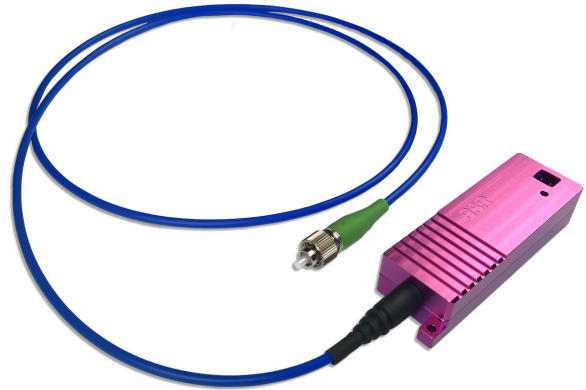


Applications

- Raman Spectroscopy & Imaging
- Interferometry
- Particle characterization
- HeNe Replacement
- Holography



Module Features

- Narrow spectral laser (300MHz or Less)
- PM Single Mode fiber
- Low RMS and Pk-Pk Noise
- Integrated Circuits – Drive, Power & Temp stability
- Rugged, single compact package design

Single Frequency Fiber Coupled Laser

The FiberTec SF™ (Single Frequency) laser module features one fiber-coupled, high performance, narrow linewidth laser diode with a stabilized, single longitudinal mode (SLM). Integrated electronics provide laser diode (LD) drive current, temperature stability, ESD protection, drive current monitor, module shutdown, laser modulation, and LD overdrive protection functions. Laser power output is via a connectorized, 1-meter-long PM single mode fiber (standard offering). Circuits are RoHS 3 compliant.

FiberTec SF™ products are offered with a 638 nm, 785 nm, or 830 nm wavelength Laser Diode. An internal volume Bragg grating is used to create a single frequency output with long coherence length and the integrated electronics are optimized for low noise LD operation. All FiberTec SF™ Laser Modules incorporate BSR μLens™ to maximize laser power coupling to the fiber and assure stable output over product lifetime. The FTEC SF single frequency laser module is designed to be easily integrated into OEM instrumentation and offers an excellent balance of performance, value and reliability.

Advantages of Using Fiber

The unique properties of optical fibers allow a reduction in optical systems complexity and enable lower system cost. System performance can be optimized by using the cost-effective fiber for light relay and beam shaping. A single mode fiber maintains near perfect Gaussian beams without introducing aberrations. In addition, optical fibers maintain the best beam pointing and steering tolerances throughout temperature variations comparing to free-space delivery optics, enabling a robust and stable system performance over wide operation conditions.

Blue Sky Research is an ISO 9001:2015 organization

Optical Specifications

Specification		Performance		
Wavelengths*	nm	638	785	830
Optical Output Power (Max)*	mW	60	60	60
Linewidth (pm/MHz) **	$\Delta\lambda$	0.4/300	0.2/100	0.7/300
Central Wavelength Tolerance	nm	+/- 1	+/- 1	+/- 1
Single Spatial Mode Field Diameter	μm	4.5	4.5	4.5
Spectral Purity (SMSR) (typical) **	dB	≥ 40	≥ 40	≥ 40
M2 Beam Quality		< 1.2	< 1.2	< 1.2
Wavelength Stability (8 hrs)	pm	< 20	< 20	< 20
RMS Noise (10Hz to 20MHz)**	%	0.05	0.05	0.05
Pk-Pk Noise (10Hz to 20kHz)**	%	0.45	0.45	0.45
Power Stability (1 hr)**	%	0.3	0.3	0.3
PM Fiber Numerical Aperture	NA	0.11	0.11	0.11
Polarization Ratio (typical)**	dB	20	20	20

* Contact Sales@Blueskyresearch.com for latest information on Laser Diode wavelength/Power offerings and custom configurations

** Specification are valid at rated output power

Electrical Specifications

Electrical Specification	Units	
Operating Voltage	V	3.3V \pm 0.25 (TEC)
Operating Current	A	1.5A max for 3.3V (TEC), < 0.5A for 5.0V (LD)
Operation Mode		ACC
Analog Modulation Frequency	kHz	3kHz
Dynamic Extinction Ratio	dB	>23

