

Fiber-coupled Acousto-Optic Frequency Shifters



KEY FEATURES

- Low Insertion Loss
- Broad Wavelength Range
- Low Power Consumption
- Hermetically Sealed
- Low RF Drive Power
- Stable Performance
- Good Temperature Stability and Reliability
- Custom Configurations Available

APPLICATIONS

- Fiber Sensing
- Heterodyne Detection
- Interferometric Fiber Sensor Systems
- Laser Doppler Configurations
- OEM Designs

Fiber-coupled Acousto-Optic Frequency Shifters

Brimrose's Fiber-coupled, Acousto-Optic Frequency Shifter Systems are used to shift the frequency of various optical signals. Due to a Doppler Shift, the frequency of the diffracted first order optical beam in the AO modulator or AO frequency shifter is shifted in frequency (wavelength) by the acoustic carrier frequency (wavelength).

If the incident acoustic wave is introduced in the direction of the incident optical wave, the laser frequency shifts towards the higher side. If the incident acoustic wave is introduced in the opposite direction of the incident optical wave, the laser shifts toward the lower frequency side.

The typical 3 dB spectral range of an AOFS device is ~60-120 nm and the 3 dB frequency shift range is ~10% of the center frequency. For wide bandwidth applications, Brimrose developed an AOFS with an extended frequency shift range of up to 100 MHz.

Brimrose offers a large variety of **RF drivers** compatible with our AO Frequency Shifters. Typically, those are fixed-frequency or variable-frequency drivers.



Brimrose Corporation of America

Fiber-coupled Acousto-Optic Frequency Shifter Specifications

Model #	Wavelength XX (nm)	Insertion Loss (dB)	Frequency Shift (MHz)	Fiber Type
TEF-125-XX-2FP	360-1600	2.5-4.0	+125 or -125	SM or SMPM
TEF-200-XX-2FP	360-1600	2.5-4.0	+200 or -200	
TEF-300-XX-2FP	360-1600	3.0-5.0	+300 or -300	
TEF-1000-XX-2FP	360-1600	8.0-12.0	+1000 or -1000	
IPF-200-XX-2FP	980-2000	2.3-5.0	+200 or -200	SMPM
IPF-500-XX-3FP	980-2000	2.3-6.0	+500 or -500	
IPF-1000-XX-3FP	980-2000	8.0-11.0	+1000 or -1000	
IPF-1500-XX-3FP	980-2000	9.0-12.0	+1500 or -1500	
AMF-25-XX-2FP	980-2900	2.0-2.2	+25 or -25	SM or SMPM
AMF-55-XX-2FP	980-2900	2.0-2.2	+55 or -55	
AMF-100-XX-3FP	980-2900	2.1-3.3	+100 or -100	
AMF-150-XX-3FP	980-2900	2.1-3.9	+150 or -150	
IPF-200-100-XX-2FP	980-2000	6.0-8.0	+150 to +250 or -150 to -250	SMPM
IPF-300-100-XX-2FP	980-2000	6.0-8.0	+250 to +350 or -250 to -350	
TEF-200-100-2FP	360-1000	6.0-8.0	+150 to +250 or -150 to -250	SM or SMPM

The Fiber-coupled Frequency Shifter models shown above represent some examples of our fabrication capabilities. In addition, other wavelengths, frequencies or configurations are available.

For more information, please check the Brimrose website or contact us at office@brimrose.com.

Fixed Frequency Driver Specifications

Driver Model #	FFF-XX-B1-FY	FFF-XX-B2-FY
Frequency (MHz)	XX MHz (compatible with the AO device)	
Frequency Control	Quartz crystal referenced phase locked loop	
Frequency Accuracy (%)	0.015	
Harmonic Content (dBc)	≤ - 10	
Frequency Stability	0.0015% minimum after 15 minute warm-up	
Output Power (watt)	Power is optimized for peak efficiency with supplied A-O device.	
Output Protection	Power amplifiers used will tolerate an infinite V.S.W.R. without damage. Rated power is available only when a proper RF load is connected.	
Rise/Fall Time	To match AO Frequency Shifter requirements	
Modulation Type (optional)	Analog amplitude modulation	TTL compatible
Modulation Rate	To match AO Frequency Shifter requirements	
Modulation Input	50 Ω; 0-1 V	330 Ω; 0-5 V
Operating Power	90-240 VAC, 50-60 Hz, 55 watts max.	
Enclosure	The unit will be packaged in a 190 mm (7.5 inch) wide by 100 mm (4 inch) high by 220 mm (8.75 inch) deep instrument case. The rear panel heat sink increases the depth to 240 mm (9.75 inches) maximum. The size is exclusive of connectors. A detachable AC line cord and RF cable are provided.	
Environmental	Nominal Laboratory Conditions: The maximum temperature is +35° C. The unit is not sealed against moisture or condensing humidity.	

Variable Frequency Driver Specifications

Driver Model #	VFF-XX-YY-V-A-F2	
Frequency Range	Corresponding to the AO device requirements	
Tuning Voltage	0 - 10 V DC analog (tolerates -2 to +20 V DC)	
Frequency Accuracy	≤ 1% after 15 minute warm-up	
Scanning Speed	50 micro-sec. from min. to max. frequency with step change in tuning voltage	
Output Power	Power is optimized for peak efficiency with supplied AO device.	
Modulation Type (optional)	Analog amplitude modulation	TTL compatible
Modulation Input	50 Ω; 0-1 V	330 Ω; 0-5 V
Operating Power	90-240 VAC, 50-60 Hz	
Enclosure	The unit will be packaged in a 190 mm (7.5 inch) wide by 100 mm (4 inch) high by 220 mm (8.75 inch) deep instrument case. The rear panel heat sink increases the depth to 240 mm (9.75 inches) maximum. The size is exclusive of connectors. A detachable AC line cord and RF cable are provided.	
Environmental	Nominal Laboratory Conditions: The maximum temperature is +35° C. The unit is not sealed against moisture or condensing humidity.	

OEM packaging is also available.

In addition to the standard product shown, customer configurations are available for specialized applications.

If there are any questions, please contact Brimrose at office@brimrose.com.