

4.4 Startup of Recorder with Display and Keypad

4.4.1 Overview

Introduction

This subsection provides procedures and reference information for startup and operation of a recorder having a display and keypad. (For information on operating a recorder that does not have a display and keypad, see Section 3.) This subsection assumes that the recorder has been properly prepared, mounted, and wired in accordance with the instructions in Section 2, and configured as described earlier in this section.

Some of the procedures in this subsection are required only initially; some are required during use. Once the recorder is up and running, operator actions are required infrequently.



WARNING—SHOCK HAZARD



STARTUP AND MAINTENANCE 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.

4.4.2 Preparing the Recorder for Startup

Introduction

Before applying power to the recorder, complete these preparation tasks.

CAUTION

Never move the pen arms when the unit is operating unless adjusting the pen alignment as described in Section 8.



WARNING

When the unit is powered, a potentially lethal shock hazard exists at the AC power connections at TB1 on the printed circuit assemblies for the pens (behind the chart plate).

Procedure

Refer to Figure 4-4 to identify the basic chart plate components and follow the procedure in Table 4-17 to prepare the recorder for operation.

Table 4-17 Preparing the Recorder for Operation

Step	Action
1	Open the door of the recorder.
2	Pull up on the pen lifter to raise the pen(s) from the chart plate and remove the protective cap from each pen tip.
3	Slip the new chart under the pen lifter, pen and time index, and press it into place over the chart hub and locating pin.
4	Grasp the locating pin, and turn the chart until the desired time line on the chart is aligned with the time index on the chart plate and pen 1. Push down the lifter to return the pen(s) to the chart.

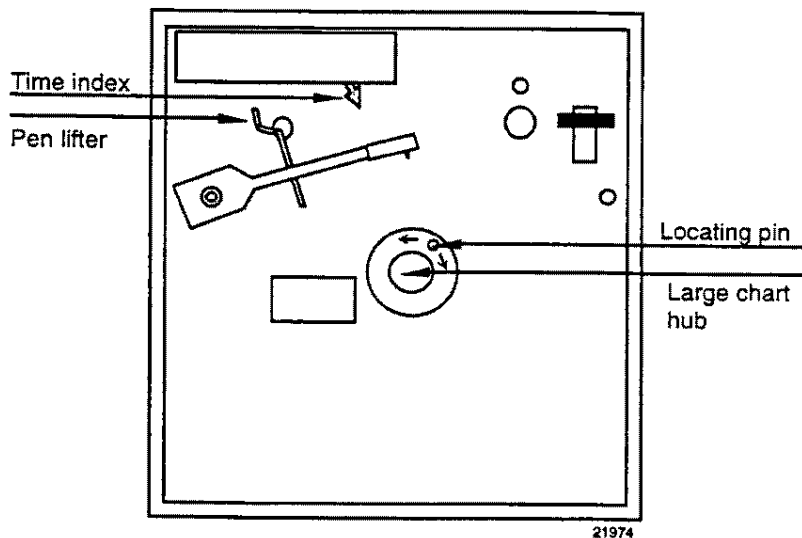


Figure 4-4 Basic Chart Plate Components

4.4.3 Running the Optional Step Test

Introduction

You can test the recorder's mechanical operation by running a step test. This test is initiated using the keypad as described in Table 4-18.

This test prints a step pattern, which is independent of any chart settings, with horizontal lines drawn by both pens at each 10% increment on the chart (see Figure 4-5).



WARNING

When the unit is powered, a potentially lethal shock hazard exists at the AC power connections at TB1 on the printed circuit assemblies for the pens (behind the chart plate).

The test will run for one complete revolution of the chart before it stops itself. The chart revolution for the test takes approximately 2 minutes, regardless of configured chart speed. However, the test can be terminated at any time by pressing the **DISP** key.

Additional automatic self-tests

At power-up the recorder runs self-diagnostics on the printed circuit assembly for each pen. See subsection 4.5.1.4 and *Section 8 – Troubleshooting and Pen Alignment of Recorder with Display* for more information about these diagnostic tests.

