

Model 400 Data Sheet



Model 400 features

- Less than 1% Probe to Probe Repeatability.
- Real Time Measurements.
- Interchangeable Probes
- Improved NIST Calibrations Specifications
- Calibration Accuracy to 3 Sigma
- Probes for all Stepper Types Work with Single Electronics
- Cosine Response Probes
- Measures MW/CM², MJ/CM², accumulated MJ/CM², time (MS), and accumulated time.
- Calculates average value, % uniformity, % deviation from center value, and more.
- Backlit display makes reading easy in any light.
- Battery operates for approximately 18 hours before recharge.
- Calculates 3 Sigma deviation for multiple readings at shutter openings.
- Charger operates from 90-240 VAC, 47-63 Hz with UL, CE, and TUV approvals.

The Model 400 is a measurement instrument with diverse capabilities. A built in computer allows the Model 400 to store sensor readings and calculate average values, percent deviations and other data values. The large display format (4x20 characters) gives space for many readings to be viewed at one time. This capability saves you from writing down values and doing calculations to get source uniformity or exposure consistency.

To make measurements less complicated, the Model 400 is programmed for a variety of operation modes. This allows for a selection of a mode which best suits the data you want to take. The Model 400 will be programmed for the mode sets that best suit the measurements needed.

This means, if you are doing large area uniformity measurements, you will have average value, percent uniformity, and deviation from center value, but you will not have standard deviation of calculations of four sets of millijoule exposures.

The simple format allows you to select the mode that gives you the results you want and then lets the machine do the work. Data review is simple with single button prompts to move back and forward through data results.

A variety of sensor packages are available to use with the Model 400 to measure exposure tools as follows: Nikon, Ultratek, Perkin Elmer, Karl Suss, ABM, OAI, and more. Probe wavelengths are available from 173nm through 540nm into the infrared spectrum.

A rechargeable battery makes the unit very portable. The battery will operate for approximately 18 hours before recharge is needed. Recharge overnight (actual time is 6 hours). You can recharge and operate at the same time, but charging will take much longer. The charger will operate from 90-240 VAC, 47 to 63 Hz and has UL, CE, and TUV approvals.

Model 400 Specifications - Area Exposure Machines

Switch Functions:		<ul style="list-style-type: none"> • Red button - ON (hold for one second) • Three Black buttons - Functions (display assigned) 'RST' (reset), 'STO' (store), 'More', Disregard, 'Mode', 'Off', Etc.
Display:		<ul style="list-style-type: none"> • 4 Lines by 20 characters with back light
Range:		<ul style="list-style-type: none"> • MW/CM² .1 to 2300.0 (peak same) • MJ/CM² .1 to 9999.9 • Milliseconds .1 to 9999.9
Mode Selection:	Mode 1:	<ul style="list-style-type: none"> • MW/CM² and Peak Mw/CM² continuous display
	Mode 2:	<ul style="list-style-type: none"> • Multiple reading of MW/CM² for uniformity measurement • Push button STO (store) of reading-nine readings in set pattern • Display of average MJ/CM² and +/-% uniformity • Display of + or -% deviation from center reading
	Mode 3:	<ul style="list-style-type: none"> • Single reading and accumulated MJ/CM², and time with peak MW/CM² • Shutter control or scanning beam (Perkin Elmer)
	Mode 4:	<ul style="list-style-type: none"> • Multiple readings of MJ/CM², time, and peak MW/CM² • Shutter control of readings - nine reading in a set pattern • Display of average MJ/CM² and +/-% deviation from center reading
	Mode 6:	<ul style="list-style-type: none"> • Multiple readings of MW/CM² and peak MW/CM² using shutter control of the measurement (one second) to measure source uniformity - line pattern - (circular pattern available) • Display of average intensity MW/CM² and the +/-% uniformity • Display of + or - % deviation from center readings • Display of all nine readings • Display of max and min readings
Power:		<ul style="list-style-type: none"> • 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 - 90-240vac, 47-63Hz • Charger is UL, CE, TUV approved
Probe Wavelengths:		<ul style="list-style-type: none"> • 173nm, 193nm, 220nm, 248nm, 254nm, 260nm, 280nm, 310nm, 365nm, 400nm, 420nm, 436nm, 540nm, and more
Size:		<ul style="list-style-type: none"> • 5 3/4 L (146mm) x 8 1/4 (210mm) x 2 H (51mm) Weight

