

1.1.2 Thermal Power Sensors

1.1.2.1 High Sensitivity Thermal Sensors

30μW to 3W

Features

- Very low noise and drift to measure very low powers and energies
- Broadband and P absorbers for CW and short pulses
- Up to 3W
- Spectrally flat
- Version for Terahertz

3A / 3A-P / 3A-P-THz



3A-FS



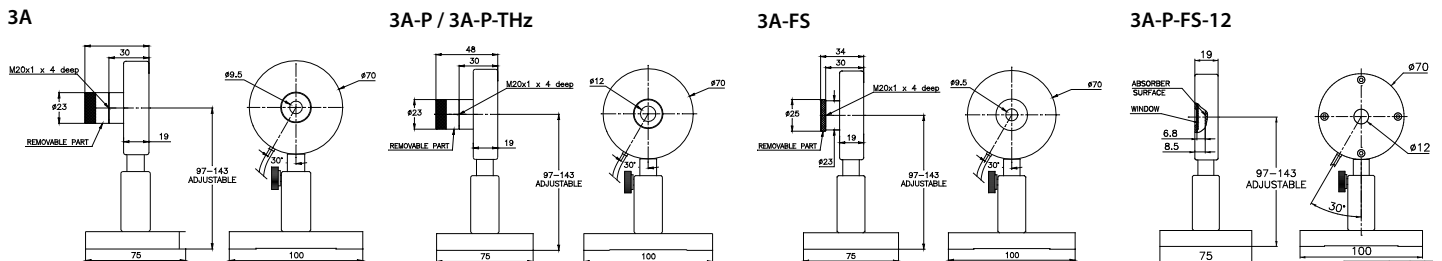
3A-P-FS-12



Model	3A	3A-P	3A-P-THz	3A-FS	3A-P-FS-12
Use	General purpose	Short pulses	Calibrated for Terahertz radiation	With removable window	For divergent beams, window blocks infrared
Absorber Type	Broadband	P type	P type	Broadband + F.S. window	P type + F.S. window
Spectral Range μm	0.19 - 20	0.15 - 8	0.3 - 10THz	0.19 - 20 ^(b)	0.22 - 2.1
Aperture mm	φ 9.5mm	φ 12mm	φ 12mm	φ 9.5mm	φ 12mm
Maximum Beam Divergence	NA	NA	NA	NA	±40 degrees
Power Mode					
Power Range	60μW - 3W	60μW - 3W	50μW - 3W	30μW - 3W	60μW - 3W
Power Scales	3W to 300μW	3W to 300μW	3W to 300μW	3W to 300μW	3W to 300μW
Power Noise Level	2μW	4μW	4μW ^(d)	2μW	6μW
Thermal Drift (30min) ^(a)	5 - 20μW	5 - 30μW	5 - 30μW	2 - 10μW	20 - 40μW
Maximum Average Power Density kW/cm ²	0.2	0.05	0.05	0.2	0.05
Response Time with Meter (0-95%) typ. s	1.8	2.5	2.5	1.8	2.5
Power Accuracy +/-%	3	3	15 ^(c)	3	3
Linearity with Power +/-%	1.5	1.5	1.5	1.5	1.5
Energy Mode					
Energy Range	20μJ - 2J	20μJ - 2J	20μJ - 2J	15μJ - 2J	20μJ - 2J
Energy Scales	2J to 200μJ	2J to 200μJ	2J to 200μJ	2J to 200μJ	2J to 200μJ
Minimum Energy	20μJ	20μJ	20μJ	15μJ	20μJ
Maximum Energy Density J/cm ² ^(e)					
<100ns	0.3	1	0.1	0.3	1
0.5ms	1	1	1	1	1
2ms	2	1	1	2	1
10ms	4	1	1	4	1
Cooling	convection	convection	convection	convection	convection
Weight kg	0.2	0.2	0.2	0.2	0.15
Fiber Adapters Available (see page 44)	ST, FC, SMA, SC	ST, FC, SMA, SC	ST, FC, SMA, SC	ST, FC, SMA, SC	NA
Version		V1			
Part number: Standard Sensor	7Z02621	7Z02622	7Z02742	7Z02628	7Z02687
BeamTrack Sensor: Beam, Position & Size (p. 56)	7Z07934	7Z07935			
StarLink Sensor: Direct USB link to PC (p. 42)	787000	787001		787002	

Note: (a) Depending on room airflow and temperature variations
 Note: (b) Remove window for measurement beyond 2.2μm
 Note: (c) 2 sigma standard lab traceable for >0.6THz. For 0.5THz and below add 5% to error
 Note: (d) Back reflections from meter can sometimes cause interference effects with source. Unit should be tilted ~10° in this case.
 Note: (e) For P type and shorter wavelengths derate maximum energy density as follows:

