DARKROOM AUTOMATION

1412 Dorsh Road
Cleveland, OH 44121-3840

216.691.3954
nolindan@ix.netcom.com
http://www.darkroomautomation.com

Application Note

Determining Lamp Delay Time

The Darkroom Automation Memory f-Stop timer has a programmable lamp-delay that can be set from 0.00 seconds to 0.99 seconds in 0.01 second steps. Setting it correctly increases the accuracy of the exposure given to the paper.

To determine the correct lamp delay make a test print, as shown below: one 20 second exposure on one side; and a set of twenty 1 second exposures on the other - with test strips continuing on at one second intervals. Make the print with a #5 contrast filter and set the enlarger aperture so a 20 second exposure produces a medium gray.
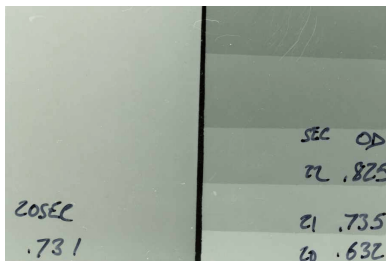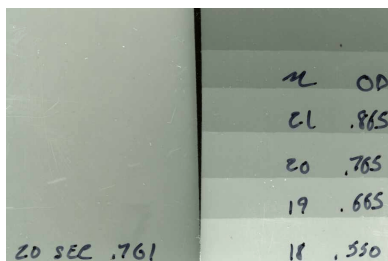

Match the density of the 20 second exposure to one of the test strips. In the example the matching strip is the one with 21 x 1 second exposures.

The lamp delay time can be calculated as:

$$\text{Delay time} = \frac{n - 20}{n - 1} \quad \text{where n is the number of the matching strip}$$

The delay time for the print above is 0.05 seconds.

Programming the lamp delay time to 0.05 seconds results in the test strip on the left. 20 one second exposures now equal 1 20 second exposure.

The example test was made with a Beseler 45 series enlarger with a PH212 150-W lamp in a condenser lamp house.

The lamp delay time is entered into the timer's set-up:

Ld.y   Enable lamp delay

t.05   0.05 seconds

A plot of the measured light output as the lamp turns on and off is shown below. The light produced when the lamp is turned off compensates for some of the delay in the lamp turn on - - the 50 milliseconds of lamp delay time makes up for the difference.

PH212 turn on/off times
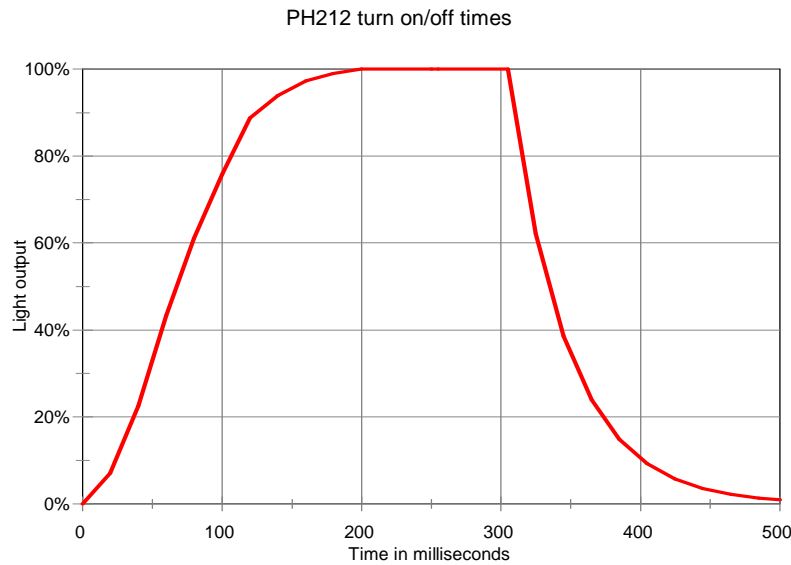
Lamp delay compensation with cold light heads can be problematic. The delay is affected by the lamp temperature and the time between exposures. A consistent pacing when making test prints is required for very accurate results.

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The example above used 20x1 second exposures, which requires putting the timer in seconds mode. The procedure can be carried out in stops mode by making 1x 4 stop (16 second) exposure and comparing it to 16 x 0.0 stop (1 second) exposures. The delay can be calculated by (n - 16) / (n - 1).

If the matching strip was number 18 then the delay setting would be
(18 - 16)/(18 - 1) = 0.1176, and the timer would be set to t.12