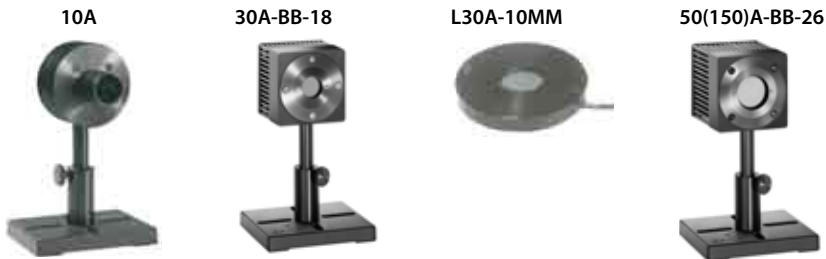


1.1.2.2 Low Power Thermal Sensors

20mW to 50W

Features

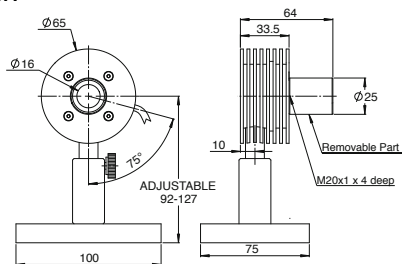
- Convection air cooled
- Broadband absorber
- 16mm to 26mm apertures
- Fast response time



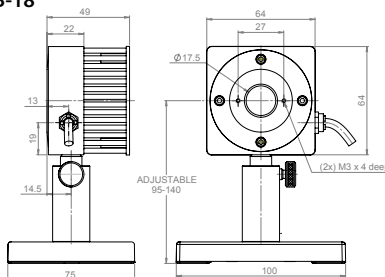
Model	10A	30A-BB-18	L30A-10MM	50(150)A-BB-26
Use	Low power	General purpose	Thin profile	General purpose
Absorber Type	Broadband	Broadband	Broadband	Broadband
Spectral Range μm	0.19 - 20	0.19 - 20	0.15 - 20	0.19 - 20
Aperture mm	ϕ 16mm	ϕ 17.5mm	ϕ 26mm	ϕ 26mm
Power Mode				
Power Range	20mW - 10W	20mW - 30W	80mW - 30W	40mW - 50W
Maximum Power			8W free standing, 30W heat sunk	150W for 1.5min, 100W for 2.2min, 50W continuous
Power Scales	10W / 5W / 0.5W	30W / 3W	30W / 3W	150W / 50W / 5W
Power Noise Level	1mW	1mW	4mW	2mW
Maximum Average Power Density KW/cm^2	28	20 at 30W 28 at 10W	20 at 30W 28 at 10W	12 at 150W 17 at 50W
Response Time with Meter (0-95%) typ. s	0.8	0.8	1.5	1.5
Power Accuracy +/-%	3	3	3	3
Linearity with Power +/-%	1	1	1	1
Energy Mode				
Energy Range	6mJ - 2J	6mJ - 30J	20mJ - 60J	20mJ - 30J
Energy Scales	2J / 200mJ	30J / 3J / 300mJ	60J / 20J / 2J / 200mJ	30J / 3J / 300mJ
Minimum Energy mJ	6	6	20	20
Maximum Energy Density J/cm^2				
< 100ns	0.3	0.3	0.3	0.3
0.5ms	2	2	5	5
2ms	2	2	10	10
10ms	2	2	30	30
Cooling	convection	convection	convection / conduction	convection
Fiber Adapters Available (see page 42)	ST, FC, SMA, SC	ST, FC, SMA, SC	NA	ST, FC, SMA, SC
Weight Kg	0.2	0.3	0.1	0.3
Version	V1.1			
Part number	7Z02637	7Z02692*	7Z02273	7Z02696*

* Delivery: Q2 2010

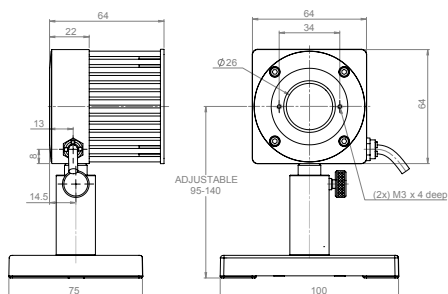
10A



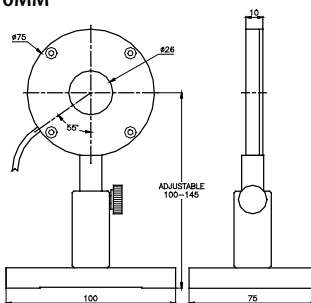
30A-BB-18



50(150)A-BB-26



L30A-10MM



1.1.2.2 Low Power Thermal Sensors

40mW to 50W

Features

- Convection air cooled
- P, BF and N type absorbers for short pulses
- $\phi 16 - 17.5\text{mm}$ apertures
- Spectrally flat



