Thermal Heads for Power and Single-Shot Energy - mW to KW, mJ to 300J

- The highest damage threshold in the industry
- Models for 1500W, 5000W and 10KW for high power laser measurement
- LP coating that can withstand up to 6KW/cm^2 (at maximum rated head power)

Energy damage threshold up to 250J/cm^2

- EMI rejection
- Single pulse energy measurement up to 600 joules
- Sensitive meters to measure power down to 40µW and energy down to 7µJ

Thermal Heads - Low Powers to 50W

3A

CW & Pulsed Measurements 60µW - 3W 15µJ to 2J

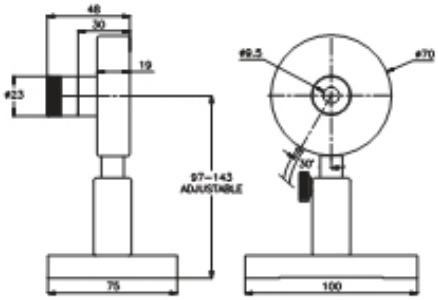
Recommended Use: Very low power and energy lasers

Special Features: Very sensitive, low noise, fast response

Absorber:	Broadband 0.19 - 20µm
Aperture:	Ø9.6 mm
Digital Power Scales:	3W / 300mW / 30mW / 3mW / 300µW
Maximum Average Power Density:	200W/cm²
Power Noise Level:	2µW
Thermal Drift (30 min):	5 - 20µW [a]
Power Accuracy:	± 3% [b]
Maximum Energy Density J/cm²:	0.3 for <100ns pulses
Response Time with Display (0 - 95%):	2.5 s
Linearity with Power:	±1.5%
Linearity with Energy:	± 2% ± 2µJ
Energy Scales:	2J / 200mJ / 20mJ / 2mJ / 200µJ
Energy Threshold:	20µJ
Cooling:	Convection

Notes:
a. Depending on typical room airflow and temperature variations
b. This head has a software linearity correction which is not supported in AN/2 display. The error can reach as much as 10% at full power with the AN/2 display.

3A



3A-FS

CW & Pulsed Measurements 60µW - 3W 15µJ to 2J

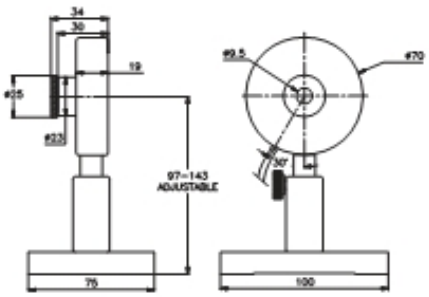
Recommended Use: Very low power and energy lasers

Special Features: Very sensitive, low noise, fast response

Absorber:	Broadband 0.19 - 20µm [a]
Aperture:	Ø9.6 mm
Digital Power Scales:	3W / 300mW / 30mW / 3mW / 300µW
Maximum Average Power Density:	200W/cm²
Maximum Energy Density J/cm²:	0.3 for <100ns pulses
Power Noise Level:	2µW
Thermal Drift (30 min):	2 - 10µW [b]
Power Accuracy	± 3% [c]
Response Time with Display (0 - 95%):	2.5 s
Linearity with Power:	±1.5% [c]
Linearity with Energy:	± 2% ± 2µJ
Energy Scales:	2J / 200mJ / 20mJ / 2mJ / 200µJ
Energy Threshold:	15µJ
Cooling:	Convection

Notes:
a. For measurement beyond 2.5µm and up to 20µm, window should be removed. Noise and drift will be higher
b. Depending on typical room airflow and temperature variations
c. This head has software linearity correction wich is not supported in AN/2 displays. The error can reach as much as 10% at full power with the AN/2 display.

