



# UDC 2500 Application Note

## Controller Failure Symptoms

### Introduction

In addition to the error message prompts, there are failure symptoms that can be identified by noting how the controller displays and indicators are reacting.

### Symptoms

Compare your symptoms with those shown in Table 1.

**Table 1 Controller Failure Symptoms**

Upper Display	Lower Display	Indicators	Controller Output	Probable Cause	Trouble-shooting Procedure
Blank	Blank	Off	None	Power Failure	1
OK	Displayed Output disagrees with Controller Output	OK	Controller Output disagrees with Displayed Output	Current Proportional Output	2
OK		OK		Three Position Step Control Output	3
OK		OK		Time Proportional Output	4
OK		OK		Current/Time Proportional Output	5
OK	OK	OK	External Alarm function does not operate properly	Malfunction in alarm output	6
Display does not change when a key is pressed				Keyboard Malfunction	7
Controller fails to go into "Slave" operation during communications				Communications Failure	8
OK	Displayed Output disagrees with Auxiliary Output	OK	Controller Auxiliary Output disagrees with Displayed Auxiliary Output	Auxiliary Output	9

### Other symptoms

If a set of symptoms or prompts other than the one you started with appears while troubleshooting, re-evaluate the symptoms. This may lead to a different troubleshooting procedure.



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If the symptom still persists, refer to the installation section in this manual to ensure proper installation and proper use of the controller in your system.

## Troubleshooting Procedures

### Introduction

The troubleshooting procedures are listed in numerical order as they appear in Table 1. Each procedure lists what to do if you have that particular failure and how to do it or where to find the data needed to accomplish the task.



### **WARNING—SHOCK HAZARD**

**TROUBLESHOOTING MAY REQUIRE ACCESS TO HAZARDOUS LIVE CIRCUITS, AND SHOULD ONLY BE PERFORMED BY QUALIFIED SERVICE PERSONNEL. MORE THAN ONE SWITCH MAY BE REQUIRED TO DE-ENERGIZE UNIT BEFORE SERVICING.**

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### Equipment needed

You will need the following equipment in order to troubleshoot the symptoms listed in the tables that follow:

- Multimeter – Capable of measuring millivolts, milliamps and resistance.
- Calibration sources – T/C, mV, Volt, etc.



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## Procedure #1

Table 2 explains how to troubleshoot power failure symptoms.

**Table 2 Troubleshooting Power Failure Symptoms**

Step	What to do	How to do it
1	Check the AC line voltage.	Use a voltmeter to measure the AC voltage across terminals L1 and L2 on the rear terminal panel of the controller. Check the earth ground connection.
2	Make sure the chassis plugs into the rear of the case properly.	Withdraw the chassis and visually inspect the controller board and the inside of the case.
3	Check the system for Brown-outs, heavy load switching, etc., and conformance to installation instructions.	Refer to - <i>Installation Section</i> .
4	Change Power board.	Installation instructions supplied with new board.

## Procedure #2

Table 3 explains how to troubleshoot Current Proportional Output failure symptoms.

**Table 3 Troubleshooting Current Proportional Output Failure**

Step	What to do	How to do it
1	Make sure the controller is configured for Current output and the proper range (4 to 20 or 0 to 20) is configured.	Make Output Set Up group function prompt OUT ALG = CUR. Make the Output Set UP group function prompt CRANGE = 4-20 or 0-20 per your application. Refer to <i>Configuration Section</i> .
2	Check the field wiring.	Output impedance must be less than or equal to 1000 ohms.
3	Check the output.	Put the controller into Manual mode and change the output from 0 % to 100 % (4-20 mA). Use a DC milliammeter at the rear terminals to verify the output.
4	Recalibrate the Current Proportional output.	Refer to <i>Output Calibration Section</i> for details.
5	Change Current Output board.	Installation instructions provided with new board.
6	Change Controller	



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## Procedure #3

Table 4 explains how to troubleshoot Position Proportional Output failure symptoms.