Procedure

Use the procedure in Table 4-18 to run the step test.

Table 4-18 Procedure for Running the Step Test

Step	Press	Action/Result
1		Make sure the cap is removed from the tip of each pen and the chart is installed. (If you plan to store or ship the recorder, save the protective caps for the pen tips. Replace them if the recorder is taken out of operation.)
2		Being careful of the shock hazard at TB1 , swing out the chart plate and set SW5 on the printed circuit assembly on the right (pen 1) to the setup position, toward the top of the board
3		Apply power to the recorder.
4	FUNC	Until INP 1 indicator is lit on the left side of the operator interface.

Table 4-18 is continued on next page.

Table 4-18 Procedure for Running the Step Test, Continued

Step	Press	Action/Result
5	<p>DISP</p> <p>and</p> <p>MAN AUTO</p> <p>together</p>	<p>You will see:</p> <p>Upper Display PASS</p> <p>Lower Display SLFTST</p> <p><i>Refer to Section 8 if step test fails.</i></p>
6		<p>Check to see that the recorder is generating a step pattern on the chart as shown in Figure 4-5.</p> <p>At the completion of the test (after one revolution of the chart), the recorder will automatically return to normal operation.</p>
7	FUNC	<p>Lights INP 2 indicator (if recorder has 2 pens)</p> <p>You will see:</p> <p>Upper Display (value)</p> <p>Lower Display INP2</p> <p>Repeat Steps 4 and 5 to test pen 2 operation.</p>
8	DISP	Terminates the test at any time.

Chart step pattern

Figure 4-5 is a typical chart step pattern generated by the recorder in the test.

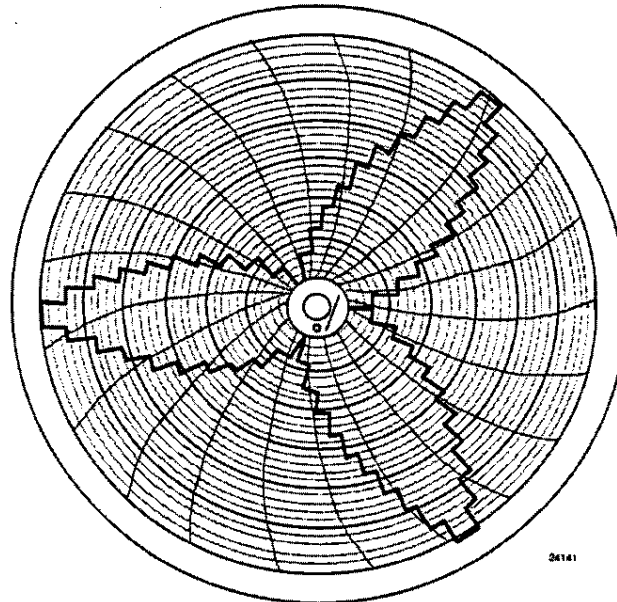


Figure 4-5 Typical Step Test Chart Patterns

4.4.4 Completing Preparation and Startup

4.4.4.1 Overview

Introduction

Once the recorder is set up, mounted, wired, and the chart has been installed, the only remaining tasks are:

- setting the chart time and applying the power (see 4.4.4.2)
- checking the self-diagnostic tests (see 4.4.4.3)
- checking the displays and keys (see 4.4.4.4)
- starting operation (see 4.4.4.5)