3A-FS



Ordering information		
Item	**Description**	**Ophir P/N**
3A	3 Watt Power/Energy Meter for low power lasers	1Z02621
3A-FS	3 Watt Power/Energy Meter for low power lasers with removable fused silica window	1Z02628

3A-P

CW & Pulsed Measurements 60µW - 3W 20µJ to 2J

Recommended Use: Very low power and energy pulsed laser
Special Features: Very sensitive, low noise, spectrally flat

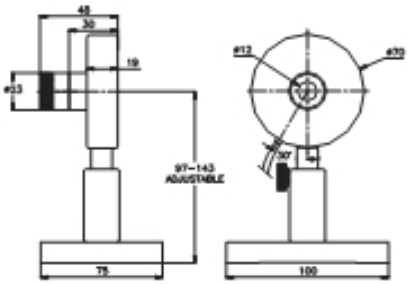
Absorber:	P type, 0.15 - 6µm	
Aperture:	Ø12 mm	
Digital Power Scales:	3W / 300mW / 30mW / 3mW / 300µW	
Maximum Average Power Density:	50W/cm²	
Power Noise Level:	4µW	
Thermal Drift (30 min):	5 - 30µW [a]	
Power Accuracy	± 3% [c]	
Maximum Energy Density J/cm² [b]	Single shot	10 - 30Hz
	10	1
Response Time with Display (0 - 95%):	2.5 s	
Linearity with Power:	± 1.5% [c]	
Linearity with Energy:	± 2% ± 4µJ	
Energy Scales:	2J / 200mJ / 20mJ / 2mJ / 200µJ	
Energy Threshold:	20µJ	
Cooling:	Convection	

Notes:
a. Depending on typical room airflow and temperature variations
b. For shorter wavelengths derate to values shown:

Wavelengths	Derate to value
355nm	40%
266nm	10%
193nm	10%

c. This head has software linearity correction wich is not supported in AN/2 displays. The error can reach as much as 10% at full power with the AN/2 display.

3A-P



10A

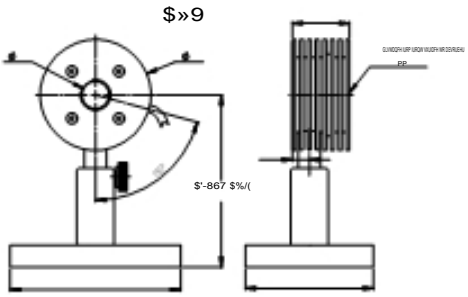
CW & Pulsed Measurements 20mW - 10W 6mJ - 2J

Recommended Use: General, powers to 10W
Special Features: Compact, fast response

Absorber:	Broadband, 0.19-20µm
Aperture:	Ø16mm
Digital Power Scales:	10W / 5W / 0.5W
Maximum Average Power Density:	30KW/cm²
Power Noise Level:	1mW
Power Accuracy:	±3%
Response Time with Display (0-95%):	0.8s
Linearity with Power:	± 1%
Energy Scales:	2J / 200mJ
Energy Threshold:	6mJ
Cooling:	Convection

NEW

10A



Ordering information		
Item	**Description**	**Ophir P/N**
3A-P-V1	3 Watt Power/Energy Meter for low energy pulsed lasers	1Z02622
10A-V1.1	10 Watt power/energy meter for low power lasers	1Z02637

10A-P-SH

CW & Pulsed Measurements 40mW -10W 10mJ to 10J

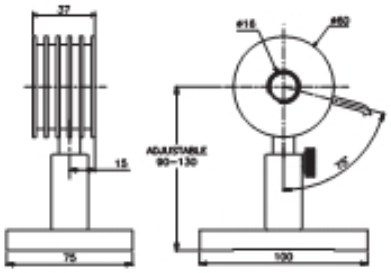
Recommended Use: General, single pulsed Q-switched laser,
low average power pulsed laser
Special Features: Broad spectral range


10-A-P-SH

Absorber:	P type, 0.15 - 6µm	
Aperture:	Ø16mm	
Digital Power Scales:	10W / 2W / 200mW and dBm	
Maximum Average Power Density:	50W/cm²	
Power Noise Level:	2mW	
Power Accuracy:	± 3%	
Maximum Energy Density J/cm² [b]	Single shot	10 - 30Hz
	10	1
Response Time with Display (0 - 95%):	3.5s	
Linearity with Power:	± 1.5%	
Energy Scales:	10J / 2J / 200mJ	
Energy Threshold:	10mJ	
Cooling:	Convection	

Notes: a. For shorter wavelengths derate to values shown:

Wavelength	Derate to value:
355nm	40%
266nm	10%
193nm	10%



12A / 12A-P

CW & Pulsed Measurements 2mW - 12W 1mJ - 30J

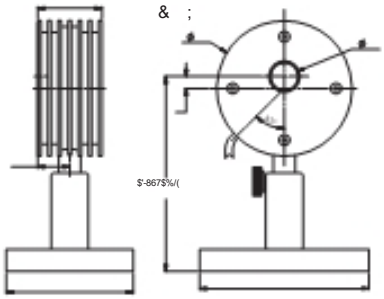
Recommended Use: Very low to low power and energy lasers
Special Features: Wide dynamic range, P type for short pulses

NEW


12A-P

Absorber:	Broadband, 0.19-20µm , P type 0.15 - 6µm			
Aperture:	Ø16mm			
Digital Power Scales:	12W / 2W / 200mW / 20mW			
Maximum Average Power Density:	Broadband 25KW/cm², P type 50W/cm²			
Power Noise Level:	50µW			
Thermal Drift (30min.):	40 - 150µW [a]			
Power Accuracy:	±3%			
Maximum energy density J/cm²	single shot		10 - 30Hz	
Head type:	BB	P	BB	P
<100ns	0.3	10	0.3	1
0.5ms	5	10	5	1
2ms	10	10	10	1
10ms	30	10	30	1
Response Time with Display (0-95%):	BB: 2.5s, P: 3.5s			
Linearity with Power:	± 1.5% ±50µJ [c]			
Energy Scales:	30J / 3J / 300mJ / 30mJ [b]			
Energy Threshold:	1mJ			
Linearity with Energy:	±1.5% ±50µJ			
Cooling:	Convection			

Notes:
a. Depending on typical room airflow and temperature variations
b. For the 30mJ energy scale measurements it is recommended to use the screw on barrel supplied with the head to protect from direct air flow.
c. This head has a software linearity correction wich is not supported in AN/2 displays. The error can reach as much as 10% at full power with the AN/2 display.



Ordering information		
Item	**Description**	**Ophir P/N**
10A-P-V3	10 Watt Power/Energy Meter for average power pulsed lasers	1Z02649
12A-V1	12 Watt power/energy meter for low power lasers	1Z02638
12A-P	12 Watt power/energy meter for pulsed lasers	1Z02624
Fiber adapters	See page 52 for ordering information	

30A / 30A-P

CW & Pulsed Measurements 20mW - 30W 6mJ - 30J

Recommended Use: General, powers to 30W

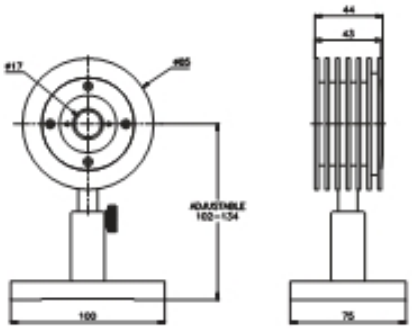
Special Features: 30A: Fast response, wide dynamic range
30A-P: Flat spectral response for pulsed lasers

Absorber:	Broadband, 0.19 - 20µm , P type 0.15 - 6µm			
Aperture:	Ø17mm			
Digital Power Scales:	30W / 3W			
Maximum Average Power Density:	Broadband 25KW/cm², P type 50W/cm²			
Power Noise Level:	BB: 1mW, P: 3mW			
Power Accuracy:	±3%			
Maximum Energy Density J/cm² [a]	single shot		10 - 30Hz	
Head type:	BB	P	BB	P
<100ns	0.3	10	0.3	1
0.5ms	2	10	2	1
2ms	2	10	2	1
10ms	2	10	2	1
Response Time with Display (0-95%):	BB: 0.8s, P: 2.5s			
Linearity with Power:	± 1%			
Energy Scales:	30J / 3J			
Energy Threshold:	BB: 6mJ, P: 30mJ			
Linearity with Energy:	±1.5% ±50µJ			
Cooling:	Convection			

Note: a. For shorter wavelengths derate to values shown:

