



## Model 410 Specifications Sheet

"G & R Labs is an ISO 9001-2015 certified company dedicated to measuring light and producing NIST traceable and repeatable light measurement instruments.

### Light Meter Model 410 Specifications – Area Exposure Machines

- |                   |  |
|-------------------|--|
| Switch Functions: | <ul style="list-style-type: none"> <li>• Red button – ON (hold for one second)</li> <li>• Gain Switch – 1X or 10X</li> <li>• Three Black buttons – Functions (display assigned) 'RST' (reset), 'STO' (store), 'More', Disregard, 'Mode', 'Off', etc.</li> </ul>  |
| Display:          | <ul style="list-style-type: none"> <li>• 4 Lines by 20 characters with back light</li> </ul>   |
| Range:            | <ul style="list-style-type: none"> <li>• MW/CM<sup>2</sup> <ul style="list-style-type: none"> <li>○ x1 Scale – .01 to 249.9</li> <li>○ x10 Scale – .1 to 2,499.9</li> </ul> </li> <li>• MJ/CM<sup>2</sup> <ul style="list-style-type: none"> <li>○ x1 Scale – .01 to 9,999,999</li> <li>○ x10 Scale – .1 to 9,999,999</li> </ul> </li> <li>• Milliseconds .1 to 9,999.999</li> </ul> |
| Mode Selection:   | <ul style="list-style-type: none"> <li>• MW/CM<sup>2</sup> and peak Mw/CM<sup>2</sup> continuous display</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Multiple reading of Mw/CM<sup>2</sup> for uniformity measurement</li> </ul>   |
| Mode 2:           | <ul style="list-style-type: none"> <li>• Push button STO (store) of reading-nine readings in set pattern</li> <li>• Display of average MJ/CM<sup>2</sup> and +/-% uniformity</li> </ul>  |

- Display of + or -% deviation from center reading
- 

**Mode 3:**

- Single reading and accumulated MJ/CM<sup>2</sup>, and time with peak Mw/CM<sup>2</sup>
  - Shutter control or scanning beam (Perkin Elmer)
- 

**Mode 4:**

- Multiple readings of MJ/CM<sup>2</sup>, time, and peak Mw/CM<sup>2</sup>
  - shutter control of readings – nine reading in a set pattern
  - Display of average MJ/CM<sup>2</sup> and +/-% deviation from center reading.
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Multiple readings of Mw/CM<sup>2</sup> and peak Mw/CM<sup>2</sup> using shutter control of the measurement (one second) to measure source uniformity – line pattern – (circular pattern available)

**Mode 6:**

- Display of average intensity Mw/CM<sup>2</sup> and the +/- % uniformity
  - Display of + or – % deviation from center readings
  - Display of all nine readings
  - Display of max and min readings
- 

**Power:**

- Built in rechargeable battery – 18 hours operation (approx.)
- Recharge time 6 hours (unit off) – indicated by LED (goes dim and then off when fully charged)
- Low battery indication on display next to ‘RST’
- Charger – 90-240 VAC, 47-63 Hz
- Charger is UL, CE, TUV approved

**Probe Wavelengths:**

<220nm to 540nm and more>

**Size:**

5 3/4 L (146mm) x 8 1/4 (210mm) x 2 H (51mm)

Weight

Mode 2 and Mode 4 have an additional capability to measure five (5) points as well as nine (9) points. The pattern used for five points is #1 center, #2 straight up (12 o'clock), and #3 left of center (9 o'clock), and #4 straight down (6 o'clock) and #5 right of center (3 o'clock). When the fifth reading is taken then the word ‘CALC’ shows up on the display. Press the ‘CALC’ button

and the 'More' button and the % deviation of each reading from reading #1 will be displayed. In reading nine points, ignore the 'CALC' selection.

