

# **4      *MOD 30ML Diagnostics Lab***

## **4.1 Foreword**

The MOD 30ML provides a comprehensive way of displaying active diagnostic information as well as a history of events. Events are a combination of alarms and information only activities that the instrument had gone through.

## **4.2 Objectives**

We learned how to read the active diagnostics and acknowledge them in Chapter 1. In this lab we will read the diagnostics history by using the Event Viewer available from the front-face. We will also force the instrument to shutdown and read the shutdown information.

After completing this lab, you should know how to read the Event Queue of the controller and also the Shutdown information.

## **4.3 Equipment Required**

You need the following equipment for this lab:

1. 1 x MOD30ML
2. 1 x Memory module (2010PZ10000A) marked SHUTDOWN (and loaded with the SHUTDOWN.CDB file)
3. 1 x Small flat screwdriver

## 4.4 Instructions

### 4.4.1 Event Viewer

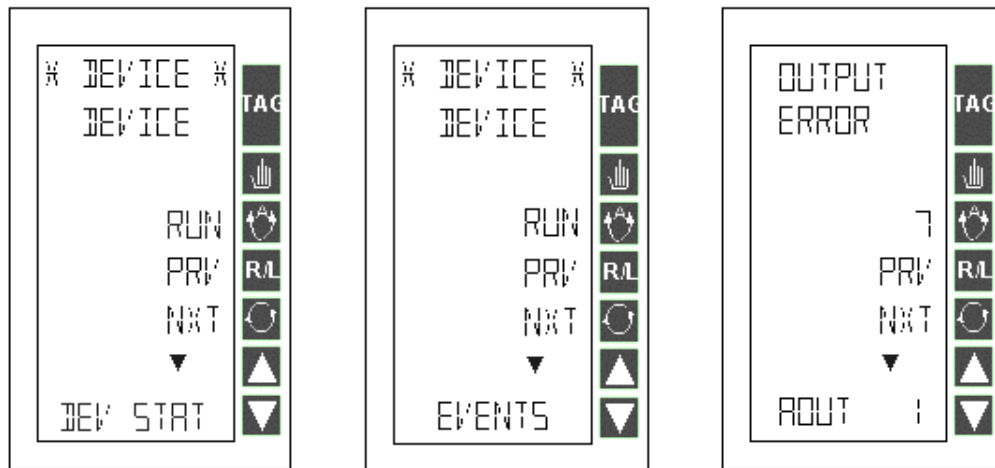
The System Event block stores diagnostics reported by the data base blocks. Viewing the system event queue provides data on all diagnostics that have occurred since the current data base was down loaded or the queue was cleared. The queue contains both informational and diagnostic data. The data for each event in the queue is displayed on two pages. View the data in the event queue using the following procedure:



Note: The procedure given here is an example. You may get a completely different set of events in the event viewer depending on what is in your event queue.

Step	Procedure	Comments
1	Press and hold the TAG key for a few seconds	The Device Status display as shown in the next figure (1) will be displayed.
2	Press <b>NXT</b> repeatedly until the Device Events display appears.	See the figure in the middle.
3	Press down arrow to enter the event queue.	Page 1 for the first event in the queue appears (third figure). You may see a different event depending on what is in your event queue. Notice that the first two lines show the event in short form and the line 6 shows the block type and its occurrence number in the instrument database.

Figure 4 .1.

