



## Bandpass Tunable Filter WLTF-BM- & WLTF-BE-

Short & Long Bandpass Tunable Filters of WLTF-BM- & WLTF-BE- series are built based on free-space optical Fourier transformation combining with diffraction grating to implement passband tuning. Unique optics design produces an access of selecting spatially desired spectral ingredients, either long pass or short pass, of input light and offers flat transmission in passband with unprecedented low insertion loss and polarization dependent loss (PDL). Precise tuning mechanism enables filters to provide high wavelength resolution and excellent wavelength repeatability.

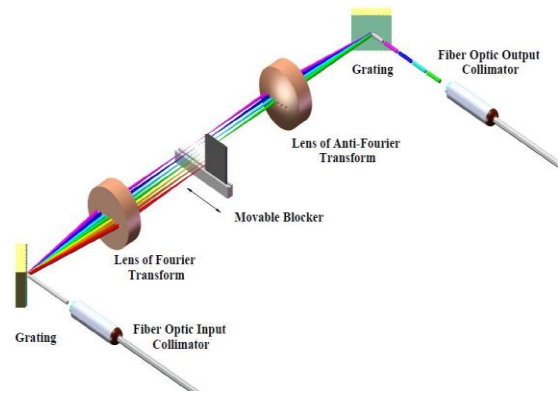
Both of manual and electric version filters are available over X-, O-, S-, C-, & L-bands. Wavelength-tuning is actuated by either a precise micrometer driver or a built-in micro motor connected to a PC through a USB (I<sup>2</sup>C or SPI) interface in which actuation is monitored by a built-in encoder and controlled dynamically in a closed-loop. Motor control software is provided.

### Key Features

- Long-pass or short-pass type available
- Unprecedented low insertion loss and polarization-dependent loss (PDL)
- Sharp filter edge roll-off slope
- Up to 120nm wavelength tuning range
- Wavelength range available over X-, O-, S-, C- and L- bands
- High out-band suppression
- High optical power handling

### Applications

- ASE noise suppression
- Wideband WDM channel filtering
- Pulse shaping and compression
- Analysis of optical spectrum
- Signal filtering



Operating Principle and Tuning Mechanism



Manual Version of WLTF-BM-



Electric Version of WLTF-BE-



## Specifications of Manual Tunable Filter (WLTF-BM-)

Center Wavelength	1060nm±15nm	1310nm±15nm	1550nm±20nm	1600nm±20nm
Tuning Range	80nm	100nm	120nm	120nm
Insertion Loss	1.5dB typ. and 3.0dB max. (connector exclusive)			
Polarization-Dependent Loss	0.15dB typ./0.30dB max. over whole tuning range (SM fiber pigtail only)			
Passband Flatness	<0.10dB (Measured within any 10% of passband)			
Extinction Ratio	20dB (Connector exclusive, PM fiber pigtail only)			
Filter Edge Roll-Off Slope <sup>1</sup>	35dB/nm for S-grade	25dB/nm for S-grade	22dB/nm for S-grade	20dB/nm for S-grade
	100dB/nm For P-grade	75dB/nm For P-grade	65dB/nm For P-grade	60dB/nm For P-grade
Wavelength Resolution	0.02nm			
Wavelength Repeatability	±0.02nm			
Return Loss	>45dB			
Max. Optical Power <sup>2</sup>	500mW (CW)			
Out-Band Suppression	>40dB (for <10nm passband and transmission to the average of background)			
Polarization Mode Dispersion	<0.2ps (SM fiber pigtail only)			
Group Delay	<0.1ps/nm			
Pigtail Fiber Type	HI1060	SMF-28 or SMF-28e		
	Panda PM980 <sup>3</sup>	Panda PM1300 <sup>3</sup>	Panda PM1550 <sup>3</sup>	
Operating Temp.	10°C to 50°C			
Storage Temp.	-10°C to 75°C			
Dimension	38mm (H)x95mm (W)x110mm (L)			
Weight	<0.75kg			
Other	RoHS compliant			
Note	<sup>1</sup> Measured from -3dB to -33dB level			
	<sup>2</sup> High power up to 5.0W (CW) is available on request.			
	<sup>3</sup> PM fibers aligned in PM slow axes (fast-axis blocking) unless specified as others.			