Wavelength	Derate to value
1064nm	Not derated
532nm	Not derated
355nm	40% of stated value
266nm	10% of stated value
193nm	10% of stated value



1.1.2.1 High Sensitivity Thermal Sensors

2mW to 12W

Features

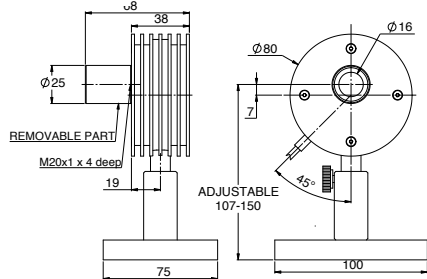
- Very low noise and drift to measure very low powers and energies
- Broadband and P absorbers for CW and short pulses
- Up to 12W
- Spectrally flat

12A/ 12A-P



Model	12A	12A-P	
Use	General purpose	Short pulses	
Absorber Type	Broadband	P type	
Spectral Range μm	0.19 - 20	0.15 - 8	
Aperture mm	ϕ 16mm	ϕ 16mm	
Power Mode			
Power Range	2mW - 12W	2mW - 12W	
Power Scales	12W to 20mW	12W to 20mW	
Power Noise Level	50 μW	50 μW	
Thermal Drift (30min) ^(a)	40 - 150 μW	40 - 150 μW	
Maximum Average Power Density kW/cm ²	25	0.05	
Response Time with Meter (0-95%) typ. s	2.5	3.5	
Power Accuracy +/-%	3	3	
Linearity with Power +/-%	1.5	1.5	
Energy Mode			
Energy Range	1mJ - 30J	1mJ - 30J	
Energy Scales ^(b)	30J to 30mJ	30J to 30mJ	
Minimum Energy mJ	1	1	
Maximum Energy Density J/cm ² ^(c)			
Pulse rate:		Single	10 - 30Hz
<100ns	0.3	10	1
0.5ms	5	10	1
2ms	10	10	1
10ms	30	10	1
Cooling	convection	convection	
Fiber Adapters Available (see page 44)	ST, FC, SMA, SC	ST, FC, SMA, SC	
Weight kg	0.35	0.35	
Version	V1		
Part number	7Z02638	7Z02624	
Notes: (a)	Depending on room airflow and temperature variations		
Notes: (b)	For the 30mJ energy scale measurements it is recommended to use the screw on barrel supplied with the sensor to protect from direct air flow		
Note: (c) For P type and shorter wavelengths derate maximum energy density as follows:	Wavelength	Derate to value	
	1064nm	Not derated	
	532nm	Not derated	
	355nm	40% of stated value	
	266nm	10% of stated value	
	193nm	10% of stated value	

12A/ 12A-P



1.1.2.2 Low Power Thermal Sensors

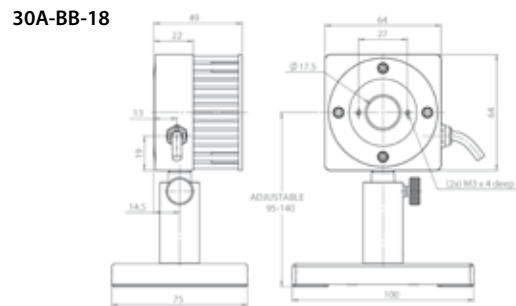
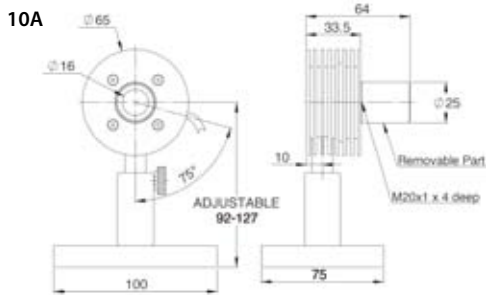
20mW to 150W

Features

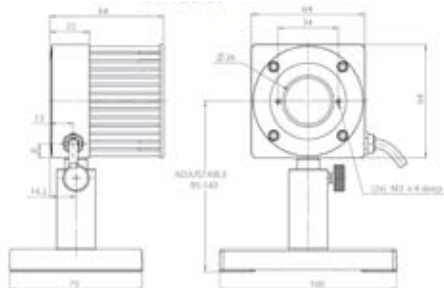
- Convection air cooled
- Broadband absorber
- ϕ 16mm to ϕ 26mm apertures
- Fast response time



