

1.1.2.8 Short Exposure High Power Sensors

1.1.2.8.3 Pulsed Power Mode

300mW to 10,000W

Features

- No water cooling
- Measure up to 10kW
- Cost Effective
- Diffuser for concentrated beams

L40(250)A-LP2-50



L40(500)A-LP2-DIF-35



L30C-LP2-26-SH



If the full features of the Helios Plus or Ariel including protective cover, Profinet interface and pulse width measurement are not needed, similar performance can be obtained with the L40(250)A-LP2-50 and L40(500)A-LP2-DIF-35. The L40(250)A-LP2-50 has the same sensor as the Helios Plus. It can measure powers from short exposure from 500W up to 10,000W. The user measures the energy of the pulse and knowing the pulse width calculates the power (e.g. 5000J in a 0.5s pulse = 10,000W). If using the Centauri and StarBright meters or Juno/Juno+ PC interfaces this can be calculated directly by inputting the laser pulse width into the Pulsed Power screen of the Meter/Interface or the equivalent StarLab screen and exposing the sensor to the power for the requisite pulse width. The meter will then directly give the power reading from the pulse energy measured. For lower powers, the L30C-LP2-26-SH will give similar performance for energies up to 2000J. For further information see pages 56 & 118.

Model	L40(250)A-LP2-50	L40(500)A-LP2-DIF-35	L30C-LP2-26-SH																																																									
Absorber Type	LP2	LP2 + Diffuser	LP2																																																									
Spectral Range	0.25 – 2.2µm, 2.94µm	0.44 – 2.2µm ^(e)	0.25 – 2.2µm																																																									
Aperture	Ø50mm	Ø35mm	Ø26mm																																																									
Absorption	>94% from 0.25 to 1.1µm	~14% backscatter from diffuser	>94% from 0.25 to 1.1µm																																																									
Power Range for continuous use	300mW - 40W	300mW - 40W	300mW - 10W																																																									
Maximum Intermittent CW power	250W for 1.5min, 150W for 3min, 80W for 6min, 40W continuous	500W for 45s, 250W for 1.5min, 150W for 3min, 80W for 6min, 40W continuous	10W continuous, 100W for 2min, 100W heat sunked																																																									
Maximum CW power density	20kW/cm ² at 250W	>150kW/cm ² at 500W	42kW/cm ² at 100W																																																									
Aperture	Ø50mm	Ø35mm	Ø26mm																																																									
Max Beam Diameter for Gaussian beam	Ø35mm for up to 30deg incidence	Ø25mm for normal incidence Ø15mm for 20deg incidence ^(f) Ø10mm for 30deg incidence ^(f)	Ø17mm for up to 30deg incidence																																																									
Pulsed Power Mode																																																												
Exposure Time For Pulsed Power Mode (see table below)	0.3s - 2s ^(b)	0.3s - 4s ^(b)	0.5s - 4s ^(b)																																																									
Energy Range	100mJ – 10,000J	100mJ – 2000J	30mJ – 2000J																																																									
Energy Accuracy	±5% 700 – 1100nm ^{(a), (c)}	±5% 900 – 1100nm ^(c)	±5% 700 – 1100nm ^{(a), (c)}																																																									
Linearity with Energy	±1.5% ^(d)	±1.5% ^(d)	±1.5% ^(d)																																																									
Reproducibility	±1%	±1%	±1%																																																									
Response Time	2.5s	2.5s	1.5s																																																									
Waiting Time for Next Measurement	12s	12s	12s																																																									
Maximum Exposure Before Cooling Down is Necessary	20kJ (e.g. 4 shots of 5000Wx1s). Cooling down time before another 20kJ series, 10min.	8kJ (e.g. 4 shots of 2000Wx1s). Cooling down time before another 8kJ series, 10min.	10kJ (e.g. 5 shots of 2000Wx1s). Cooling down time before another 10kJ series, 10min.																																																									
Recommended Exposure Times and Beam Diameters	<table border="1"> <thead> <tr> <th>Laser Power W</th> <th>Recommended Exposure s</th> <th>Min 1/e² beam dia. mm</th> </tr> </thead> <tbody> <tr><td>500</td><td>2</td><td>9</td></tr> <tr><td>1000</td><td>1</td><td>9</td></tr> <tr><td>2000</td><td>1</td><td>12</td></tr> <tr><td>4000</td><td>1</td><td>16</td></tr> <tr><td>5000</td><td>1</td><td>18</td></tr> <tr><td>10000</td><td>0.3</td><td>22</td></tr> </tbody> </table>	Laser Power W	Recommended Exposure s	Min 1/e ² beam dia. mm	500	2	9	1000	1	9	2000	1	12	4000	1	16	5000	1	18	10000	0.3	22	<table border="1"> <thead> <tr> <th>Laser Power W</th> <th>Recommended Exposure s</th> <th>Min 1/e² beam dia. mm</th> </tr> </thead> <tbody> <tr><td>100</td><td>4</td><td>1</td></tr> <tr><td>500</td><td>1</td><td>1</td></tr> <tr><td>1000</td><td>1</td><td>1</td></tr> <tr><td>2000</td><td>1</td><td>1.5</td></tr> <tr><td>4000</td><td>0.4</td><td>3.5</td></tr> </tbody> </table>	Laser Power W	Recommended Exposure s	Min 1/e ² beam dia. mm	100	4	1	500	1	1	1000	1	1	2000	1	1.5	4000	0.4	3.5	<table border="1"> <thead> <tr> <th>Laser Power W</th> <th>Recommended Exposure s</th> <th>Min 1/e² beam dia. mm</th> </tr> </thead> <tbody> <tr><td>100</td><td>4</td><td>9</td></tr> <tr><td>500</td><td>1</td><td>9</td></tr> <tr><td>1000</td><td>1</td><td>13</td></tr> <tr><td>2000</td><td>1</td><td>17</td></tr> <tr><td>4000</td><td>0.5</td><td>22</td></tr> </tbody> </table>	Laser Power W	Recommended Exposure s	Min 1/e ² beam dia. mm	100	4	9	500	1	9	1000	1	13	2000	1	17	4000	0.5	22
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Compatible Meter/PC interface	Centauri, StarBright, Juno/Juno+ with StarLab	Centauri, StarBright, Juno/Juno+ with StarLab	Centauri, StarBright, Juno/Juno+ with StarLab																																																									
Weight kg	0.6	0.6	0.3																																																									
Operating Temperature	15-60°C	15-60°C	15-60°C																																																									
Connections	DB15 Smart Plug	DB15 Smart Plug	DB15 Smart Plug																																																									
Compliance	CE, UKCA, China RoHS	CE, UKCA, China RoHS	CE, UKCA, China RoHS																																																									
Part Number	7Z02794 (see page 56)	7Z02797 (see page 56)	7Z02775 (see page 118)																																																									

Notes: (a) Above 1100nm there is an additional 1% uncertainty

(b) Repetitive pulses can also be measured as long as the total exposure time is within this range

(c) The power is calculated by measuring the energy and exposure time. The laser pulse is assumed to be rectangular for this calculation

(d) For pulse widths in the range 0.3 – 4s

(e) Calibrated for 900 – 1100nm

(f) At large angles of incidence, the position the beam hits the absorber should be offset into the direction of incidence by 5-10mm for correct reading and at 20deg incidence the reading will be 5% lower and at 30deg incidence 10% lower

Choose energy scale

Input pulse width

Read power

L40(250)A-LP2-50

L30C-LP2-26-SH

For L40(500)A-LP2-DIF-35 drawing see page 56