Model	10A-P	30A-P-17	50A-BF-DIF-18	30A-N-18
Use	Short pulse to 10W	Short pulse to 30W	High energy density pulsed beams	High power density pulsed YAG
Absorber Type	P type	P type	BF type + diffuser	N type
Spectral Range μm	0.15 - 6	0.15 - 6	0.25 - 2.2	0.532, 1.064
Aperture mm	$\phi 16\text{mm}$	$\phi 17\text{mm}$	$\phi 17.5\text{mm}$	$\phi 17.5\text{mm}$
Power Mode				
Power Range	40mW - 10W	60mW - 30W	120mW - 50W	60mW - 30W
Power Scales	10W / 2W / 200mW and dBm	30W / 3W	50W / 5W	30W / 3W
Power Noise Level	2mW	3mW	6mW	3mW
Maximum Average Power Density KW/cm ²	0.05	0.05	0.5	5
Response Time with Meter (0-95%) typ. s	3.5	2.5	2	2
Power Accuracy +/-%	3	3	5	3
Linearity with Power +/-%	1.5	1.5	1	1
Energy Mode				
Energy Range	10mJ - 10J	30mJ - 30J	50mJ - 200J	30mJ - 200J
Energy Scales	10J / 2J / 200mJ	30J / 3J	200J / 30J / 3J	200J / 30J / 3J
Minimum Energy mJ	10	30	50	30
Maximum Energy Density J/cm ² (a) (b)				
Pulse rate:	Single 10 - 30Hz	Single 10 - 30Hz	Single 10 - 50Hz	10 - 50Hz
<1 μs	10 1	10 1	5 5	1
0.5ms	10 1	10 1	20 20	20
5ms	10 1	10 1	50 50	>100
Cooling	convection	convection	convection	convection
Fiber Adapters Available (see page 42)	ST, FC, SMA, SC	ST, FC, SMA, SC	NA	ST, FC, SMA, SC
Weight Kg	0.2	0.3	0.35	0.3
Version	V3	V1		
Part number	7Z02649	7Z02693*	7Z02723*	7Z02695*

Note: (a) For shorter wavelengths derate maximum energy density as follows:

Wavelength	Derate to value
1064nm	100%
532nm	100%
355nm	40%
266nm	10%
193nm	10%

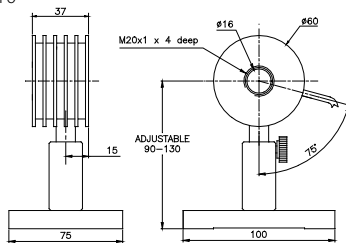
Wavelength	Derate to value
1064nm	100%
532nm	60%
355nm	60%
266nm	60%
193nm	NA

Note: (b) For diffuser sensor maximum depends on beam size:

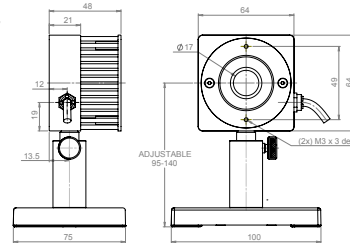
For $\leq 5\text{mm}$ diameter beam. For 10mm beam derate to 50% of above values

* Delivery: Q2 2010

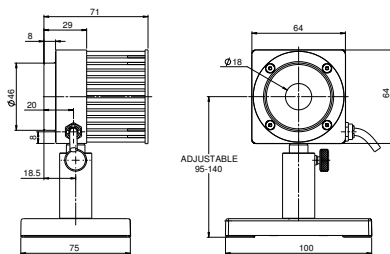
10A-P



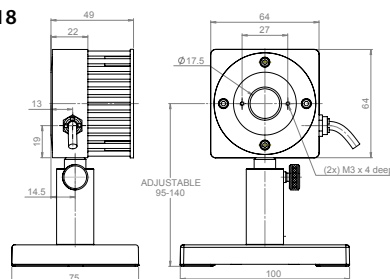
30A-P-17



50A-BF-DIF-18



30A-N-18



1.1.2.3 Low - Medium Power Thermal Sensors - Apertures to 35mm

30mW to 150W

Features

- Convection air cooled
- CW to 50W, intermittent to 150W
- ϕ 17.5mm and ϕ 35mm apertures