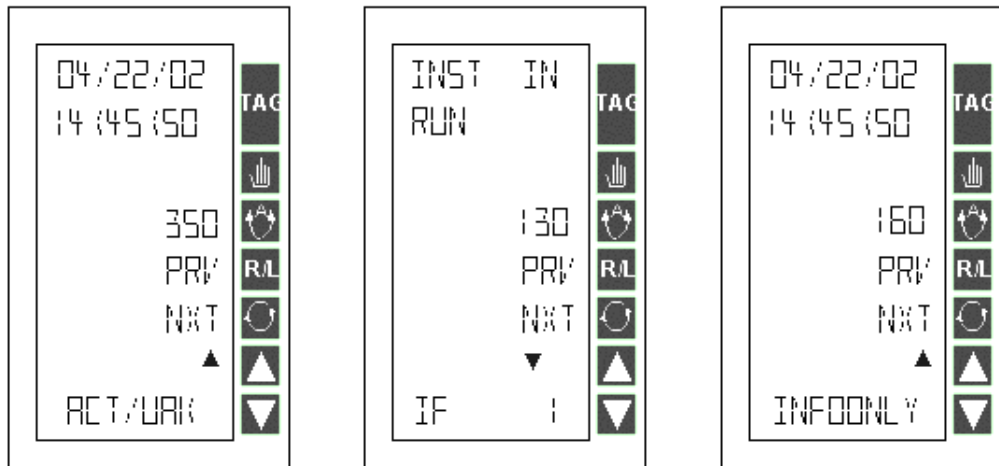


4	Press the down arrow again to view page 2 for the first event	See the first picture in the next figure. Notice that the date and the time in ms (14:45:50.350 in this example) is displayed. If the event is a diagnostic alarm, page 2 will also display the acknowledged state of the alarm (ACT / UAK / CLR).
5	Press the up arrow to return to	Page 1 of this event will be displayed.

page1

- |   |  |   |
|---|--|---|
| 6 | Press <b>NXT</b> to display the next event in the queue.   | Page 1 of the next event will be displayed next.  |
| 7 | Use the block type and event code, to locate the event description and recommended action listed in Section 7 of the Maintenance manual. | Pressing the <b>DOWN</b> arrow will display the time at which the event occurred and line 6 will display the nature of this event – in this example, the “ <b>INST IN RUN</b> ” is the event and it means that the instrument was put in RUN mode. This is an information only type event and line 6 displays “ <b>INFOONLY</b> ” |

Figure 4 .2.



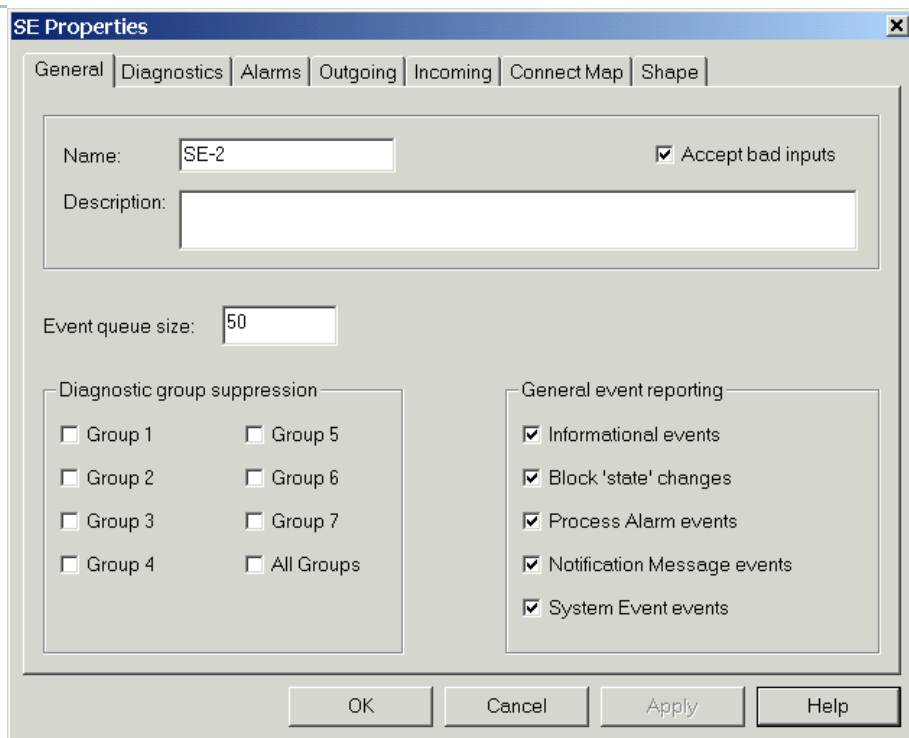
- |    |  |   |
|----|--|---|
| 8  | Press <b>NXT</b> to display the next event in the queue.   | Page 1 of the next event will be displayed next.  |
| 9  | Use the block type and event code, to locate the event description and recommended action listed in Section 7 of the Maintenance manual. | Pressing the <b>DOWN</b> arrow will display the time at which the event occurred and line 6 will display the nature of this event – in this example, the “ <b>INST IN RUN</b> ” is the event and it means that the instrument was put in RUN mode. This is an information only type event and line 6 displays “ <b>INFOONLY</b> ” |
| 10 | Continue using the <b>NXT</b> , <b>Down</b> , <b>Up</b> sequence to view all the event data in the queue.                                |   |
| 11 | Press the <b>TAG</b> key to return to the <b>DEVICE/EVENTS</b> display.  |   |

### 4.3.2 Clearing events from the event history:

The controller can store up to a maximum of 1000 events in its queue. The default queue size is 50 events and is configured in the SE (System Event) block of the database. You can configure what goes in to the queue. By default, the following are entered in the event list: (see the next figure)

1. Informational events
2. Block state changes
3. Process alarms
4. Diagnostic alarms
5. Notification message events
6. System Event events

Figure 4 .3.