Environmental Specifications

Parameter	Units	Specification		Conditions
		Min	Max	
Operating Temperature	$^{\circ}\text{C}$	10	40	Non-Condensing
Storage Temperature	$^{\circ}\text{C}$	-10	85	Non-Condensing
Storage Humidity	%	10	90	Non-Condensing

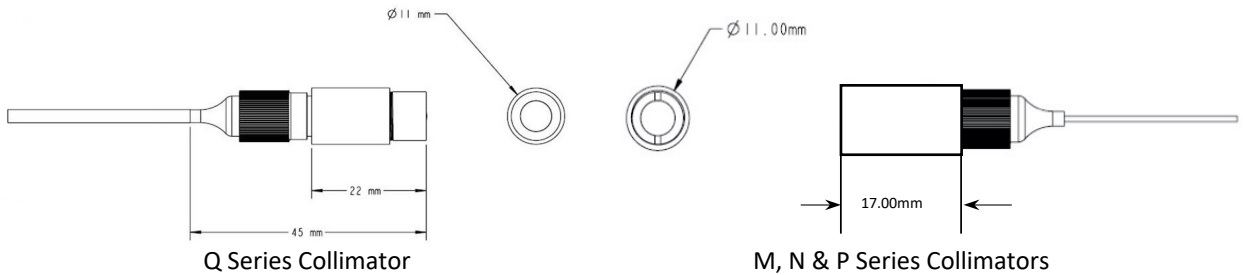
Collimation Optics

A cylindrical collimator option is available for the FiberTec SF™; the collimator is a miniature lens enclosure secured to the fiber pigtail's connector and houses an aspheric or doublet lens which provides a specific collimated beam diameter and divergence. The collimator does not affect beam quality or Polarization Extinction Ratio (PER). Beam size specifications must be specified at time of purchase. Please contact Blue Sky Research for exact beam specifications as beam diameter and divergence are dependent on wavelength and laser diode. Focus optics are available as an option.

Collimator Specifications	M	N	P	Q
Beam Diameter* @ 1/e ² (mm) , +/- 25%	0.75	1.25	1.8	4
Beam Divergence (mrad) ** @638nm	1.20	0.80	0.50	0.40

* Typical data at 638nm, constant temp of 25°C, constant Pout.

** Beam Diameter and Divergence will change with LD wavelength, contact Blue Sky Sales for exact specifications relative to your specific wavelength of interest



ACC and APC Operation

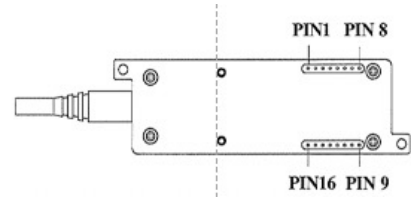
For optimal spectral and optical power performance of the FiberTec SF™ module, ACC operation is recommended.

ACC (automatic current control): Laser Diode driving current is detected and feedback to control circuit. An error signal is generated to lock the LD current to preset value or user specified setting. This is the preferred mode of operation for the FiberTec SF™ module.

APC (automatic power control): Laser power is detected via a back facet monitor inside the laser diode housing (TO can). An error signal is generated to adjust LD current to lock power to preset value or user specified setting.

Electrical Connection and Operation of FiberTec SF™

Customer can choose one from two options of electrical connection for FiberTec SF™ operation: 16 Pin or 8 wire ribbon. The most advanced interface (16 Pin) uses two rows of 8 pins on the bottom of the unit. You can remotely access all functions available in the FiberTec SF™



The Pin out locations are shown above. When looking at the bottom of the module and the fiber exiting from the left, Pin #1 is in the upper left-hand corner, and Pin #16 is in the lower left-hand corner.