Wavelengths	Derate to value
355nm	40%
266nm	10%
193nm	10%

30A-P



30A-P-DIF

CW & Pulsed Measurements 50mW - 30W 30mJ - 30J

Recommended Use: Concentrated beam Q switched lasers

Special Features: Diffuser to spread out concentrated beams

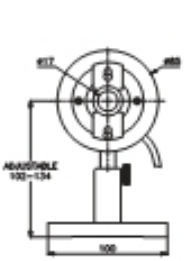
Absorber:	P type, 0.15 - 6µm [a]	
Aperture:	Ø16mm	
Digital Power Scales:	30W / 3W	
Maximum Average Power Density:	500W/cm²	
Power Noise Level:	3mW	
Power Accuracy:	±5%	
Maximum Energy Density J/cm² for <100ns pulses and 10 - 50Hz:	Diffuser IN	Diffuser OUT
1064nm	3	1
532nm,	2	1
355nm	1	0.4
Response Time with Display (0-95%):	2.5s typ	
Linearity with Power:	± 1%	
Energy Scales:	30J / 3J	
Energy Threshold:	30mJ	
Cooling:	Convection	

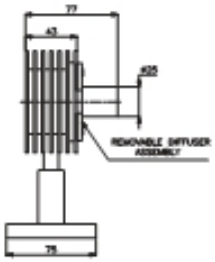
Note: a: With diffuser in, head is only calibrated at wavelengths listed.

30A-P-DIF

Diffuser IN

Diffuser OUT





Ordering information		
Item	**Description**	**Ophir P/N**
30A-V1	30 Watt power/energy meter	1Z02604
30A-P-V1	30 Watt power/energy meter for pulsed lasers	1Z02613
30A-P-DIF	30W power/energy meter for pulsed lasers with diffuser for concentrated beams up to 500W/cm²	1Z02616

30A-N

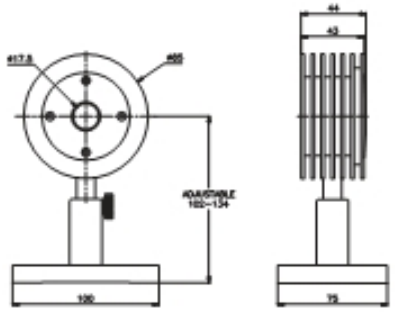
CW & Pulsed Measurements 60mW - 30W 30mJ - 200J

Recommended Use: Concentrated beam YAG lasers

Special Features: High damage threshold for high power density

Absorber:	N type: 1064nm, 532nm
Aperture:	Ø17.5mm
Digital Power Scales:	30W / 3W
Maximum Average Power Density:	5KW/cm²
Power Noise Level:	3mW
Power Accuracy:	±3%
Maximum Energy Density J/cm²	
1µs	1
0.5ms	20
>5ms	>100
Response Time with Display (0-95%):	2s typ
Linearity with Power:	± 1%
Energy Scales:	200J / 30J / 3J
Energy Threshold:	30mJ
Cooling:	Convection

30A-N



L30A

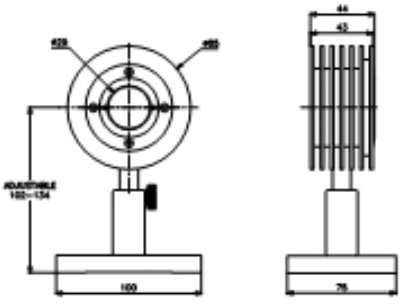
CW & Pulsed Measurements 80mW -30W 20mJ - 30J

Recommended Use: Divergent beams, large apertures

Special Features: 29mm aperture, 30 Watts

Absorber:	Broadband, 0.19-20µm
Aperture:	Ø29mm
Digital Power Scales:	30W / 3W
Maximum Average Power Density:	25KW/cm²
Power Noise Level:	4mW
Power Accuracy:	±3%
Maximum Energy Density J/cm²	
<100ns	0.3
0.5ms	5
2ms	10
10ms	30
Response Time with Display (0-95%):	1.5s
Linearity with Power:	± 1%
Energy Scales:	30J / 3J / 300mJ
Energy Threshold:	20mJ
Cooling:	Convection

L30A



Ordering information		
Item	**Description**	**Ophir P/N**
30A-N	30W power/energy meter for concentrated or high energy YAG beams	1Z02003
L30A-V1	Large aperture 30 Watt power/energy meter	1Z02603