**Table 4 Troubleshooting Three Position Step Control Output Failure**

Step	What to do	How to do it
1	Make certain that the controller is configured for Three Position Step control.	Make Output Algorithm Set Up group function prompt OUT ALG = TPSC.
2	Check the field wiring.	Refer to <i>Installation Section</i> for
3	Check the output.	Put the controller into Manual mode and change the output from 0 % to 100 %.
4	Check whether the motor drives in both directions.	Remove controller and short out Output 1 or Output 2. The motor should go to either open or closed. If it does controller is ok. If not, repeat Step 1.
5	Check whether the motor drives in either direction. If the motor does not drive in either direction, check the motor. If the motor drives in one direction but not the other, go to Step 6	Refer to the motor instructions.
6	Make sure the output relays are actuating properly.	Put the controller into Manual mode. Vary the output above and below the present value. Observe "OT" in the Lower Display and the Relay Annunciators on the operator interface. If they are not working properly, check the field wiring, then go to Step 5. If they are, go to Step 7.
7	Change the two Output Relays or the Dual Relay Board (depending upon unit)	Installation instructions supplied with the new relays or board.



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## Procedure #4

Table 5 explains how to troubleshoot Time Proportional Output failure.

**Table 5 Troubleshooting Time Proportional Output Failure**

Step	What to do	How to do it
1	Make sure the controller is configured for Time Proportional output.	Make Output Algorithm Set Up group function prompt OUTALG = RLY or RLYD. Refer to <i>Configuration Section</i> .
2	Check the field wiring.	Make sure the NO or NC contact wiring is correct. Refer to <i>Installation Section</i> for details.
3	Check the output.	Put the controller into Manual mode. Vary the output above and below the present value. Observe OUT1 indicator on the operator interface. Contact should change state. 0 % open, 100 % closed. Listen for a click from the relay when the OUT1 indicator changes state.
4	Check relay.	Change relay.
5	Change MCU board.	Installation instructions supplied with the new board.



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## Procedure #5

Table 6 explains how to troubleshoot Current/Time or Time/Current Proportional Output failure.

**Table 6 Troubleshooting Current/Time or Time/Current Proportional Output Failure**

Step	What to do	How to do it
1	Make sure the controller is configured for Time/Current or Current/Time Proportional output.	Make Output Algorithm Set Up group function prompt OUT ALG = TCUR or CURT. Refer to <i>Configuration Section</i> .
2	Check the field wiring.	Make sure the NO or NC contact wiring selection is correct. Refer to <i>Installation Section</i> for details.
3	Check the relay output.	Put the controller into Manual mode. Vary the output above and below the present value. Observe OUT1 indicator on the operator interface. Listen for a click from the relay when the OUT1 indicator changes state.
4	Check the Current Proportional Output.	Put the controller into Manual mode and change the output from 0 % to 100 % (4-20 mA). Use a DC milliammeter at the rear terminals to verify the output.
5	Recalibrate the controller.	Refer to <i>Output Calibration Section</i> for details.
6	Change relay and/or Current Output boards.	Installation instructions supplied with new board.



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## Procedure #6

Table 7 explains how to troubleshoot Alarm Relay Output failure.

**Table 7 Troubleshooting Alarm Relay Output Failure**

Step	What to do	How to do it
1	Check the alarm configuration data. If it is correct, check the field wiring.	Reconfigure if necessary. Refer to <i>Configuration Section</i> for details.
2	Check that the applicable alarm relay actuates properly depending on what you have set at prompt AxSxTYPE. If it does, check the field wiring.	If the alarm type is set for PV, place the controller in manual mode. Vary the input to raise and lower the PV around the setpoint. Listen for a click from the relay as the PV moves in either direction and note that the proper ALM1 or ALM2 is lit.  EXAMPLE: If the alarm is set for MAN, put the controller into manual mode. The alarm light is ON. Put the controller into automatic mode and the alarm light is OFF.
3	Check the contacts.	Make sure the NO or NC contact wiring is correct.  Refer to <i>Installation Section</i> for relay contact information.
4	Change the relay and/or the current output board.	Installation instructions supplied with the new relay or board.
5	Change MCU board.	Installation instructions supplied with the new board.



