



A Furukawa Company

High Power Pump Combiners and Pump Signal Combiners for Directed Energy



www.ofsoptics.com

High Power Pump Combiners and Pump Signal Combiners for Directed Energy

- High pump transmission
- Low signal loss
- Compact size
- Reduced cooling requirements

High Power Pump Combiners and Pump Signal Combiners

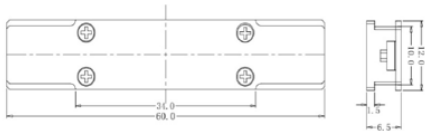
for Directed Energy

Fiber laser technology for defense applications is advancing rapidly due to advantages over solid state lasers and funding by the US Department of Defense. Fiber lasers offer features that are critical to the Directed Energy platform. Key components of a highly integrated fiber laser and amplifier system are high-power all-fiber pump and pump signal combiners. OFS fiber combiners can be implemented in almost any fiber laser or amplifier architecture.

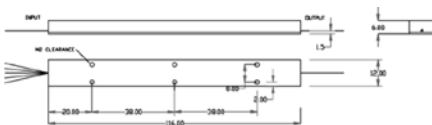
OFS combiners can be used in a high brightness, (42+1) x 1 cascaded combiner system which consists of one (6+1) x 1 pump-signal combiner pumped with six 7x1 multimode pump combiners. The cascaded combiner system has a pump efficiency of ≥96%. The higher brightness of the combiner system is driven by optimized high efficiency multimode pump combiners that have 99% pump throughput.

OFS has an extensive fiber laser and amplifier research program and seeks partners for collaboration in defense related opportunities.

Mechanical Dimensions (all units in mm)



60 x 12 x 6.5



116 x 12 x 6

(42+1) x 1 High Power Pump-Signal Combiner Specification

Description						
(42+1) x 1 High Power Pump-Signal Combiner - 400 μm Output						
Feature	Min.	Typical	Max.	Unit	NOTE	
MM Input Fibers						
Number			42		Up to 42 pump arms are available by attaching six 7x1 MM pump combiners to a (6+1) x 1 pump-signal combiner	
Numerical Aperture (NA)		0.225				
Coating Outer Diameter	240	245	250	μm		
Clad Diameter	123	125	127	μm		
Core Diameter	104	105	106	μm		
Pigtail Fiber Length	1			m		
Coating						High Index Acrylate
Signal Input Fiber						
Core MFD @ 1064 nm		11		μm		
Coating Outer Diameter		425		μm		
Clad Diameter	244	245	248	μm		
Pigtail Fiber Length	1			m		
Coating						High Index Acrylate
Output Fiber						
Core NA		0.065				
Cladding NA		0.46				
Core MFD @ 1064 nm		17		μm		
Coating Outer Diameter	555	560	565	μm		
Clad Diameter		400		μm		
Pigtail Fiber Length	1			m		
Coating						Low Index Polymer Coating
Optical Performance						
Multimode Transmission	95	96	96	%	OFS Standard Test Condition: 95% power within 0.15 NA	
Signal Transmission @ 10XXnm	90			%	Fundamental mode transmission	
Pump Power Peg Leg		72		W		
Maximum Pump Power			2500	W		
Environmental	Transport and Storage Temperature Transport and Storage Humidity				-40 to +85 °C < 85% (non-condensing)	
Mechanical Packages	60 x 12 x 6.5/ 116 x 12 x 6			mm	See Drawing	
Order by Part Number	TBD					

Applications: Fiber Lasers and Amplifiers

NOTE: Custom configurations and packaging is available upon request.