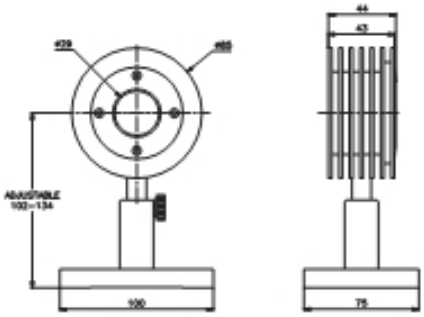
L30A-EX

CW & Pulsed Measurements 80mW - 30W 20mJ - 30J

Recommended Use: Medium aperture excimer lasers, Cu vapor lasers, TEA Lasers
Special Features: Sensitive, spectrally flat in th UV, compact

Absorber:	EX absorber: 0.15 - 0.4µm, 10.6µm
Aperture:	Ø29mm
Digital Power Scales:	30W / 3W
Maximum Average Power Density:	2KW/cm²
Power Noise Level:	4mW
Power Accuracy:	±3%
Maximum energy density J/cm²	
<100ns	0.5
1µs	0.6
0.5ms	6
2ms	12
Response Time with Display (0-95%):	1.5s
Linearity with Power:	± 1%
Energy Scales:	30J / 3J / 300mJ
Energy Threshold:	20mJ
Cooling:	Convection

L30A-EX



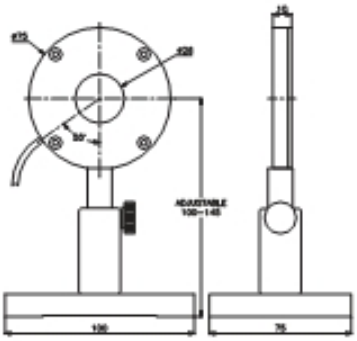
L30A-10MM

CW & Pulsed Measurements 80mW - 30W 20mJ - 60J

Recommended Use: Tight spaces, photolithography exposure
Special Features: Low profile - 10mm thick, 26mm aperture

Absorber:	Broadband, 0.15-20µm
Aperture:	Ø26mm
Digital Power Scales:	30W / 3W
Maximum Power:	8W free standing, 30W heat sinked
Maximum Average Power Density:	25KW/cm²
Power Noise Level:	4mW
Power Accuracy:	±3%
Maximum Energy Density J/cm²	
<100ns	0.3
0.5ms	5
2ms	10
10ms	30
Response Time with Display (0-95%):	1.5s
Linearity with Power:	± 1%
Energy Scales:	60J / 20J / 2J / 200mJ
Energy Threshold:	20mJ
Repeatability of Energy:	0.5%
Max Width of Pulse Train:	4s for measuring accumulated energy
Cooling:	Convection, conduction

L30A-10MM



Ordering information		
Item	**Description**	**Ophir P/N**
L30A-EX	Medium aperture 30 Watt excimer power/energy meter	1Z02194
L30A-10MM	Large aperture 10mm thick 30 Watt power/energy meter	1Z02273

L50A

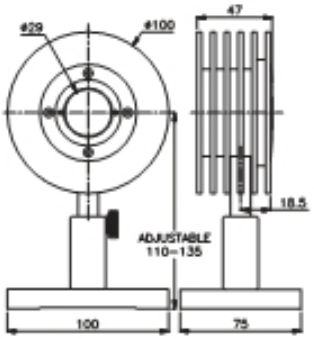
CW & Pulsed Measurements 80mW - 50W 20mJ - 100J

Recommended Use: General purpose to 50W

Special Features: Medium aperture, convection cooled

Absorber:	Broadband: 0.19 - 20µm
Aperture:	Ø29mm
Digital Power Scales:	50W / 5W
Maximum Average Power Density:	20KW/cm²
Power Noise Level:	4mW
Power Accuracy:	±3%
Maximum Energy Density J/cm²	
<100ns	0.3
0.5ms	5
2ms	10
10ms	30
Response Time with Display (0-95%):	1.5s typ
Linearity with Power:	± 1%
Energy Scales:	100J / 30J/ 3J / 300mJ
Energy Threshold:	20mJ
Cooling:	Convection

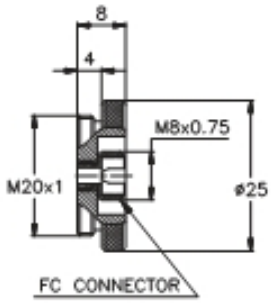
L50A



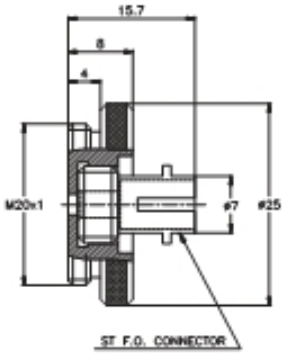
Ordering information		
Item	**Description**	**Ophir P/N**
L50A	50 Watt power meter for general use	1Z02606

