) is not set to the correct value.
5. When running short cycle times the brake reaction time may not be fast enough causing the brake to drag during the first few milliseconds of the press cycle.

RECOVERY:

1. Verify that the motor cable is connected and not damaged.
2. Connect all spare tool cables to the existing tool.
3. Exchange tool and/or controller with known working units. Reinitialize the system after exchanges.
4. Verify that system parameter 00-06 is set to the correct default value. If weight is installed on the press ram and this abnormal occurs, the value may have to be increased.
5. Inspect and correct any binding in the transmission or press shaft.
6. Verify that the brake is operating correctly.
7. **For item 5 above:** The brake is designed to be used for maintenance, not for control. Set Parameter 00, Data No. 36 to "Dynamic Hold - On" (this allows motor to control holding of press). See Page 4-28 for brake setup.
If brake must be used for control on short cycle time applications, incorporate a timer to delay the start until the brake has time to react.

8.7 Servo Type Error [A6_*]

- **Code A6_0 - SERVO TYPE ERROR / SERVO TYPE MISMATCH**

The SAN Unit model does not match the connected motor type.

RECOVERY:

1. Verify the servo type tag with the motor type tag.
2. There are 3 types of SAN Units (controllers) available & they must be connected to the correct motor size as shown in the tables in sections 2.1 and 2.2.

Tool Type Part Number Breakdown

R1 motor = SAN3/4-24S
R1H motor = SAN3/4-24HS
R2 motor = SAN3/4-24S
R3 motor = SAN3/4-40S
R4 motor = SAN3/4-120S
R5 motor = SAN3/4-120S

Example: Tool Type DPT-151R3-**FS
R3 is motor size

8.8 Servo Amplifier Errors [A8_*]

• Code A8_1 - SERVO AMPLIFIER ERROR / SERVO IS OVER HEATED

The SAN controller servo circuit has overheated.

CAUSE:

1. The controller servo drive circuit has failed.
2. If the environment temperature is more than 122 degrees Fahrenheit (50 degree centigrade) without any air flow.
3. Source voltage is very close to the limit (242 VAC) and the environment temperature is also close to the limit.

RECOVERY:

1. Replace the controller.
2. Provide additional cooling to the enclosure.
3. Verify and correct the source voltage as required.

• Code A8_4 - SERVO AMPLIFIER ERROR / OVER CURRENT

The SAN controller servo circuit experienced a current overload.

CAUSE:

1. The controller servo drive circuit has failed.
2. If the environment temperature is more than 122 degrees Fahrenheit (50 degree centigrade) without any air flow.
3. Source voltage is very close to the limit (242 VAC) and the environment temperature is also close to the limit.
4. Maximum force is being run or exceeded by the tool every cycle.
5. Speed may be too low or too high during load speed.

RECOVERY:

1. Replace the controller.
2. Verify proper cooling for the enclosure.
3. Verify and correct the source voltage as required.
4. Verify proper load or work piece.
5. Adjust load speed setting.

• Code A8_5 - SERVO AMPLIFIER ERROR / INTERNAL POWER SUPPLY

The SAN controller servo power supply circuit is not working properly or the input voltage is above the maximum limit.

CAUSE:

1. The controller internal power supply has failed.
2. Source voltage is very close to the limit (242 VAC) and the environment temperature is also close to the limit.

RECOVERY:

1. Replace the controller.
2. Provide additional cooling to the enclosure.
3. Verify and correct the source voltage as required.

• Code A8_6 - SERVO AMPLIFIER ERROR / INPUT VOLTAGE ABNORMAL

The SAN3 controller servo power supply circuit or SAN4 controller control power circuit has detected improper input voltage either above or below the specified limits.

CAUSE:

1. The controller internal power supply has failed.
2. Source voltage is out of the limit (180-242 VAC) and/or the environment temperature is also close to the limit.
3. One or more phases of input power are missing.

RECOVERY:

1. Replace the controller.
2. Provide additional cooling to the enclosure.
3. Verify and correct the source voltage as required (SAN3 - between 180-242 VAC 3 phase, SAN4 - between 180-242 VAC 1 phase).

• Code A8_7 - SERVO AMPLIFIER ERROR / DRIVE VOLTAGE ABNORMAL (SAN4)

The SAN4 controller motor power supply circuit has detected improper input voltage either above or below the specified limits.

CAUSE:

1. The controller internal power supply has failed.
2. Source voltage is out of the limit (180-242 VAC) and/or the environment temperature is also close to the limit.
3. One or more phases of input power are missing.

RECOVERY:

1. Replace the controller.
2. Provide additional cooling to the enclosure.
3. Verify and correct the source voltage as required (between 180-242 VAC 3 phase).

• Code A8_9 - SERVO AMPLIFIER ERROR / OVER SPEED.

The resolver signal received at the SAN controller indicates an over speed condition.

CAUSE:

1. The resolver cable or resolver has failed.

RECOVERY:

1. Check resolver using method in 7.2.3.
2. Replace resolver cable with spare cable.
3. Replace tool assembly.

• Code A8_10 - SERVO AMPLIFIER ERROR / OVER LOAD (I SQUARE T)

The duty cycle of the press application is too severe for this size of tool, or for the parameters currently set up.