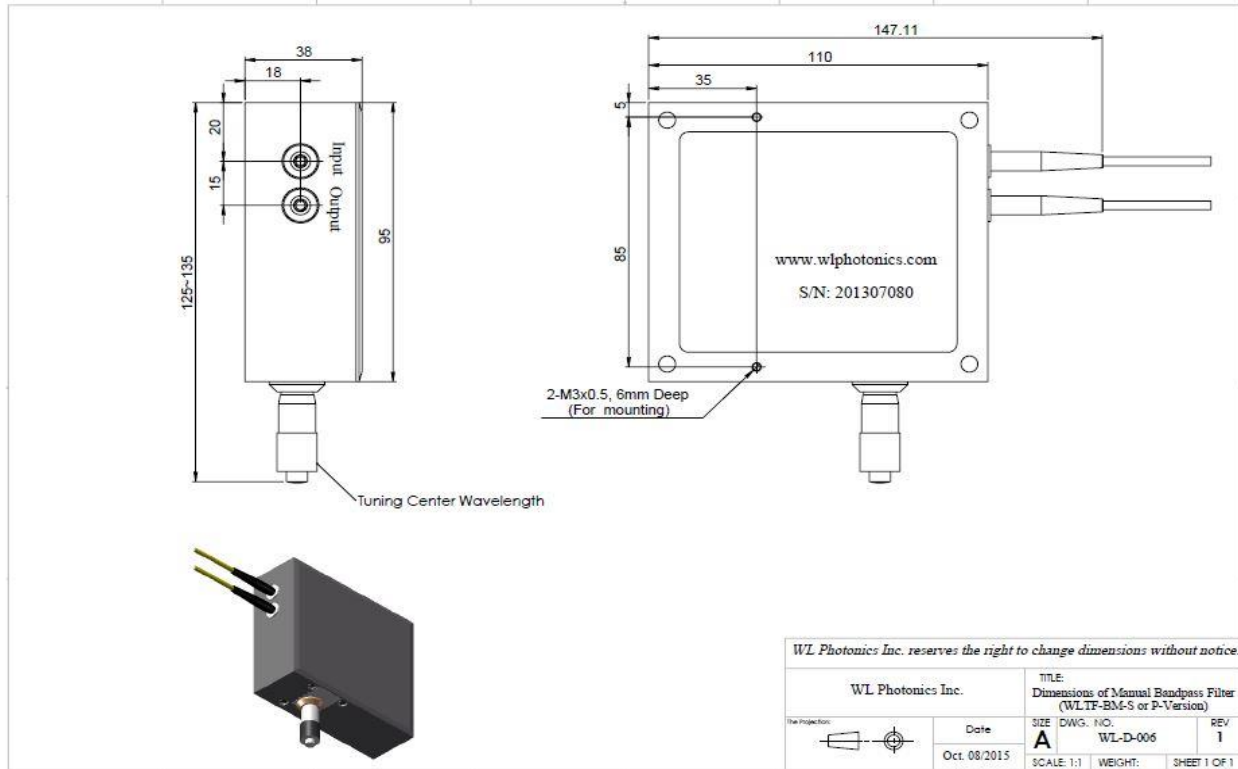


## Specifications of Electric Tunable Filter (WLTF-BE-)

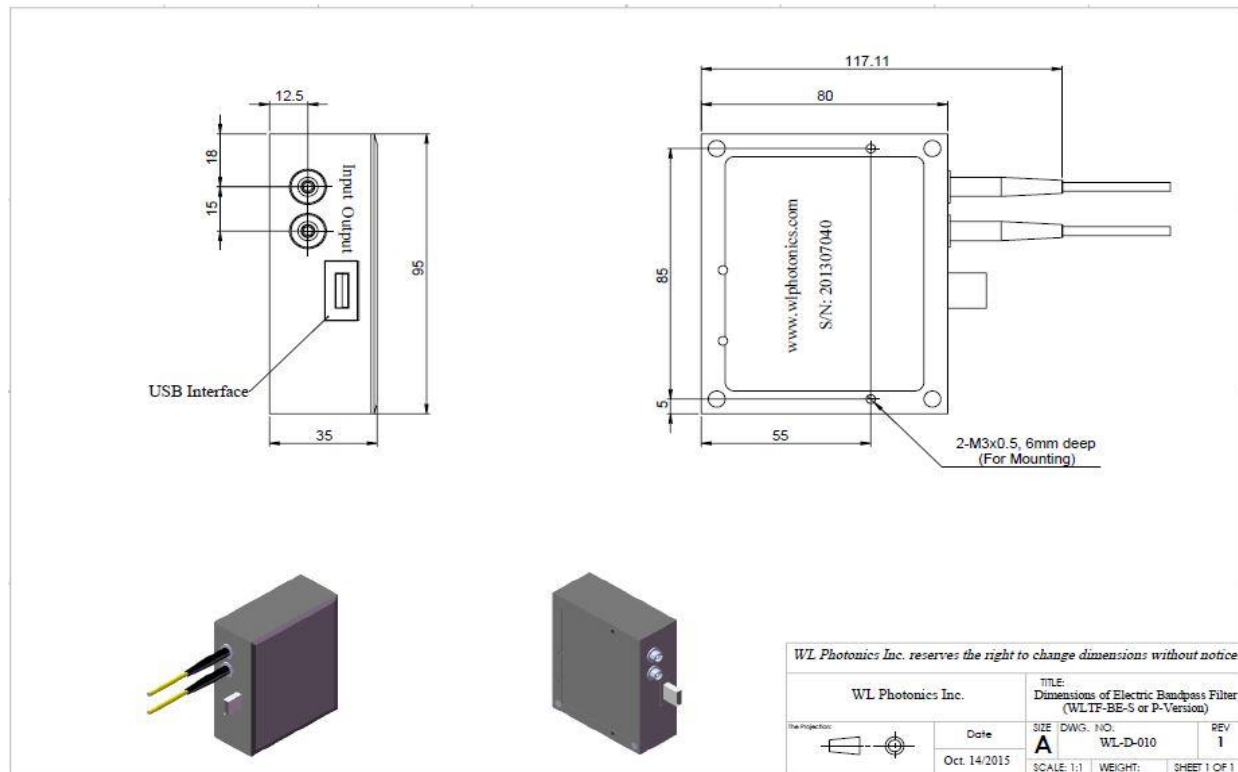
Center Wavelength	1060nm±15nm	1310nm±15nm	1550nm±20nm	1600nm±20nm
Tuning Range	80nm	100nm	120nm	120nm
Insertion Loss	1.5dB typ. and 3.0dB max. (connector exclusive)			
Polarization-Dependent Loss	0.15dB typ./0.30dB max. over whole tuning range (SM fiber pigtail only)			
Passband Flatness	<0.10dB (Measured within any 10% of passband)			
Extinction Ratio	20dB (Connector exclusive, PM fiber pigtail only)			
Roll-Off Edge of Passband <sup>1</sup>	35dB/nm for S-grade	25dB/nm for S-grade	22dB/nm for S-grade	20dB/nm for S-grade
	100dB/nm For P-grade	75dB/nm For P-grade	65dB/nm For P-grade	60dB/nm For P-grade
Wavelength Resolution	0.01nm			
Wavelength Repeatability	±0.01nm (from Home to Target)			
Max. Tuning Speed	80nm/Sec.			
Return Loss	>45dB			
Max. Optical Power <sup>2</sup>	500mW (CW)			
Out-Band Suppression	>40dB (for <10nm passband, transmission to the average of background)			
Polarization Mode Dispersion	<0.2ps (SM fiber pigtail only)			
Group Delay	<0.1ps/nm			
Pigtail Fiber Type	HI1060	SMF-28 or SMF-28e		
	Panda PM980 <sup>3</sup>	Panda PM1300 <sup>3</sup>	Panda PM1550 <sup>3</sup>	
Electric Interface	USB, I <sup>2</sup> C or SPI			
Electric Power Consumption	<0.5W			
Operating Temp.	10°C to 50°C			
Storage Temp.	-10°C to 75°C			
Dimension	35mm (H)x95mm (W)80mm (L)			
Weight	<0.75kg			
Other	RoHS compliant			
Note	<sup>1</sup> Measured from -3dB to -33dB level			
	<sup>2</sup> High power up to 5.0W (CW) is available on request.			
	<sup>3</sup> PM fibers aligned in PM slow axes (fast-axis blocking) unless specified as others.			