30(150)A-BB-18/ 30(150)A-LP1-18



L50(150)A-BB-35

L50(150)A-LP1-35

L50(150)A-EX-35

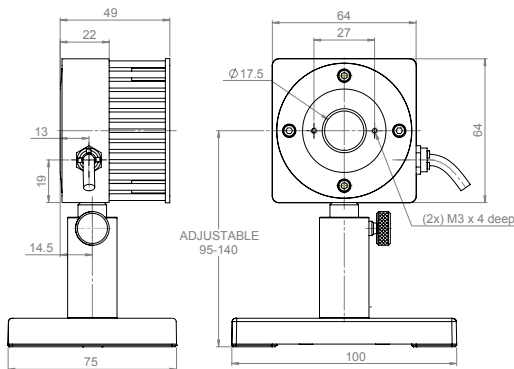


Model	30(150)A-BB-18	30(150)A-LP1-18	L50(150)A-BB-35	L50(150)A-LP1-35	L50(150)A-EX-35
Use	General purpose	High power density and long pulse lasers	General purpose	High power density and long pulse lasers	Excimer lasers
Absorber Type	Broadband	LP1	Broadband	LP1	EX
Spectral Range μ m	0.19 - 20	0.25 - 2.2	0.19 - 20	0.25 - 2.2	0.15 - 0.4, 10.6
Aperture mm	ϕ 17.5mm	ϕ 17.5mm	ϕ 35mm	ϕ 35mm	ϕ 35mm
Power Mode					
Power Range	30mW - 150W	30mW - 150W	100mW - 150W	100mW - 150W	100mW - 150W
Maximum Intermittent Power W	150W for 1.5min 100W continuous	150W for 1.5min, 100W for 2.2min, 30W continuous	150W for 1.5min, 100W for 2.5min, 50W continuous		
Power Scales	150W / 30W / 3W	150W / 30W / 3W	150W / 30W	150W / 30W	150W / 30W
Power Noise Level	2mW	2mW	4mW	4mW	4mW
Maximum Average Power Density KW/cm ²	12 at 150W 20 at 30W	38 at 150W 97 at 30W	12 at 150W 17 at 50W	38 at 150W 75 at 50W	2
Response Time with Meter (0-95%) typ. s	1.2	1.2	2	2	2
Power Accuracy +/-%	3	3 ^(a)	3	3 ^(a)	3
Linearity with Power +/-%	1	1	1	1	1
Energy Mode					
Energy Range	20mJ - 100J	20mJ - 300J	40mJ - 300J	40mJ - 300J	40mJ - 100J
Energy Scales	100J / 30J / 3J / 300mJ	300J / 30J / 3J / 300mJ	300J / 30J / 3J	300J / 30J / 3J	100J / 30J / 3J
Minimum Energy mJ	20	20	40	40	40
Maximum Energy Density J/cm ²					
<100ns	0.3	0.05	0.3	0.05	0.5
0.5ms	5	20	5	20	5
2ms	10	50	10	50	12
10ms	30	250	30	250	25
Cooling	convection	convection	convection	convection	convection
Fiber Adapters Available (see page 42)	ST, FC, SMA, SC	ST, FC, SMA, SC	ST, FC, SMA, SC	ST, FC, SMA, SC	NA
Weight Kg	0.3	0.3	0.35	0.35	0.35
Version					
Part number	7Z02699*	7Z027215*	7Z02730*	7Z027265*	7Z02697*