RECOVERY:

1. Reduce duty cycle - Increase tool "downtime or off time" and/or increase Press Speed and Part Search Speed to reduce the amount of time running at high load/slow speed.
2. Increase the Press Speed Start Load or Press Speed Start Distance at which Part Search Speed shifts to Press Speed.
3. If using Load Hold, try decreasing the hold time.
4. If the problem remains, a larger tool assembly may be required for this application. Please contact FEC.
5. If this happens while performing a "Home Position Search", verify that the brake is operating correctly.

- **Code A8_11 - SERVO AMPLIFIER ERROR / RESOLVER SIGNAL ERROR.**

The resolver signal received is not correct.

RECOVERY:

1. Check the cable and look for loose connectors or visible damages to the cable.
2. Replace with known good tool.

8.9 Parameter Errors [A9_*]

• Code A9_0 - PARAMETER ERROR / MISSING SPEED PRESET

Some speed preset is not set up in the parameter number selected or the wrong parameter number has been selected by the PLC.

RECOVERY:

1. Verify that the parameter number that is being selected by the PLC is configured in the controller.
2. Check that the speed presets are not <0> or out of the specified speed range of the tool.

• Code A9_1 - PARAMETER ERROR / MISSING TIME or SPEED PRESET

Some Time or Speed preset is not setup in the parameter number selected or the wrong parameter number has been selected by the PLC.

RECOVERY:

1. Verify that the parameter number that is being selected by the PLC is configured in the controller.
2. Check that the time or speed presets are not set as <0> or out of the specified speed range of the tool.

• Code A9_2 - PARAMETER ERROR / PARAMETER SELECT ERROR

The parameter selected was empty.

RECOVERY:

1. Verify that the parameter number that is being selected by the PLC is configured in the controller.
2. Check that the press presets are not <0> or out of the specified range for the tool.

• Code A9_3 - PARAMETER ERROR / MISSING RETURN SPEED

The Return Speed preset is missing.

RECOVERY:

1. Verify that the parameter number that is being selected by the PLC is configured in the controller.
2. Check that the Return Speed is not set as <0> or out of the specified range for the tool.

• Code A9_4 - PARAMETER ERROR / PRESS SPEED NOT SET

The Press Speed preset is missing.

RECOVERY:

1. Verify that the parameter number that is being selected by the PLC is configured in the controller.
2. Check that the Press Speed is not set as <0> or out of the specified range for the tool.

• Code A9_5 - PARAMETER ERROR / LOAD SETUP ERROR

One of the Load presets is out of range.

RECOVERY:

1. Verify that the Load presets are in range for the tool size.
2. Check that the load presets are not <0> or setup as specified in 6.4.5.2.

• Code A9_6 - PARAMETER ERROR / DISTANCE SETUP ERROR

One of the Distance presets is out of range

RECOVERY:

1. Verify that the Distance presets are in range for the tool size.
2. Check that the Distance presets are not <0> or setup as specified in 6.4.5.2.

• Code A9_7 - PARAMETER ERROR / RETURN LOAD OVER.

The Return Load is more than 1/6 of the Full Scale Load.

RECOVERY:

1. Verify there is no excessive binding in the press shaft or press fixture while running in the return portion of the press stroke.
2. Verify that the brake has been released while running a return operation.
3. If heavy tooling is attached to the press ram causing an excessive load to be seen, set the "Self Check Off" signal high (on) before sending a "Start" signal.

• Code A9_8 - PARAMETER ERROR / ADVANCE JOG LOAD OVER.

The Advance Jog Load is more than 1/6 of the Full Scale Load.

RECOVERY:

1. Verify there is no excessive binding in the press shaft or press fixture while jogging forward in manual mode.
2. Verify that the brake has been released while performing a forward jog operation.

• Code A9_9 - PARAMETER ERROR / HOME SEARCH LOAD OVER.

The Home Search Load is more than 1/6 of the Full Scale Load.

RECOVERY:

1. Verify there is no excessive binding in the press shaft or press fixture while performing a Home Position Search.
2. Verify that the brake has been released while performing a Home Position Search.

• Code A9_10 - PARAMETER ERROR / HOME RETURN LOAD OVER.

The Home Return Load is more than 1/6 of the Full Scale Load.

RECOVERY:

3. Verify there is no excessive binding in the press shaft or press fixture while performing a Home Return operation.
4. Verify that the brake has been released while performing a Home Return operation.

8.10 Questions & Answers

Q1: Does home position search have to be performed every time the power is turned on?

A1: Yes.

Home position search may also need to be performed after a catastrophic abnormal has occurred.

Q2: REJECT was output but the reason is unclear.

A2: See “**Press Result Display Mode**” in Section 6.3.5.

Contents of the REJECT is shown from ‘ 6= ’ to ‘ 9= ’.

Q3: Is it possible to press while jogging in Manual Mode?

A3: No.

Abnormal 9-8 will occur when 1/6 of the full-scale load is detected.

It is possible to jog using a parameter.

When you want to JOG operate, set the operation finish mode to JOG RETURN and turn the START signal ON and turn it OFF when you want to stop. It will start from the present position if it is turned ON again.

- When set to Jog Return Mode, if a load is detected when the START signal goes off, the load will be released.
- If you do not want the load to be released, set to Keep Load Mode. Also, turn on the Self Check Off signal before starting again or when returning or an abnormal will be generated due to a force being present at START.



When the Self Check signal is turned off, the present load is set to the 0 load value, so be careful. ** It is a possible to destroy the equipment using this method. **

This method can be used with F type tools, but make sure it is not overloaded.