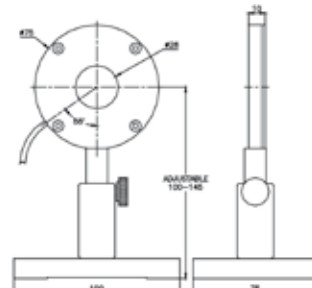
Model	10A	30A-BB-18	L30A-10MM	50(150)A-BB-26
Use	Low power	General purpose	Thin profile	General purpose
Absorber Type	Broadband	Broadband	Broadband	Broadband
Spectral Range μ m	0.19 - 20	0.19 - 20	0.15 - 20	0.19 - 20
Aperture mm	ϕ 16mm	ϕ 17.5mm	ϕ 26mm	ϕ 26mm
Power Mode				
Power Range	20mW - 10W	20mW - 30W	80mW - 30W	40mW - 150W
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 / 5W	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	1.5
Energy Mode				
Energy Range	6mJ - 2J	6mJ - 30J	20mJ - 60J	20mJ - 100J
Energy Scales	2J / 200mJ	30J / 3J / 300mJ	60J / 20J / 2J / 200mJ	100J / 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 44)	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: Standard Sensor	7Z02637	7Z02692	7Z02273	7Z02696
BeamTrack Sensor: Beam, Position & Size (p. 56)	7Z07904			7Z07900
StarLink Sensor: Direct USB link to PC (p. 42)	787004	787006		



50(150)A-BB-26



L30A-10MM



1.1.2.2 Low Power Thermal Sensors

40mW to 50W

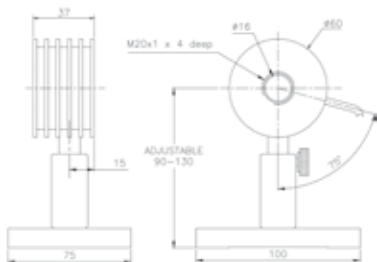
Features

- Convection air cooled
- P, PF and N type absorbers for short pulses
- ϕ 16mm to 17.5mm apertures

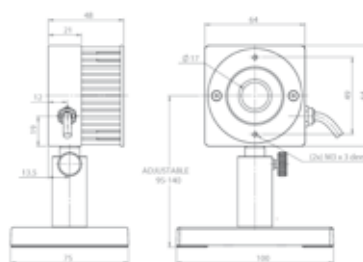


Model	10A-P	30A-P-17	15(50)A-PF-DIF-18/ 50A-PF-DIF-18	30A-N-18
Use	Short pulse to 10W	Short pulse to 30W	High energy density pulsed beams	High power density pulsed YAG
Absorber Type	P type	P type	PF type + diffuser	N type
Spectral Range μm	0.15 - 8	0.15 - 8	0.24 - 2.2	0.532, 1.064
Aperture mm	ϕ 16mm	ϕ 17mm	ϕ 17.5mm	ϕ 17.5mm
Power Mode				
Power Range	40mW - 10W	60mW - 30W	140mW - 50W	60mW - 30W
Maximum Intermittent Power W	NA	NA	(for 15(50)A-PF-DIF-18 only) 50W for 5min, 15W continuous	NA
Power Scales	10W / 2W / 200mW and dBm	30W / 3W	50W / 5W	30W / 3W
Power Noise Level	2mW	3mW	7mW	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	1.5	1
Energy Mode				
Energy Range	10mJ - 10J	40mJ - 30J	60mJ - 200J	30mJ - 200J
Energy Scales	10J / 2J / 200mJ	30J / 3J	200J / 30J / 3J	200J / 30J / 3J
Minimum Energy mJ	10	40	60	30
Maximum Energy Density J/cm^2 (a)				
Pulse rate:	Single 10 - 30Hz	Single 10 - 30Hz	10 - 50Hz	10 - 50Hz
<1 μs	10 1	10 1	4	1
0.5ms	10 1	10 1	15	20
5ms	10 1	10 1	50	>100
Cooling	convection	convection	convection	convection
Fiber Adapters Available (see page 44)	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			
Part number	7Z02649	7Z02693	7Z02740/ 7Z02738	7Z02695
Note: (a) For shorter wavelengths derate maximum energy density as follows:	Wavelength 1064nm 532nm 355nm 266nm 193nm	Derate to value Not derated Not derated 40% of stated value 10% of stated value 10% of stated value	Wavelength 1064nm 532nm 355nm 266nm 193nm	Derate to value Not derated 80% of stated value 60% of stated value 40% of stated value NA

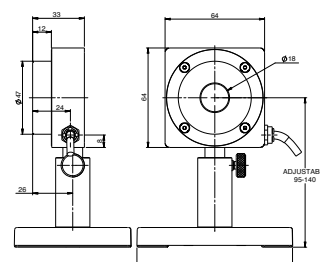
10A-P



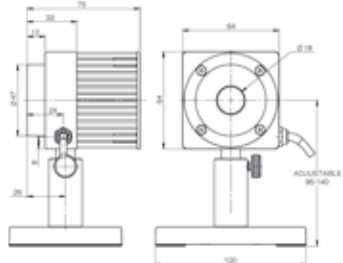
30A-P-17



15(50)A-PF-DIF-18



50A-PF-DIF-18



30A-N-18