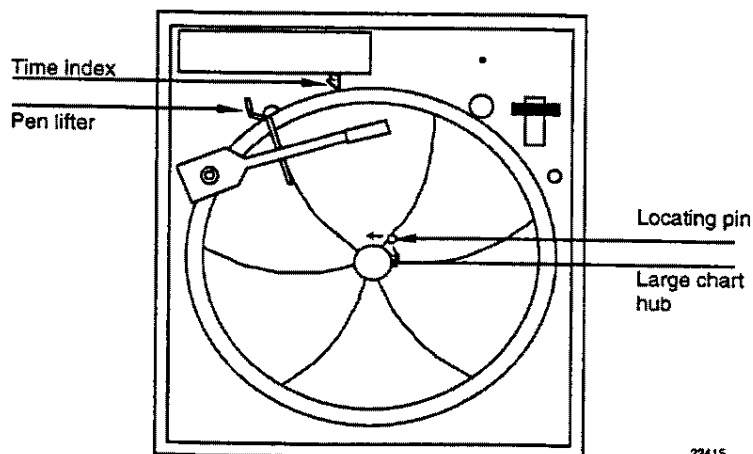
4.4.4.2 Set chart time and apply power

Procedure

To set the chart time and apply power, follow the procedure in Table 4-19. (See also Figure 4-6.)

Table 4-19 Procedure for Setting Chart Time and Applying Power

Step	Action
1	Open the door.
2	Pull up the pen lifter to raise the pen(s) from the chart plate.
3	Grasp the locating pin and turn the chart until the desired time line on the chart is aligned with the time index on the chart plate and pen 1. Push down the pen lifter to return the pen(s) to the chart.
4	Close the door and apply power.
5	The pen(s) will move into position and the recorder pen will start to track the value specified using the "PENIN" parameter in the pen set up group (see subsection 4.3.10).



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Figure 4-6 Setting Chart Time to Time Index

4.4.4.3 Diagnostic tests

Tests run automatically

When the recorder is powered-up, self-diagnostics are run by the software.

As the tests in Table 4-20 are run, the display indicates whether the tests were passed or failed as described below.

Table 4-20 Power-Up Diagnostic Tests

Lower Display	Upper Display
RAMTST	PASS or FAIL
CFGTST (configuration checksum)	PASS or FAIL
CALTST (working calibration)	PASS or FAIL

Status of tests displayed

As the tests are run, the lower line of the display shows which test is running. The upper line of the display indicates the status. If any of these tests fail, "FAIL" appears momentarily in the upper display, then a display test is run. The display changes to show the value of the process variable on the top line, and the error message for the failed test on the second line.

In addition, if the control group parameter "CONTRL" has a value of "ENAB" when the test is failed, the message "FAILSF" (failsafe) will alternate with error message for the test, and the controller will be in manual mode. When the "FAILSF" message is displayed, it indicates that the recorder control output has been driven to the value assigned to the control group "FAILSF" parameter.

By default, when the recorder is powered up the display will be for pen 1. Therefore, when the power up tests run, the "PASS" and "FAIL" messages will apply only to the printed circuit assembly associated with pen 1. However, in a 2-pen recorder the tests will also be run on the printed circuit assembly for pen 2. If the pen 2 assembly fails one of the tests, the message "P2 ERR" will be displayed, along with any error messages from the pen 1 tests.



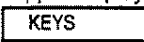
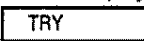
Section 8 contains additional information about self-diagnostics, and suggested remedies if a problem is detected.

4.4.4.4 Check the displays and keys

Procedure

Use the procedure in Table 4-21 to run the optional display and key test.

Table 4-21 Procedure for Testing the Displays and Keys

Press	Result														
<div style="text-align: center;">  and hold in, then  at the same time </div>	<p>The recorder runs a display test. All the displays will light for 10 seconds, then the displays will look like this:</p> <p>Upper Display </p> <p>Lower Display </p>														
<p>Press each key to see if it works</p>	<p>When the key is pressed, the lower display indicates the name of the key pressed.*</p> <table border="1" data-bbox="841 822 1393 1072"> <thead> <tr> <th>Key Pressed</th> <th>Lower Display</th> </tr> </thead> <tbody> <tr> <td>SET UP</td> <td>SET</td> </tr> <tr> <td>FUNC</td> <td>FUNC</td> </tr> <tr> <td>DISP</td> <td>DISP</td> </tr> <tr> <td>MAN/AUTO</td> <td>AUTO</td> </tr> <tr> <td>▲</td> <td>INCR</td> </tr> <tr> <td>▼</td> <td>DECR</td> </tr> </tbody> </table> <p>If pressing a key does not display its name, the display/keypad assembly is defective. Replace it as described in <i>Section 9 – Replacing Hardware Assemblies</i>.</p>	Key Pressed	Lower Display	SET UP	SET	FUNC	FUNC	DISP	DISP	MAN/AUTO	AUTO	▲	INCR	▼	DECR
Key Pressed	Lower Display														
SET UP	SET														
FUNC	FUNC														
DISP	DISP														
MAN/AUTO	AUTO														
▲	INCR														
▼	DECR														