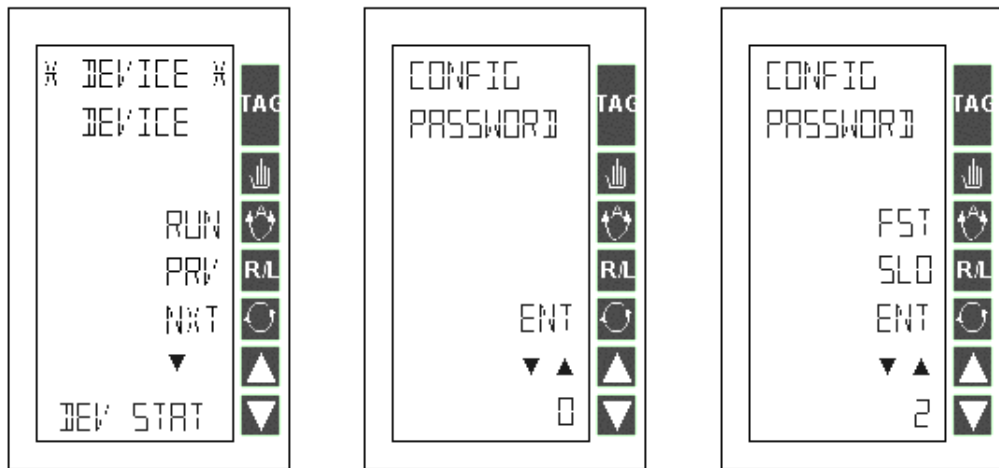
You can configure process alarms and diagnostic alarms associated with each block to be entered in to the event list on an individual basis.

We will clear the instrument’s event queue in this section:

<b>Step</b>	<b>Procedure</b>	<b>Comments</b>
1	Press and hold TAG key until *DEV ICE* is displayed on line 1. See the next set of figures.	The Device Status display will be displayed. DEV STAT will be displayed on line 6. DEV STAT provides access to State Commands, Shutdown information and acknowledgment, Status Commands, Execution Times and Current Time, Date and Day.

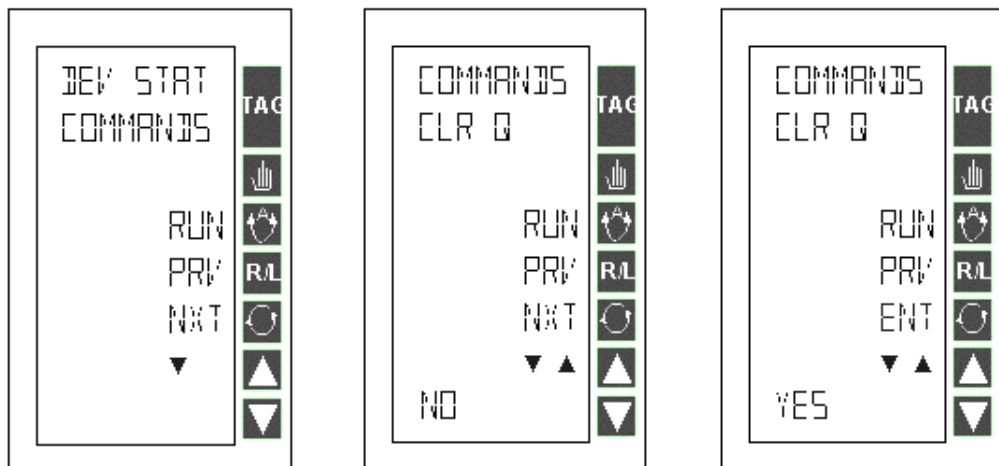
- |   |   |
|---|---|
| <p>2 Press DOWN key once. If PASSWORD is not displayed on line 2, go to step 5. Otherwise continue with Step 3.</p> <p>3 Use UP key three times to select the PASSWORD and then use ENT to enter. See the next set of figures</p> <p>4 Press ENT again to enter Configuration mode.</p> | <p>Lines 1 and 2 will display CURRENT LEVEL and Line 6 will display CONFIG indicating that the controller is in configuration mode.</p> <p>Lines 1 and 2 will display DEV STATE and INSTATE (Instrument state). Line 6 will display RUN indicating that the controller is running a valid database.</p> |
|---|---|

Figure 4 .4.