**Dimensions of Manual Tunable Filter (WLTF-BM-version)**

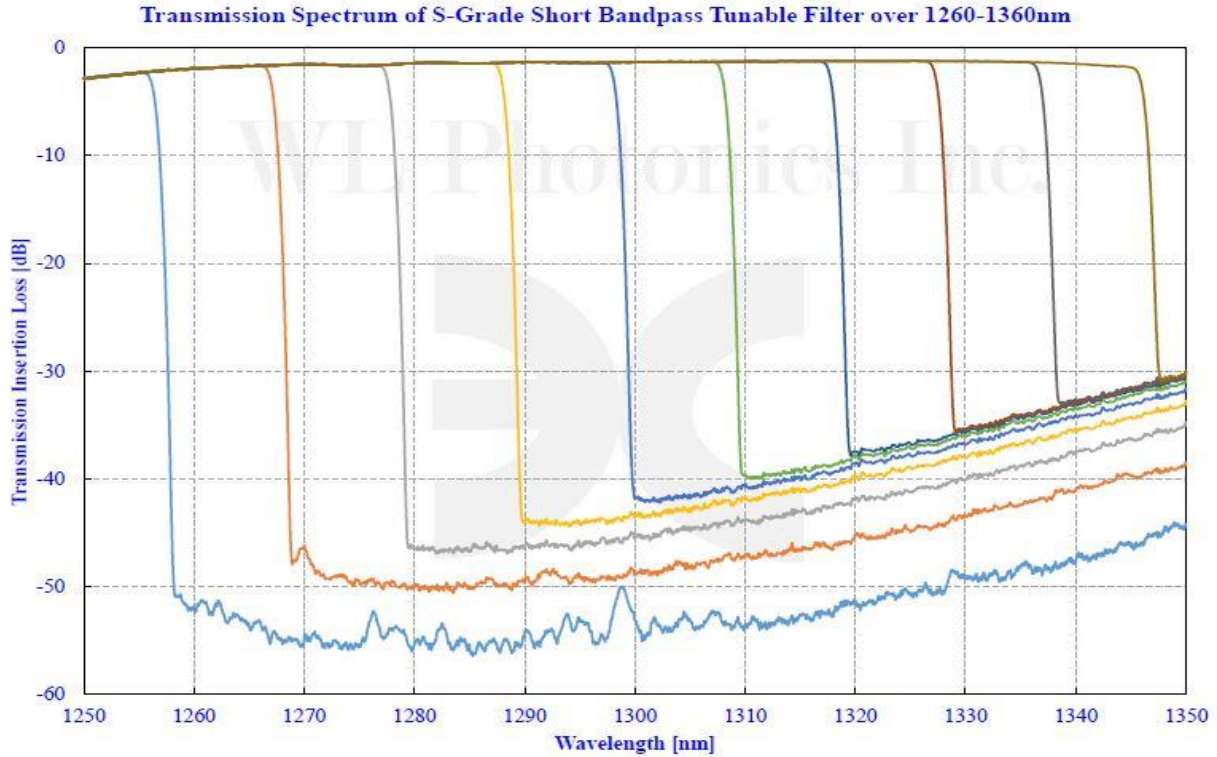


**Dimensions of Electric Tunable Filter (WLTF-BE-version)**

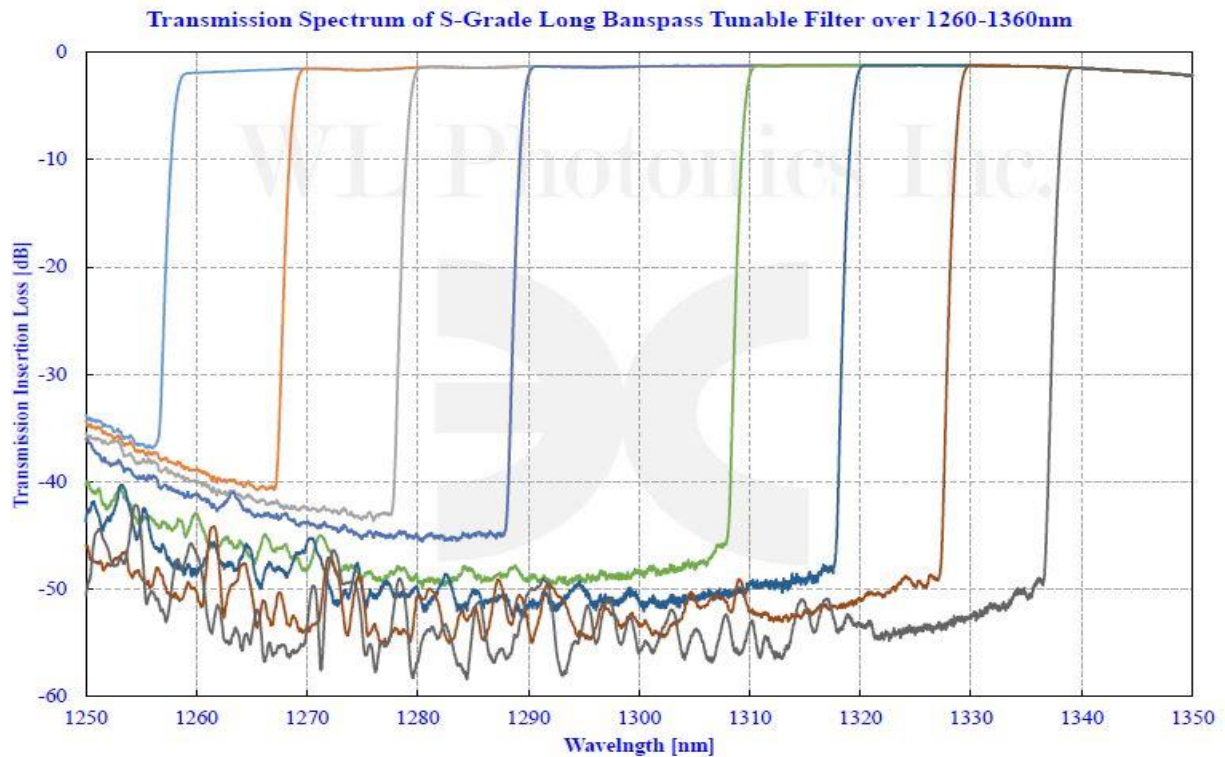




**Example: Typical Transmission Spectrum of Short Passband Tunable Filter over O-Band**



**Example: Typical Transmission Spectrum of Long Passband Tunable Filter over O-Band**





**Ordering Information**

**Part Number of Manual Version: WLTF-BM-ABCDE/FG**

**Part Number of Electric Version: WLTF-BE-ABCDE/FGH**

- A. **S** is for S-grade and **P** is for P-grade version respectively.
- B. **L** is for long bandpass type and **S** is for short bandpass type respectively.
- C. Center Wavelength of tuning range in nanometer: **1550** is for 1550nm center wavelength, **1310** is for 1310nm center wavelength and **1050** is for 1050nm center wavelength.
- D. Fiber type: **SM** is for single mode fiber and **PM** is for polarization maintaining fiber.
- E. Pigtail cable diameter in millimeter: **0.25** is for 250µm OD buffer fiber, **0.9** is for 900µm OD loose tube and **3.0** is for 3.0mm OD cable (only existing for pigtail version).
- F. Pigtail length in meter: **0.5** is for 0.5m long and **1.0** is for 1M long (only existing for pigtail version).
- G. Connector type of either pigtail termination or receptacle interface, such as **FC/APC**, **FC/UPC**, **SC/APC** or **LU/UPC** and **00** is for no connector.