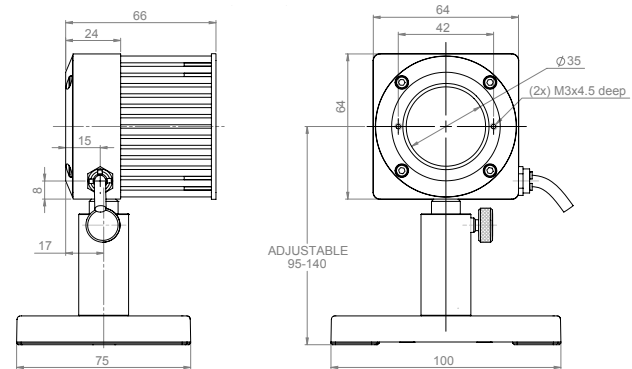
Note: (a) LP1 sensors have relatively large spectral variation in absorption and have a calibrated spectral curve at all wavelengths in their spectral range to the above specified accuracy. Nova and Orion displays do not support this feature and when used with those displays, accuracy will be \pm 3% for 532nm, 755nm, 1064nm and 2100nm and \pm 6% for other wavelengths in the spectral range 400 – 1100nm.

* Delivery: Q2 2010

30(150)A-BB-18 / 30(150)A-LP1-18



L50(150)A-BB-35 / L50(150)A-LP1-35 / L50(150)A-EX-35



1.1.2.3 Low - Medium Power Thermal Sensors - Apertures to 35mm

50mW to 150W

Features

- Special purpose SV and HE absorbers
- For concentrated beams and pulses
- Convection air cooled
- CW to 30W, intermittent to 150W
- 17mm aperture

30(150)A-SV-17 /
30(150)A-HE-17



30(150)A-HE-DIF-17
Diffuser installed



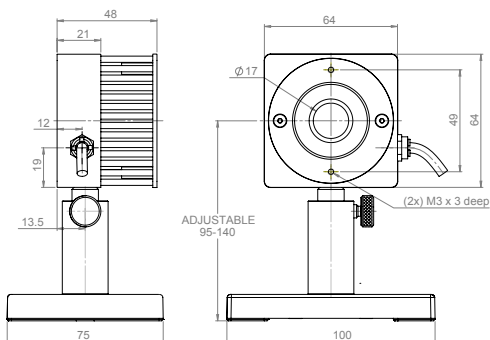
30(150)A-HE-DIF-17
Diffuser off



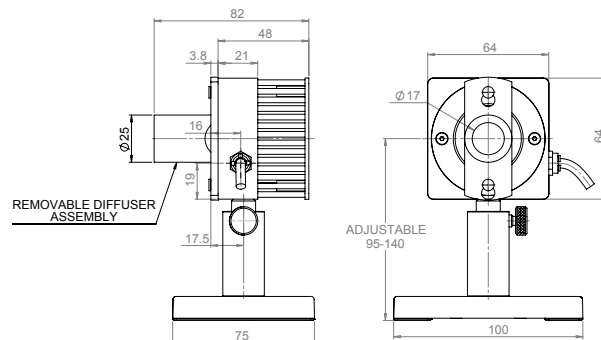
Model	30(150)A-SV-17			30(150)A-HE-17			30(150)A-HE-DIF-17		
Use	High power and energy density			High energy and average power pulsed lasers			Concentrated beam pulsed lasers - has removable diffuser		
Absorber Type	SV			HE			HE		
Spectral Range μm	0.19 - 12			0.19 - 0.625, 1.064, 2.1, 2.94			0.19 - 3 except for 0.625 - 0.9 ^(b)		
Aperture mm	ϕ 17mm			ϕ 17mm			ϕ 17mm		
Power Mode	50mW - 150W			50mW - 150W			50mW - 150W		
Power Range	50mW - 150W			50mW - 150W			50mW - 150W		
Maximum Intermittent Power W	150W for 1.5min, 100W for 2.2min, 30W continuous			150W for 1.5min, 100W for 2.2min, 30W continuous			150W for 1.5min, 100W for 2.2min, 30W continuous		
Power Scales	150W / 30W / 3W			150W / 30W / 3W			150W / 30W / 3W		
Power Noise Level	3mW			3mW			3mW		
Maximum Average Power Density KW/cm ²	60 at 150W			0.5			0.5		
Response Time with Meter (0-95%) typ. s	1.5			3.8			3.8		
Power Accuracy +/-%	3			3			5 ^(b)		
Linearity with Power +/-%	1			1.5			1.5		
Energy Mode	50mJ - 300J			50mJ - 200J			50mJ - 30J		
Energy Range	300J / 30J / 3J			200J / 30J / 3J			30J / 3J		
Energy Scales	50			50			50		
Minimum Energy mJ	50			50			50		
Damage Threshold J/cm ²	Pulse width ^(a) Single 10-50Hz			Pulse width ^(a) Single 10-50Hz			Pulse width <100ns, 10 - 50Hz		
	<100ns	1	1	<100ns	1	1	Wavelength	DIF IN	DIF OUT
	0.5ms	20	20	0.5ms	20	20	1064nm	5	2
	2ms	50	50	2ms	50	50	532nm	4	2
							355nm	1.5	1
Cooling	convection			convection			convection		
Fiber Adapters Available (see page 42)	ST, FC, SMA, SC			ST, FC, SMA, SC			ST, FC, SMA, SC		
Weight Kg	0.3			0.3			0.4		
Version									
Part number	7Z02724*			7Z02722*			7Z02729*		
Notes:	(a) At 1064nm. For shorter wavelengths derate maximum energy density to: 355nm 50% of above values 266nm 50% of above values 193nm 10% of above values						(b) With diffuser in, sensor is only calibrated for 1064, 532 and 355nm wavelengths		