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## Procedure #7

Table 8 explains how to troubleshoot a Keyboard failure.

**Table 8 Troubleshooting a Keyboard Failure**

Step	What to do	How to do it		
1	Make sure the keyboard is connected properly to the MCU/output and power/input boards.	Withdraw the chassis from the case and visually inspect the connection.		
2	Controller Keyboard or specific keys may be LOCKED OUT via the security code.	Use your four-digit security code number to change the lockout level. Refer to <i>Section 3 – Configuration</i> .		
3	Run the keyboard test.	Press the [SET UP] key and hold in, then press the [FUNCTION] key at the same time. The controller will run a display test. Then you will see: Upper Display <table border="1"><tr><td>KEYS</td></tr></table> Lower Display <table border="1"><tr><td>TRY ALL</td></tr></table> Press each key. If it works, the key name will appear in the lower display.	KEYS	TRY ALL
KEYS				
TRY ALL				
4	Replace the display/keyboard if any keys do not function.	Refer to <i>“Parts Replacement Procedures”</i> in this section.		



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## Procedure #8

Table 9 explains how to troubleshoot a Communications failure.

**Table 9 Troubleshooting a RS-485 Communications Failure**

Step	What to do	How to do it
1	Check the field wiring and termination resistor.	Using an ohm meter, check the resistance across the communications rear terminals. See wiring Section for diagrams.
2	Make sure the Communications Printed Wiring Board is installed properly in the controller.	Withdraw the chassis from the case and inspect the board. See the exploded view for location of the board. Return the chassis to the case.
3	Determine if the Communications board is faulty by running a LOCAL LOOPBACK TEST.  If the test fails, replace the board. If the test passes, the problem is most likely elsewhere in the communications network.	<p>Disconnect the communications cable from the rear terminals. Run the Local Loopback Test.</p> <p>Press [SET UP] until you see:</p> <p>Upper Display  <div style="border: 1px solid black; padding: 2px; display: inline-block;">SET UP</div></p> <p>Lower Display  <div style="border: 1px solid black; padding: 2px; display: inline-block;">COM</div></p> <p>Press [FUNCTION] until you see:</p> <p>Upper Display  <div style="border: 1px solid black; padding: 2px; display: inline-block;">DISABLE</div></p> <p>Lower Display  <div style="border: 1px solid black; padding: 2px; display: inline-block;">LOOPBACK</div></p> <p>Press  or  you will see:</p> <p>Upper Display  <div style="border: 1px solid black; padding: 2px; display: inline-block;">ENABLE</div></p> <p>Lower Display  <div style="border: 1px solid black; padding: 2px; display: inline-block;">LOOPBACK</div></p> <p>The test will run until the operator disables it here.</p>



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## Procedure #9

Table 10 explains how to troubleshoot Auxiliary Proportional Output failure symptoms.

**Table 10 Troubleshooting Auxiliary Output Failure**

Step	What to do	How to do it
1	Make sure the controller is configured for Auxiliary Output and the proper range (4 to 20 or 0 to 20) is configured.	<p>Make Options Set Up group function prompt AUX OUT any selection other than NONE. If this prompt does not show up, check if DIG IN 2 is enabled. If so, then as Auxiliary Output and Digital Input 2 are mutually exclusive, you must choose which one of these features you wish to use.</p> <p>Make the Options Set UP group function prompt CRANGE = 4–20 or 0–20 per your application.</p> <p>Refer to <i>Configuration Section</i>.</p>
2	Check the field wiring.	Output impedance must be less than or equal to 1000 ohms.
3	Check the output.	Change the AUX OUT selection to OUTPUT. Put the controller into Manual mode and change the output from 0 % to 100 % (4-20 mA). Use a DC milliammeter at the rear terminals to verify the output.
4	Recalibrate the Auxiliary output.	Refer to <i>Section Output Calibration</i> for details.
5	Change Auxiliary Output board.	Installation instructions provided with new board.
6	Change Controller	