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|---|---|
| <p>5 Press the NXT key until COMMANDS is displayed on line 2.</p> | <p>You will be in DEV STATE menu now. See the sequence of figures below:<br/>You can issue commands to the controller from this menu.</p> |
|---|---|

Figure 4 .5.



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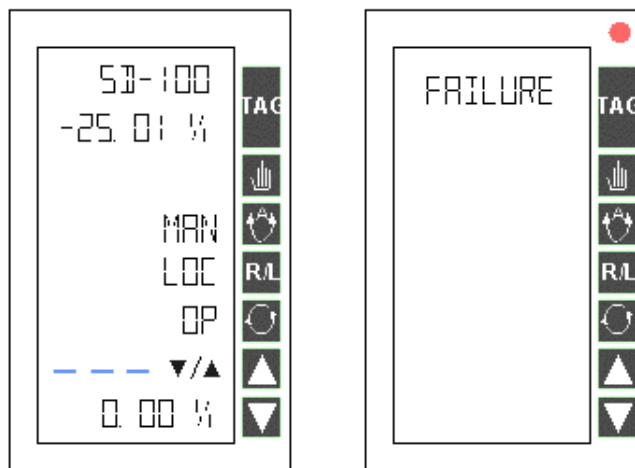
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|----|--------------------------|--|
| 6  | Press the DOWN key once. | CLR $\square$ is displayed on line 2.                              |
| 7  | Press the UP arrow.      | YES will be displayed.   |
| 8  | Press ENT (SCROLL key).  | The Events queue will be cleared and line 6 will display NO again. |
| 9  | Press the TAG key.       | The DEVICE page will be displayed.                                 |
| 10 | Pres the TAG key again.  | Your runtime display will be displayed.                            |

## 4.5 Instrument Shutdown

### 4.5.1 Force a shutdown

Step	Procedure	Comments
1	Make sure the <b>SERV/RUN</b> switch under the front face is set to the <b>RUN</b> position	This ensures that after a download the database will be able to run. This switch is located behind the front panel in the NEMA 4 option. You will need to remove the instrument from its housing to set it.
2	Make sure the switches on the memory module are set to <b>READ ONLY</b> and <b>NORMAL</b>	This ensures that the database stored in the memory module is downloaded to the instrument during a power-up sequence.  Normal = Transfers the database contained in the memory module to the instrument.  Module Load = Transfers the database contained in the instrument to the memory module
3	Loosen the retaining screw and slide the instrument from the housing	<b>CAUTION !</b> Ensure that the main circuit board is supported at all times.
4	Install the memory module	With the catalogue number of the memory module facing upwards, install the memory module onto the connector of the main circuit board
5	Place the instrument back into the housing and tighten the retaining screw	You should see <b>*****</b> appear for a short while, then a flashing loop display with the tag SD -100 and the alarm light.

Figure 4 .6.



6	Acknowledge alarms if any and press the TAG key to go to the SD-100 display.	This database is configured with most of the diagnostic alarms suppressed (turned off).  The SD-100 display is a typical PID display with the tag name, process value and output shown on lines 1, 2 and 6 respectively.
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| 7  | Press the SCROLL key <b>ONCE</b> .                          | The PID setpoint will be shown on line 6 and the text "SP" on line 5.   |
| 8. | Press the SCROLL key twice more and wait for a few seconds. | The runtime PID display will disappear and FAILURE will be displayed on line 1 with an audible continuous alarm.<br>At this point, you cannot operate the PID loop or use the controller.<br>This is an indication that the controller is in SHUTDOWN mode. |

## 4.5.2 Read the shutdown information and acknowledge it:

Step	Procedure	Comments
1	The first step in reading the shutdown info is to cycle power the controller. Power down the controller and then power it.	After power up the DEVICE display will come up. The instrument will be in default mode and Line 3 will display DEF as shown in the first figure below.  There will be diagnostic alarms and the RED LED will be flashing.
2	View the diagnostic alarms by pressing the ALARM button.  Acknowledge the alarms by pressing the button next to LAR on the display.  Go to the next alarm by pressing the ALARM button again.	The diagnostic alarms that come up after an instrument shut down are:  1. Instrument Power up 2. Instrument SHUTDOWN 3. Spurious Interrupt  Refer to the following figures

Figure 4 .7.

