

# Luminometer TD-20e

## Section 1: Getting Started

Never open the sample compartment in the middle of a run, or while the instrument is off. Exposure of the detector to ambient light may prevent normal operation for 48 hours.

### RESET button

- 1) If pressed in the middle of a run, RESET terminates the current measurement cycle. Data collected in subsequent runs will appear in separate columns in the final spreadsheet.
- 2) If pressed between runs it serves as a 2nd function button to modify the effect of other buttons.

### Routine operation

1. Turn the POWER ON using the main switch at the bottom right of the luminometer front panel

This starts a 120 second warm up count down.

2. Start recording data with the computer attached to the luminometer

Click on the TD-20e Luminometer.stc icon in the Dock on the left side of the screen. The CoolTerm software starts. In the Connection menu, select the "Capture to Textfile" option and provide a file name.

3. Change the repeat count to 99 (continuous operation)

This setting is useful for kinetic assays because it provides measurements at regular intervals. It is not required if only one measurement is desired. By default the instrument will produce a new reading every 16 seconds. This interval can be adjusted by changing settings for Delay, Integrate and Repeat Period as described in Section 2.

Presss RESET/2nd Fn. "2nd Fn" is displayed. Press REPEAT. "rEPt" is displayed. While holding down the REPEAT COUNT READ (left) button, press the adjacent SET (right) button repeatedly until the display shows "r ct", followed by 99. Presss RESET/ 2nd Fn twice to return to normal operation.

4. Insert a sample

Lift the cap of the sample compartment and turn it sideways. Insert a test tube (use a blank for the first run) and tightly close the sample compartment cap.

### 5. Press START

The luminometer starts acquiring and sending data to the computer. Also start a timer and collect data for as long as desired (a plateau is usually reached after a few minutes). Each luminescence reading appears on the computer screen in the middle of a list of numbers, as shown in the example below. Note that out of range values read 10010.

### 6. Press RESET

This stops data acquisition. It is now safe to open the sample chamber and to remove the test tube.

### 7. Repeat data acquisition

Insert the next sample and collect data as above, by pressing START, followed by RESET after the desired time.

### 8. Last steps

At the end of a session, remove any test tube that may still be in the sample chamber. Quit the CoolTerm software on the computer (there is no need to save data). Copy the raw data file to a USB flash drive. Turn the power off on the luminometer and put the computer to sleep. Raw luminometer data files can be converted to Excel format with the LumiSort software available on other computers in the lab (the computer attached to the luminometer is too old to run LumiSort 3.0).

### Example of data record

10005	start of record
0513	constant
1	constant
3	constant
000.0	pre-delay setting in seconds
005.0	delay setting in seconds
010.0	integrate setting in seconds
50	data point number, incremented sequentially
<b>768.0</b>	<b>luminescence data of interest</b> (full integral)
386.5	luminescence data ("half" integral)
784.6	luminescence data (peak value)
00	days (?) since instrument was turned on
00	hours
27	minutes
31	seconds
<EOD>	end of record

## Section 2: User Manual (Summary)

### Modes of operation

#### Normal operation

Press START to initiate a measurement cycle. After a while, the display shows F followed by a 4 digit luminescence reading. Data is transmitted to the computer.

#### Blank operation

Hold BLANK and press START to initiate a measurement cycle (in the case of repeating runs, hold BLANK in the middle of a run until the next one starts). Data will be acquired as usual and only marked by the start of a new column in the final spreadsheet. Note that the blank value will not be subtracted from further measurements.

#### Continuous operation

In this mode, data is not sent to the computer. To perform successive measurements and send data to the computer, use the Repeat function below.

Press the RESET/2nd Fn button. Press the NORM/CONT button repeatedly and notice "n" and "c" on the display. Press RESET to return to normal operation. Note that in continuous mode the number on the display will fluctuate. Press RESET to stop.

#### Shutter Closed operation

This is used to test for spillage in the sample compartment. In the absence of sample there should be no difference between Normal and Shutter Closed readings, if the sample compartment is clean.