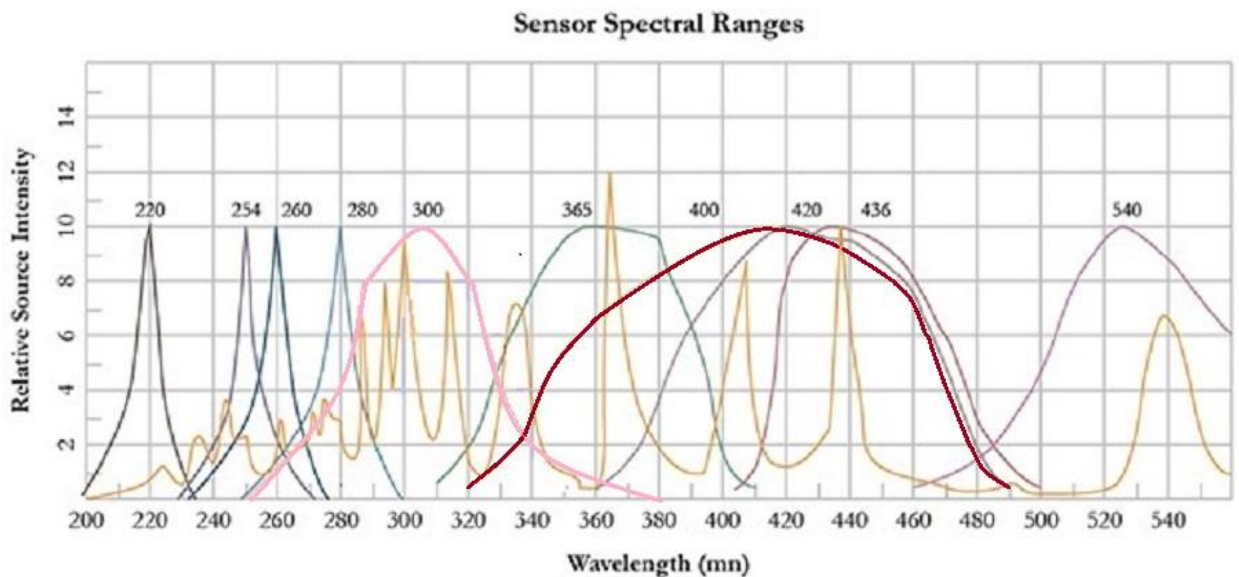
**Note #1:** When the battery symbol comes on next to the 'RST' (reset) on the display, then plug in the charger to continue operating the Model 410. The time left on the battery is 30 minutes maximum.

**Note #2:** The circular counter clockwise pattern is #1 center with #2 position straight up at 12 o'clock with number rotation counter clockwise at 45 degree increments 3 through 9. The linear pattern is #1 center position, #2 upper left, #3 upper center, #4 upper right, #5 left center, center, #6 right center, #7 lower left, #8 lower center and #9 lower right.

**Note #3:** Uniformity is calculated using the following formula:

$$\frac{\text{Max reading} - \text{Min reading}}{\text{Max reading} + \text{Min reading}} \times 100 = \pm\%$$

$$\frac{\text{Max reading} - \text{Min reading}}{\text{Max reading} + \text{Min reading}}$$



This graph accurately represents the spectral response of probes used today in the Microelectronic Industry. This graph includes the spectral response of the detector as well as the spectral response of the filter glass used in probes.

### Model 410 Specifications – Nikon Modes

#### Switch Functions:

- Red button – ON (hold for one second)
- Gain Switch

- Three Black buttons – Functions (display assigned) ‘RST’ (reset), ‘STO’ (store), ‘More’, Disregard, ‘Mode’, ‘Off’, etc.
- Display:**
- 4 Lines by 20 characters with back light
- Range:**
- Mw/CM<sup>2</sup>
    - x1 Scale – .01 to 249.9
    - 10 Scale – .1 to 2,499.9
  - MJ/CM<sup>2</sup>
    - x1 Scale – .01 to 9,999,999
    - x10 Scale – .1 to 9,999,999
  - Milliseconds .1 to 9,999,999
- Mode 1:**
- Mw/CM<sup>2</sup> and peak Mw/CM<sup>2</sup> continuous display
- Mode 3:**
- Single reading and accumulated MJ/CM<sup>2</sup>, and time with peak Mw/CM<sup>2</sup>
  - Shutter control or scanning beam (Perkin Elmer)
- Mode 5:(Nikon)**
- Multiple reading of MJ/CM<sup>2</sup> and time to determine consistency of a system exposure using shutter control
  - Display of average MJ/CM<sup>2</sup> range and standard deviation (3 Sigma’s)
  - Display of 10 readings of MJ/CM<sup>2</sup>
- Mode Selection:**
- Mode 7:(Nikon)**
- Reading of MJ/CM<sup>2</sup> in four sets. Any number of shutter openings from 2 to 10 per set with set target values of 400 MJ/CM<sup>2</sup> (set 1), 200 MJ/CM<sup>2</sup> (set 2), 100 MJ/CM<sup>2</sup> (set 3), and 50 MJ/CM<sup>2</sup> (set 4), record all shutter opening values and display for each set the average value, standard deviation 3 sigma, range (max-min), values of MJ/CM<sup>2</sup> and the % deviation from the target value of each reading
- Mode 8:(Nikon)**
- Reads MW/CM<sup>2</sup> and peak MW/CM<sup>2</sup> for nine shutter openings of one second (minimum). Displays the average value, the individual % deviation of each reading from average value, all nine readings, and the maximum and minimum readings

**Power:**

- Built in rechargeable battery – 18 hours operation (approx.)
- Recharge time 6 hours (unit off) – indicated by LED (goes dim and then off when fully charged)
- Low battery indication on display next to 'RST'
- Charger – 90-240 VAC, 47-63 Hz
- Charger is UL, CE, TUV approved

**Probe Wavelengths:**

<220nm to 540nm and more>

**Size:**

- 5 3/4 L (146mm) x 8 1/4 (210mm) x 2 H (51mm)  
Weight
- Aluminum casing

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