* Delivery: Q2 2010

30(150)A-SV-17 / 30(150)A-HE-17



30(150)A-HE-DIF-17



1.1.2.5 Medium-High Power Fan Cooled Thermal Sensors

50mW to 250W

Features

- General purpose and high damage threshold
- Fan cooled
- Powers to 250W
- φ26 to φ35mm apertures

F150A-BB-26



FL250A-LP1-35 / FL250A-BB-35



FL250A-LP1-DIF-33



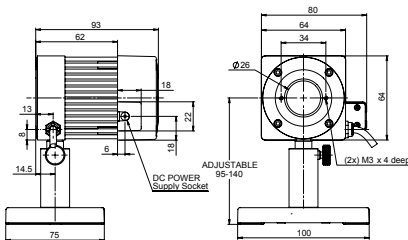
Model	F150A-BB-26	FL250A-BB-35	FL250A-LP1-35	FL250A-LP1-DIF-33
Use	General purpose	General purpose	High power density and long pulse lasers	Diffuser for highest energy densities
Absorber Type	Broadband	Broadband	LP1	LP1 + diffuser
Spectral Range μm	0.19 - 20	0.19 - 20	0.25 - 2.2	0.4 - 3
Aperture mm	φ 26mm	φ 35mm	φ 35mm	φ 33mm
Power Mode				
Power Range ^(c)	50mW - 150W	150mW - 250W	150mW - 250W	200mW - 250W
Power Scales	150W / 30W / 3W	250W / 30W	250W / 30W	250W / 30W
Power Noise Level ^(c)	5mW	15mW	15mW	10mW
Maximum Average Power Density KW/cm ²	12 at 150W 17 at 50W	10 at 250W 12 at 150W	27 at 250W 39 at 150W	2
Response Time with Meter (0-95%) typ. s	1.5	2	2	2.5
Power Accuracy +/-%	3	3	3 ^(a)	3 ^(b)
Linearity with Power +/-%	1	1	1	1
Energy Mode				
Energy Range	20mJ - 100J	50mJ - 300J	50mJ - 300J	200mJ - 600J
Energy Scales	100J / 30J / 3J / 300mJ	300J / 30J / 3J	300J / 30J / 3J	600J / 100J / 10J
Minimum Energy mJ ^(c)	20	50	50	200
Maximum Energy Density J/cm ²				
<100ns	0.3	0.3	0.05	0.5
0.5ms	5	5	20	200
2ms	10	10	50	400
10ms	30	30	250	1000
Cooling	fan	fan	fan	fan
Fiber Adapters Available (see page 42)	ST, FC, SMA, SC	ST, FC, SMA, SC	ST, FC, SMA, SC	ST, FC, SMA, SC
Weight Kg	0.35	0.4	0.4	0.45
Version				
Part number	7Z02727*	7Z02728*	7Z02731S*	7Z02733*

Notes: (a) LP1 sensors have relatively large spectral variation in absorption and have a calibrated spectral curve at all wavelengths in their spectral range to the above specified accuracy. Nova and Orion displays do not support this feature and when used with those displays, accuracy will be ±3% for 532nm, 755nm, 1064nm and 2100nm and ±6% for other wavelengths in the spectral range 400 - 1100nm.