7x1 High Power Combiner Specification

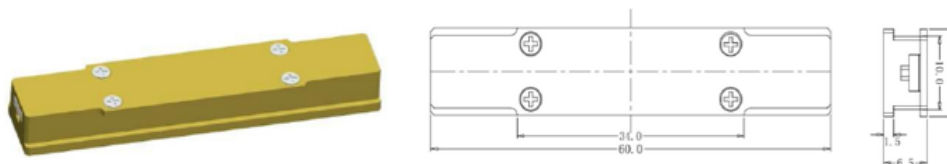
Description	7x1 High Power Pump-Signal Combiner - 400 μm Output				
Feature	Min.	Typical	Max.	Unit	NOTE
Multimode Pump Input Fibers					
Number		7			
Numerical Aperture (NA)		0.22			
Coating Outer Diameter	240	245	250	μm	
Clad Diameter	123	125	127	μm	
Core Diameter	104	105	106	μm	
Pigtail Fiber Length	1			m	
Coating	High Index Acrylate				
Output Fiber					
Core NA		0.22			
Cladding NA					
Coating Outer Diameter		425		μm	
Clad Diameter	244	245	248	μm	
Core Diameter	229	231	233	μm	
Pigtail Fiber Length	1			m	
Coating	High Index Acrylate				
Optical Performance					
Multimode Transmission	95	98	99	%	OFS Standard Test Condition: 95% power within 0.15 NA
Overall Backward Cross Talk		TBD			
Average Isolation (per leg)		TBD			
Pump Power per Leg		72		W	
Total Pump Power		450		W	
Package Weight (g) Al		12		g	
Environmental	Transport and Storage Temperature			-40 to +85 °C	
	Transport and Storage Humidity			< 85% (non-condensing)	
Mechanical Package	60 x 12 x 6.5		mm	See Drawing	
Order by Part Number	TBD				

Applications: Fiber Lasers and Amplifiers

NOTE: Custom configurations and packages are available upon request.

Mechanical Dimensions (all units in mm)

60 x 12 x 6.5



(6+1) x 1 High Power Pump-Signal Combiner Specification

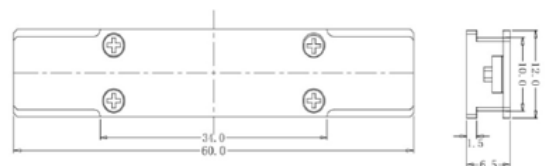
Description		(6+1) x 1 High Power Pump-Signal Combiner - 400 μm Output			
Feature	Min.	Typical	Max.	Unit	NOTE
Multimode Pump Input Fibers					
Number		6			
Numerical Aperture (NA)		0.225			
Coating Outer Diameter		425		μm	
Clad Diameter	240	245	250	μm	
Core Diameter	229	231	233	μm	
Pigtail Fiber Length	1			m	
Coating					High Index Acrylate
Signal Input Fiber					
Core MFD @ 1064 nm		11		μm	
Coating Outer Diameter		425		μm	
Clad Diameter	244	245	248	μm	
Pigtail Fiber Length	1			m	
Coating					High Index Acrylate
Output Fiber					
Core NA		0.065			
Cladding NA		0.46			
Core MFD @ 1064 nm		17		μm	
Coating Outer Diameter	555	560	565	μm	
Clad Diameter		400		μm	
Pigtail Fiber Length	1			m	
Coating					Low Index Polymer Coating
Optical Performance					
Multimode Transmission	98			%	OFS Standard Test Condition: 95% power within 0.15 NA
Signal Transmission @ 10XXnm	90			%	Fundamental mode transmission
Overall Backward Cross Talk		TBD			
Average Isolation (per leg)		TBD			
Pump Power Peg Leg		415		W	
Maximum Pump Power			2500	W	
Package Weight (g) Al		21		g	
Environmental		Transport and Storage Temperature			-40 to +85 °C
		Transport and Storage Humidity			< 85% (non-condensing)
Mechanical Package		60 x 12 x 6.5		mm	See Drawing
Order by Part Number					TBD

Applications: Fiber Lasers and Amplifiers

NOTE: Custom configurations and packaging is available upon request.

Mechanical Dimensions (all units in mm)

60 x 12 x 6.5



For additional information please contact your sales representative.

You can also visit our website at www.ofsoptics.com

or call 1-888-FIBER-HELP (1-888-342-3743) from inside the USA or +1-770-798-5555 from outside the USA.
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