Control functions for FiberTec SF™ – 16Pin or 8 wire ribbon

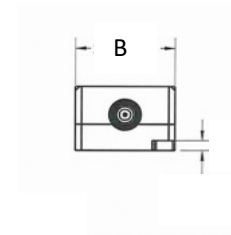
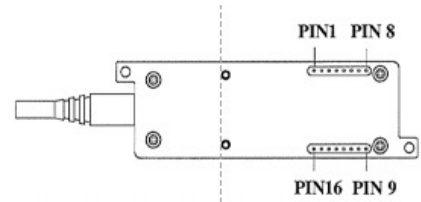
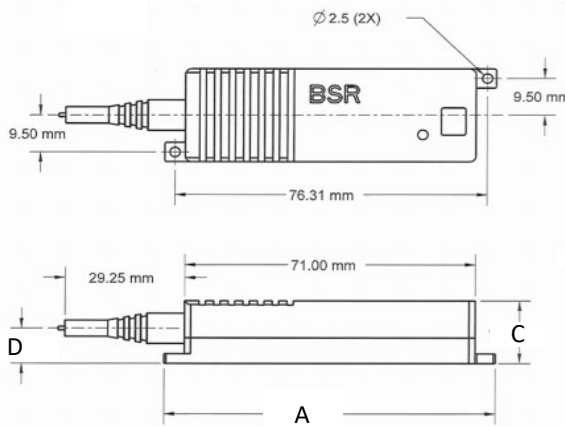
Pin No	Wire Ribbon	Name	Type	Description
1	BLUE	DIS	Input	SHUTDOWN, Laser enable/disable, GND active. CMOS HI (>4.2V) to disable, input impedance ~20kΩ
2	GREY	LDV	Output	Laser Diode Monitor, Voltage proportional to drive current on LD (in test report that comes w/FiberTec™)
3	YELLOW	GND	Input	Ground
4	GREEN	Vset	Analog Input	Constant Current or Constant Power setting, Variable power input control, 0 ~ 5V
5		Them Mon	Output	Monitor of Thermistor resistance for temperature
6		APC	Input	Connect to Pin 15 to select APC mode operation
7		ACC	Input	Connect to Pin 8 to select ACC Mode operation
8		ACC	Input	Connect to Pin 7 to select ACC mode operation
9	ORANGE	Vcc	Power	LD Driver Circuit Supply Voltage, 5V/6.5V/8V laser specific.
10	YELLOW	GND	Input	Ground
11		Vtemp	Input	Input voltage to change the set temperature of the TEC, typ 1.24V = 25°C
12		TEC OK	Digital Output	Output Hi for TEC within 1 C of set temperature
13	PURPLE	PD Mon	Output	PD Monitor, Voltage is inversely proportional to output power, laser specific, see FiberTec™ test report
14	BROWN	TEC GND	Input	GND for 3.3V TEC Supply
15		APC	Input	Connect to Pin 6 for APC Mode Operation
16	RED	Vtec	Input	TEC Supply Voltage, 3.3V

If module has an eight-wire ribbon exiting from the rear of the module. the function assignment of each color wire is shown in the table above. The FiberTec SF™ is set at ACC mode in factory to meet system specifications. If you want to switch between ACC and APC modes, please contact BSR sales.

Optional Evaluation Board for FiberTec SF™

An optional Evaluation Board can quickly get FiberTec modules (with a 16 Pin interface) running without building a unique PCB. The evaluation board gives users access to the optical output and all electrical connections including LD drive, control, monitoring, and protection circuits. The Evaluation Board has a built-in heat sink to help with thermal management, and four corner posts to facilitate system mounting. Please contact BSR sales for more details.

FiberTec SF Mechanical Specifications



FiberTec SF™	Dimension
A Length	81 mm
B Width	24 mm
C Height	15 mm
D Fiber Exit Height	7.76 mm
E Flange Height	4.5 mm

Ordering Information

FTEC SF-XXX-YZZZ-P-BCDE

Product Family – FTEC SF or FTEV SF

FTEC SF = Single Frequency wavelength laser system w/TEC, control, drive & stability circuits

FTEV = FTEC SF + separate evaluation board

XXX - Wavelength in nm – 638 for 638nm LD, 785 for 785nm LD, 830 for 830nm LD

Y - O = Wire ribbon interface, with manual trimpot power adjust

- V = Wire ribbon interface

- P = Pin interface

ZZZ - Power Output (mW) = 060

P = Polarization Maintaining smf (PM)

B - Optical Connector: F = FC/PC, A = APC

C - Collimator choice: O = no collimator, G = Cylinder,

D – Collimator lens - M, N, P, Q see collimator specifications for details, O = no collimator lens

E – H = 3mm buffer, J = 3mm armored metal jacket, K = 900um PVC Jacket

All FiberTec SF™ modules come with 1 meter connectorized fiber pigtail output as standard. Please contact Blue Sky Research Sales if different fiber pigtail lengths are required.

Blue Sky Research

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ISO 9001:2015 Certified

RoHS 3 Compliant