Fiberoptic Adapters and Accessories for Thermal Heads

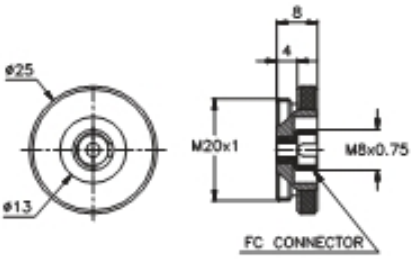
The heads can work either with or without the adapters attached



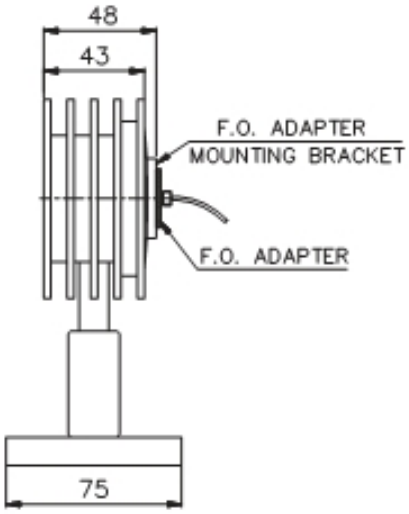
SMA fiber adapter



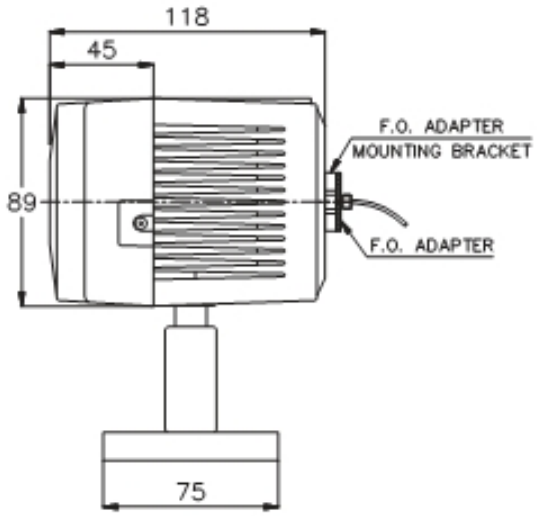
ST fiber adapter



FC fiber adapter



30A / L30A
with F.O. input



FL250A
with F.O. input

Ordering Information for Fiber Adapters for Thermal and Photodiode Heads

Head Series	Fiber adapter mounting bracket (1 bracket will fit all fiber adapters)	SC fiber adapter	LC fiber adapter	ST fiber adapter	FC fiber adapter	SMA fiber adapter
PD300	not needed	1Z08221	Not available	1Z02210	1Z02213	1Z02212
PD300-IRG-V1	not needed		1Z08215		1Z08216	1Z08222
3A-IS-V1	1Z08213	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
F100A-IS	1Z08213	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
3A	not needed	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
3A-P-V1	not needed	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
10A-V1.1	not needed	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
12A / 12A-P	not needed	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
30A -V1	1Z08211	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
30A-P-V1 / F100A-HE/HE1	1Z08230	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
L30A-V1 / F150A-V1	1Z08210	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
L50A	1Z08210	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
30(150)A-HL	1Z08211	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
30(150)A-SV	1Z08230	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
30(150)A-HE/HE1	1Z08230	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
30(150)A-V1	1Z08211	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
L40(150)A-V2/ L50(150)A	1Z08238[a]	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
FL250A-V1	1Z08212	1Z08227	1Z08228	1Z08226	1Z08229	1G01236
FL300A / FL300A-LP	1Z08212	1Z08227	1Z08228	1Z08226	1Z08229	1G01236

Note: a. The fiber mounting bracket for these heads is a triple adapter for mounting up to three different fibers looking at same head.

SH to BNC Adapter

Ordering information		
Item	**Description**	**Ophir P/N**
SH to BNC Adapter	Allows connection of smart head to voltage measuring device for measurement of raw voltage output.	1Z11010