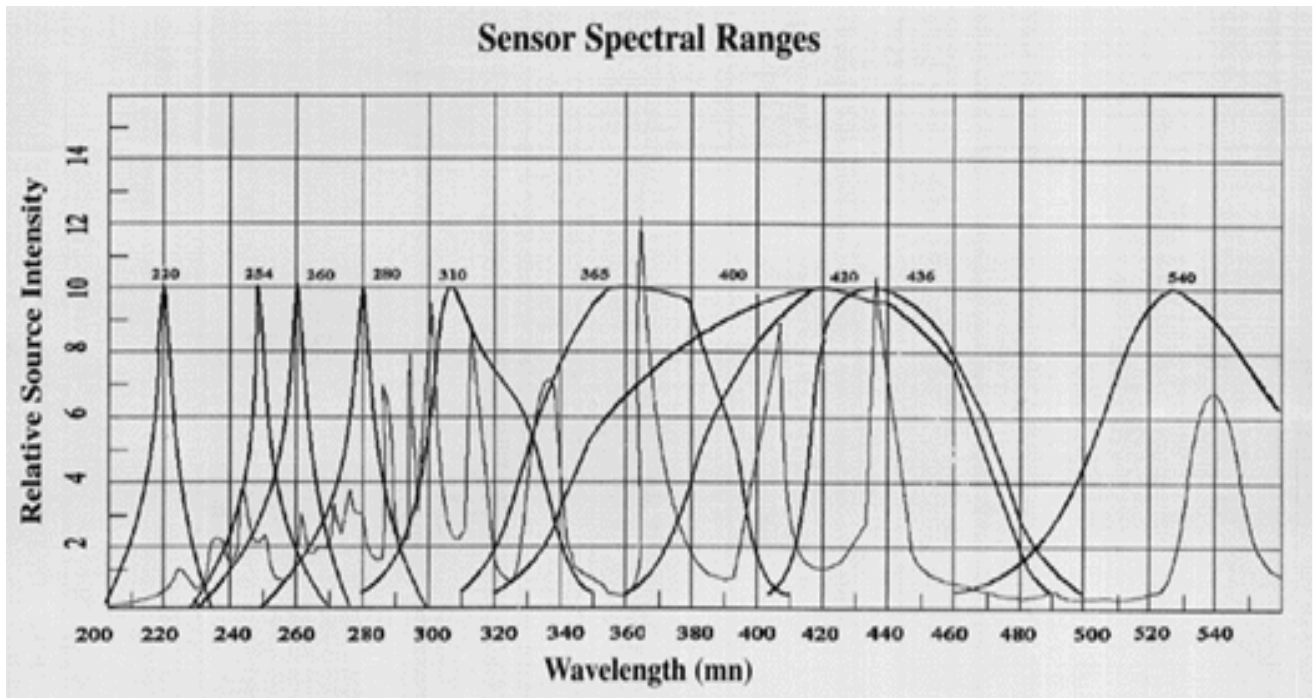
* Mode 2 and Mode 4 have an additional capability to measure five (5) points as well as nine (9) points. The pattern used for five points is #1 center, #2 straight up (12 o'clock), and #3 left of center (9 o'clock), and #4 straight down (6 o'clock) and #5 right of center (3 o'clock). When the fifth reading 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 400. 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:

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

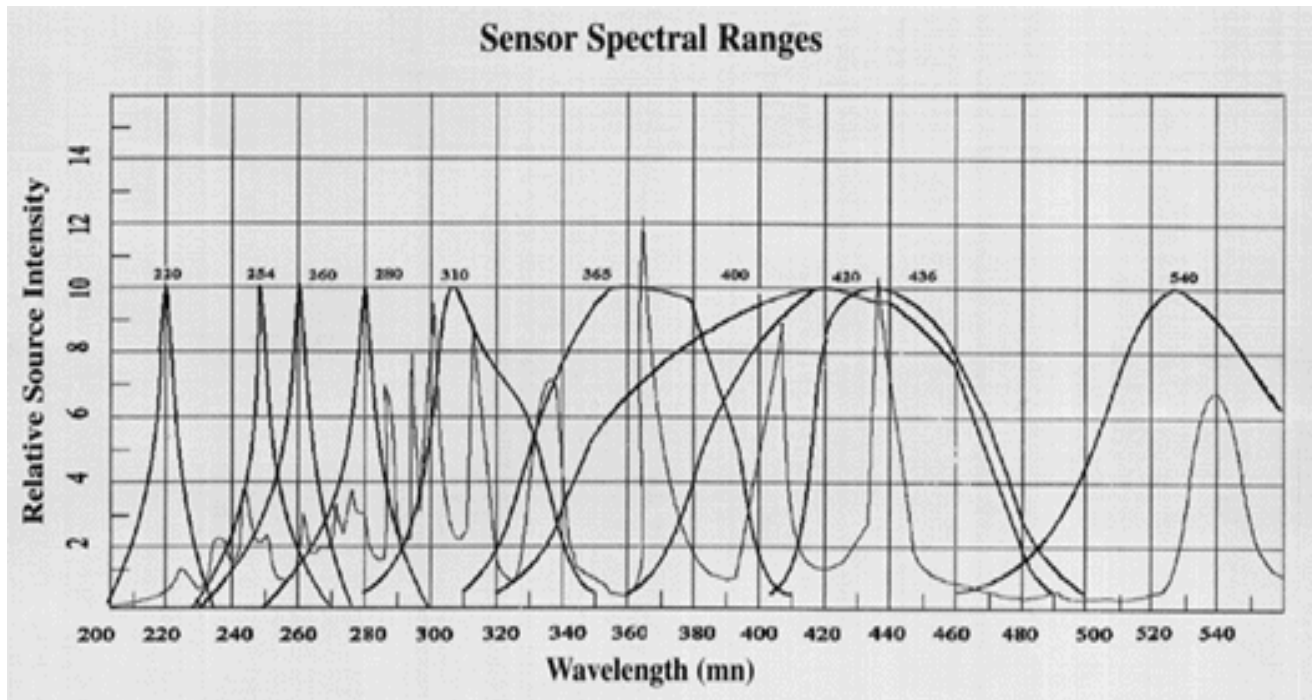


This graph accurately represents the spectral response of probes used today in the Microelectronic Industry. This graph includes the spectral response of the detector as well as the spectral response of the filter glass used in probes.

Model 400 Specifications - Nikon Modes

Nikon

Switch Functions:		<ul style="list-style-type: none"> • Red button - ON (hold for one second) • Three Black buttons - Functions (display assigned) 'RST' (reset), 'STO' (store), 'More', Disregard, 'Mode', 'Off', Etc.
Display:		<ul style="list-style-type: none"> • 4 Lines by 20 characters with back light
Range:		<ul style="list-style-type: none"> • MW/CM² .1 to 2300.0 (peak same) • MJ/CM² .1 to 9999.9 • Milliseconds .1 to 9999.9
Mode Selection:	Mode 1:	<ul style="list-style-type: none"> • MW/CM² and peak MW/CM² continuous display
	Mode 5: (Nikon)	<ul style="list-style-type: none"> • Multiple reading of MJ/CM² and time to determine consistency of a system exposure using shutter control • Display of average MJ/CM² range and standard deviation (3 Sigmas) • Display of ten readings of MJ/CM²
	Mode 7: (Nikon)	<ul style="list-style-type: none"> • Reading of MJ/CM² in four sets. Any number of shutter openings from 2 to 10 per set with set target values of 400 MJ/CM² (set 1), 200 MJ/CM² (set 2), 100 MJ/CM² (set 3), and 50 MJ/CM² (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/CM² and the % deviation from the target value of each reading
	Mode 8: (Nikon)	<ul style="list-style-type: none"> • Reads MW/CM² and peak MW/CM² 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:		<ul style="list-style-type: none"> • 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 - 90-240vac, 47-63Hz • Charger is UL, CE, TUV approved
Probe Wavelengths:		<ul style="list-style-type: none"> • 173nm, 193nm, 220nm, 248nm, 254nm, 260nm, 280nm, 310nm, 365nm, 400nm, 420nm, 436nm, 540nm, and more
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