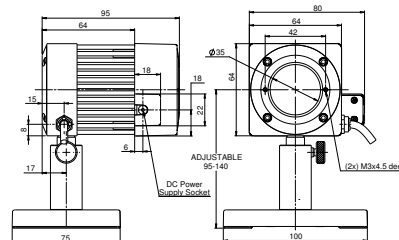
Notes: (b) at calibrated wavelengths 755nm, 1064nm and 532nm only

* Delivery: Q2 2010

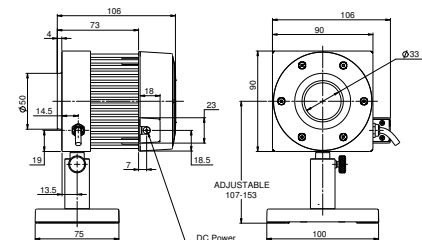
F150A-BB-26



FL250A-BB-35 / FL250A-LP1-35



FL250A-LP1-DIF-33



1.1.2.5 Medium-High Power Fan Cooled Thermal Sensors

200mW to 500W

Features

- High powers and energies, large apertures
- Fan cooled
- Up to 500W
- φ50mm and φ65mm apertures



FL250A-EX-50 /
FL400A-BB-50 /
FL400A-LP-50



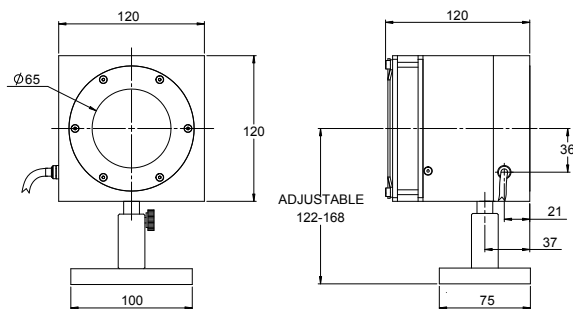
FL500A / FL500-LP1

Model	FL250A-EX-50	FL400A-BB-50	FL400A-LP-50	FL500A	FL500A-LP1
Use	Excimer lasers	General purpose	High power densities and long pulses	Very large aperture	High power densities and long pulses
Absorber Type	EX	Broadband	LP	Broadband	LP1
Spectral Range μm	0.15 - 0.4, 10.6	0.19 - 20	0.4 - 1.5, 10.6	0.19 - 20	0.25 - 2.2
Aperture mm	φ 50mm	φ 50mm	φ 50mm	φ 65mm	φ 65mm
Power Mode					
Power Range ^(a)	200mW - 250W	300mW - 400W	300mW - 400W	500mW - 500W	500mW - 500W
Power Scales	250W / 30W	400W / 50W	400W / 50W	500W / 50W	500W / 50W
Power Noise Level ^(a)	10mW	25mW	25mW	25mW	25mW
Maximum Average Power Density KW/cm ²	2	8 at 400W 12 at 150W	10 at 400W 14 at 150W	7 at 500W 12 at 150W	16 at 500W 39 at 150W
Response Time with Meter (0-95%) typ. s	2.5	2.8	2.8	2.8	2.8
Power Accuracy +/-%	3	3	3	3	3
Linearity with Power +/-%	1	1	1	1.5	1.5
Energy Mode					
Energy Range	50mJ - 200J	75mJ - 600J	75mJ - 600J	100mJ - 600J	100mJ - 600J
Energy Scales	200J / 30J / 3J	600J / 60J / 6J	600J / 60J / 6J	600J / 60J / 6J	600J / 60J / 6J
Minimum Energy mJ ^(a)	50	75	75	100	100
Maximum Energy Density J/cm ²					
<100ns	0.5	0.3	0.05	0.3	0.05
1μs	0.6	1	0.3	1	0.3
0.5ms	6	5	20	5	15
2ms	12	10	50	10	40
10ms	25	30	150	30	200
Cooling	fan	fan	fan	fan	fan
Fiber Adapters Available (see page 42)	NA	ST, FC, SMA, SC	ST, FC, SMA, SC	ST, FC, SMA, SC	ST, FC, SMA, SC
Weight Kg	0.8	0.9	0.9	2.7	2.7
Version					
Part number	7Z02732*	7Z02734*	7Z02735*	7Z02648	7Z026675

Note: (a) For lower powers up to 50W it is recommended to work with the fan off and then the noise level is ~3 times lower. It is also recommended to measure energy with the fan off.

* Delivery: Q2 2010

FL500A / FL500A-LP1



FL250A-EX-50 / FL400A-BB-50 / FL400A-LP-50