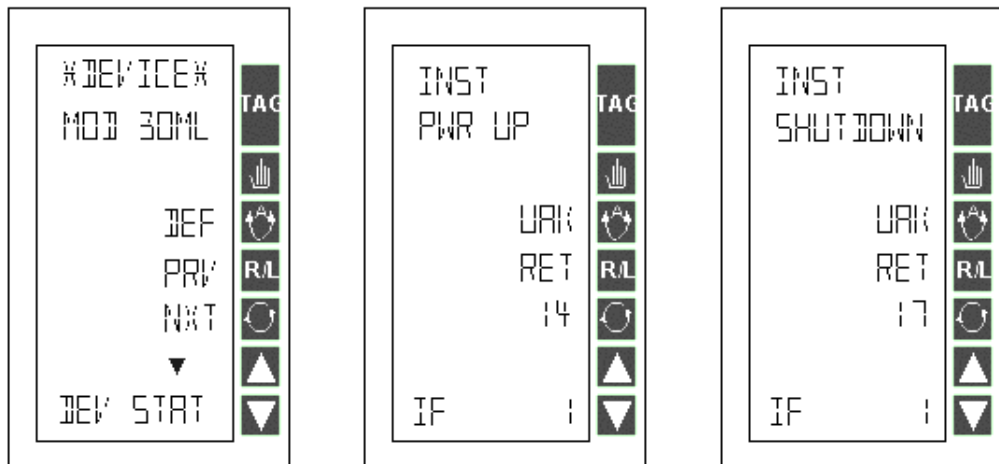
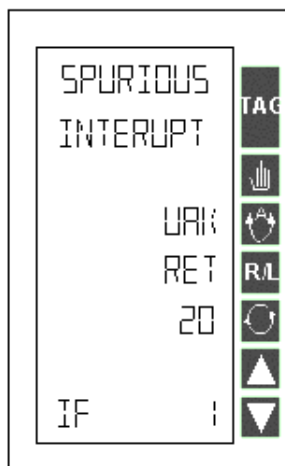


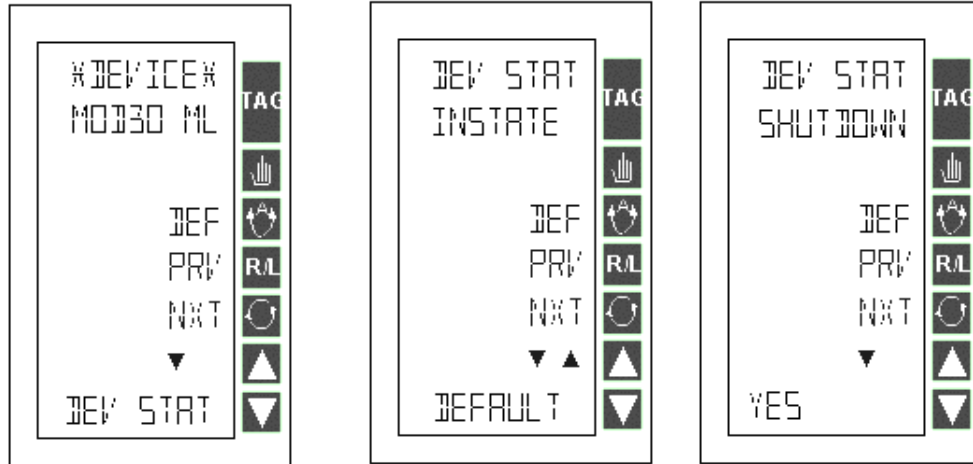
Figure 4 .8.