- H. **USB** is for USB interface, **I<sup>2</sup>C** is for I<sup>2</sup>C interface and **SPI** is for SPI interface (electric version only).

**Example 1: WLTF-BM-S-L-1550-SM-3.0/1.0-FC/APC**

Description: S-grade fiber optic polarization-insensitive manually long bandpass tunable optical filter @ 1550nm center wavelength with 1M long, 3.0mm OD loose cabled SMF-28 single mode fiber pigtails and FC/APC connectors on both ports. 500mW optical input power.

**Example 2: WLTF-BM-P-S-1060-PM-0.9/1.0-FC/APC-3.0**

Description: P-grade fiber optic polarization-sensitive electrically short bandpass tunable optical filter @ 1060nm center wavelength with 1M long, 900µm OD loose cabled Panda PM980 fiber pigtails aligned in PM slow axes (fast-axis blocking) and FC/APC connectors on both pigtail ends. 3.0W (CW) optical input power.

**Example 3: WLTF-BE-P-S-1060-PM-0.9/1.0-FC/APC-USB-5.0**

Description: P-grade fiber optic polarization-sensitive electrically short bandpass tunable optical filter @ 1060nm center wavelength with 1M long, 900µm OD loose cabled Panda PM980 fiber pigtails aligned in PM slow axes (fast-axis blocking) and FC/APC connectors on both pigtail ends. 5.0W (CW) optical input power and USB interface.

**Example 4: WLTF-BE-S-L-1310-SM-FC/APC-I<sup>2</sup>C**

Description: S-grade fiber optic polarization-insensitive electrically long bandpass tunable optical filter @ 1310nm center wavelength with receptacle input and output interface for FC/APC connectors. SMF-28 operating fiber, 500mW (CW) optical input power and I<sup>2</sup>C digital interface.