Press the RESET/2nd Fn button. Press the NORM/SHUT button repeatedly to cycle between Normal and Shutter Closed modes, as shown by "n" and "S" on the display. Press RESET to return to normal operation. In this mode the display alternates between the usual and "Shut" as a reminder.

### Display Output

Blinking indicates out of range values that cannot be trusted.

#### Routine display

The value shown at the end of a run is normally the only one of interest = Full Integral value.

Full Integral value = average of light during the Integrate period. It is calculated by dividing the sum of individual readings (internally acquired 10 times per second) by the integrate period. It is displayed as F and 4 digits, or as alternating F and b for a blank run. The most recent blank value can be seen by pressing BLANK. It is shown as b followed by 4 digits.

Half Integral value = measured during the first half of the integrate period. Only used as a quick check of light output kinetics. Can be displayed by pressing the HALF button after a run. It is displayed by H or alternating H and b, followed by 4 digits.

Peak = highest value of light produced during delay and integrate periods. Can be displayed by pressing the PEAK button after a run. It is displayed by P or alternating P and b, followed by 4 digits. (four zeros will be shown if the Peak value is invalid due to autoranging).

## **Operating Parameters**

Pre-delay initiated when run starts. Used to block light measurement during sample injection. Default = zero second. It can be displayed by pressing RESET/2nd Fn and holding PRE-DELAY READ. It is shown as P d, followed by a number. It ranges from 0 to 5 seconds. This setting can be changed by pressing PRE-DELAY SET, while holding down PRE DELAY READ. Press RESET to return to normal operation.

Delay starts at the end of Pre-delay period. Default = 5 seconds. Light is measured and autoranging performed but delays the onset of integration. It can be displayed by holding DELAY READ. It ranges from 0 to 30 seconds (3 to 30 seconds in autoranging mode, even if set to a lower value). This parameter can be changed by pressing DELAY SET, while holding down the DELAY READ button.

Integrate starts after the Delay period. Default = 10 seconds. This is when most routine measurements are made. It can be displayed by holding INTEGRATE READ. It ranges from 0 to 600 seconds. Usually this setting is not critical. It should simply be long enough to get good replicates. 10 or 15 seconds is typical. To change this setting, press INTEGRATE SET, while holding down the INTEGRATE READ button. To decrease the value, press the RESET/2nd Fn button. Press RESET to return to normal operation.

Range and Autoranging. The range does not alter the sensitivity, but only the displayed value. Set the range to display as many significant digits as possible in the measured value. Most of the time use Autoranging. Use a fixed range if the light intensity varies rapidly with time. This setting is displayed by lights in the range switches: 3 lights indicate Autoranging and 1 light indicates fixed ranging. This setting can be changed by pressing RESET/2nd Fn, followed by any one of the DISPLAY buttons. Press RESET to return to normal operation. To select a range, press the corresponding DISPLAY button.

Smoothing factor. Measurements are acquired 10 times per second. Smoothing can average from 1 to 20 measurements. Smoothing has no effect on Integral, but only on Peak values. It can be displayed by pressing RESET/2nd Fn and pressing the SMOOTH'G button. It is shown on the display as SF followed by a number. Press RESET to return to normal operation. This parameter can be modified by pressing the SMOOTH'G button repeatedly.

Repeat and Interval. Automatically performs successive runs at predetermined intervals. These settings can be displayed by pressing RESET/2nd Fn and pressing the REPEAT button. rEPt will be displayed. Hold the REPEAT COUNT READ (left) button to display "r ct" followed by a number ranging from 1 to 99. A value of 99 means continuous operation until the RESET button is pressed. Hold the REPEAT PERIOD READ (left) button to display "p rd" followed by a number ranging from 0 to 60. This is the time between the start of two successive runs in minutes. If this setting is below the time required to complete a run, the next run will start immediately after the previous one (this is similar to continuous operation, but data are sent to the computer). These settings can be changed by pressing the adjacent SET (right) button, while holding down the corresponding left button. Press RESET/2nd Fn button twice to return to normal operation.