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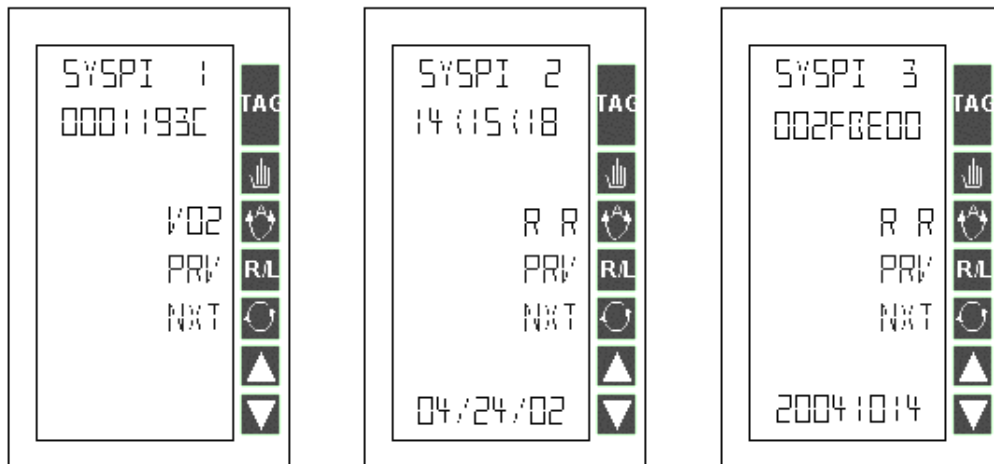
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|---|--|---|
| 3 | Press the TAG button after viewing and acknowledging the alarms. | The instrument will display the DEVICE display. Line 6 will show DEV STAT. See the middle picture in the next figure.                                   |
| 4 | Press the DOWN arrow to enter the DEV STAT menu.                 | The first page in this menu shows the Instrument's state as shown in the last picture in the next figure. The device state is DEFAULT after a SHUTDOWN. |

**Figure 4 .9.**



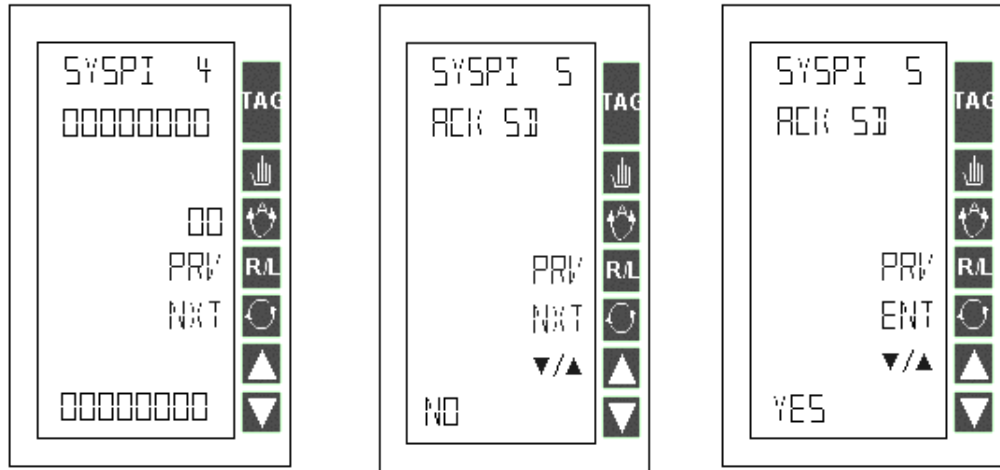
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|---|--|---|
| 5 | Press the NXT to view the SHUTDOWN page.               | Line 2 will display SHUT DOWN and line 6 will display YES. This indicates that a Shutdown condition exists. See the above figure. |
| 6 | Press the DOWN arrow to view details of the shut down. | The Shutdown information is provided in the next 4 pages (displays).  |
- Record this shutdown information on the form at the end of this chapter.
- Page 1 of the SHUTDOWN info as shown in the next figure.

**Figure 4 .10.**



- 7 Press the **NXT** key to view Pages 1, 2, 3 and 4 and record the information Shutdown page 2 displays the time and date of the shutdown.
- 8 Press **NXT** to go to Page 5 Page 5 displays **ACK 53** and **NO** on lines 2 and 6 respectively. See the next figure:

Figure 4 .11.



- 8 Press the **UP/DOWN** arrow to show **YES** on line 6 and then press the key next to **ENT** on the display This will acknowledge the Shutdown and line 6 will display **NO** again. Line 3 will now change to display **RUN**. This means that the instrument state is back to **RUN**.



The database we used for forcing the instrument to shutdown has a configuration error in the display script for the PID. If you press the **SCROLL** key to switch between setpoint and output for line 6 will force the instrument to shutdown again.

This type of error can be prevented by ensuring that display script case statements handle all possible cases. For example, if your script counts the number of times that the scroll button is pressed, it must reset the count before it exceeds the number of cases defined in the statement. If only two cases are defined and the count reaches three, it will cause a shutdown fault when it attempts to evaluate the statement.

In certain cases where shutdown occurred due to serious hardware problems, you will still be able to acknowledge the shutdown, but you may not be able to put the instrument to **RUN** mode. Please visit <http://www.micromodautomation.com> for instructions to send the instrument for repair.

**Notes:**