* If no key is pressed for 30 seconds, the test times out and the recorder exits the key test.

Key Error message

When a key is pressed and the prompt "KEY ERROR" appears in the lower display, the message is not associated with the display and keypad test. This message will be displayed when the operator presses a key that is invalid for the recorder's configuration. The "KEY ERROR" message will be displayed during normal operation if one of the following conditions is met.

- The parameter normally called up by the key is not available.
- The recorder is not in Set Up mode, so the recorder can not respond to the key; press the **SET UP** key first.
- The key is not valid because the recorder is not set up for control.
- The key malfunctions; perform keypad test.

4.4.4.5 Startup procedure

Procedure

Use the procedure listed in Table 4-22 to start the recorder.

Open the recorder door (if the recorder does not have the optional keypad on the outside of the door).
Apply power and wait for the recorder to run its power-up tests.

ATTENTION

If FAILSF or another error message starts blinking in the lower display, refer to Section 8 for troubleshooting information.

For recorders with control on both pens, be sure the INP '1' indication is lit for steps 2-6. If INP 1 is not lit, press the **FUNC** key until "1" is lit when "INP" is displayed.

Table 4-22 Procedure for Starting the Recorder



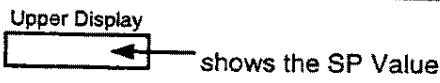
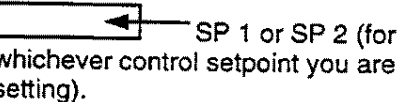
Step	Operation	Press	Action/Result
1	Pen check		For models without outputs, check that the pen is operating and skip to Step 4.
2	Select manual mode	MAN AUTO	Until "M" indicator is ON. Be sure INP 1 indicator is lit. If it is not, press FUNC key. The recorder is in manual mode and the Output (OUT 1) in percent is displayed in the lower display.
		DISP	Calls up OUT 1 in the lower display.
3	Adjust the output	▲ or ▼	Adjust the output value and ensure that the final control element is functioning correctly. Upper Display  shows the OUTPUT value in %. Lower Display  shows OUT 1.
4	Confirm correct configuration.	SET UP	If you want to check the recorder's configuration, follow the procedure described earlier in this section. If you try to change a value and can not, a lockout is enabled; see subsection 4.3.16.

Table 4-22 is continued on next page

Table 4-22 Procedure for Starting Up the Recorder, Continued

Step	Operation	Press	Action/Result
5	Enter the setpoint	<div style="border: 1px solid black; padding: 2px; display: inline-block;">DISP</div> until	Upper Display  Lower Display 
		<div style="text-align: center;">▲ or ▼</div>	Adjust the setpoint to the value at which you want the process variable maintained.
6	Select automatic mode	<div style="border: 1px solid black; padding: 2px; display: inline-block;">MAN AUTO</div>	Until "A" indicator is ON. The recorder is in Automatic mode. The recorder will automatically adjust the output to maintain the process variable at setpoint as tracked by the pen trace.
7	Start up Controller #2	<div style="border: 1px solid black; padding: 2px; display: inline-block;">FUNC</div>	Until INP 2 indicator on left side of display is lit. For recorders with two control outputs enabled, repeat steps 2-6 for the second control output, but be sure INP "2" indicator is lit instead of INP "1".
8	Exit Startup		Close the door and monitor the operation.