Narrowband Tunable Filter
WLTF-NM- & WLTF-

Narrowband Tunable Filters of WLTF-NM- & WLTF-NE- series are built based on free-space optical Fourier transformation combing with diffraction grating. Patent-pending optics design offers great options of bandwidth with unprecedented low insertion loss and polarization dependent loss (PDL). Precise tuning mechanism enables filters to provide high wavelength resolution and repeatability.

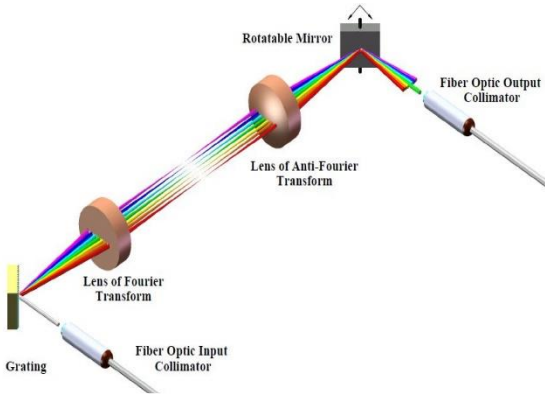
Both of manual and electric version filters are available over X-, O-, S-, C-, & L- bands. Wavelength-tuning is actuated by either a precise micrometer driver or a built-in micro motor connected to a PC through a USB (I²C or SPI) interface in which actuation is monitored by a built-in encoder and controlled dynamically in a closed-loop. Motor control software is provided.

Key Features

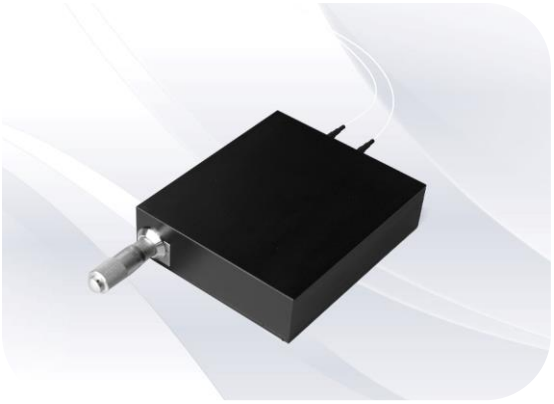
- Operating range available over X-, O-, S-, C- and L-bands
- Up to 200nm wavelength tuning range
- Unprecedented low insertion loss and PDL
- High optical power handling
- Accurate and uniform bandwidth over whole tuning range
- Down to 0.1nm FWHM bandwidth
- High out-band suppression
- Customized versions available on request

Applications

- ASE noise suppression
- DWDM channel filtering
- WDM wavelength tuning
- Pulse shaping
- FBG sensor interrogation
- Tunable fiber lasers



Operating Principle and Tuning Mechanism



Manual Version of WLTF-NM-

Electric Version of WLTF-NE-S-

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Specifications of Manual Tunable Filter (WLTF-NM-)

Center Wavelength	1060nm±15nm		1310nm±15nm		1550nm±20nm		1600nm±20nm	
Tuning Range[1]	60nm	120nm	60nm	120nm	60nm	140nm	60nm	140nm
Insertion Loss	1.5dB typ., 2.5dB max. over 60nm tuning range and 3.0dB max. over 120nm tuning range (Connector exclusive)							
FWHM Bandwidth	0.80nm, 0.60nm, 0.50nm, 0.40nm, 0.35nm, 0.30nm, 0.25nm, 0.20nm, 0.15nm, 0.10nm.		1.40nm, 1.25nm, 1.15nm, 0.90nm, 0.85nm, 0.80nm, 0.75nm, 0.70nm 0.60nm, 0.55nm, 0.50nm, 0.40nm, 0.35nm, 0.30nm, 0.25nm, 0.20nm, 0.15nm, 0.10nm,		1.80nm, 1.50nm, 1.40nm, 1.20nm, 0.85nm, 0.80nm, 0.70nm, 0.60nm, 0.55nm, 0.50nm, 0.45nm, 0.40nm, 0.35nm, 0.30nm, 0.25nm, 0.20nm, 0.15nm, 0.11nm.		1.90nm, 1.60nm, 1.25nm, 1.00nm, 0.85nm, 0.75nm, 0.65nm, 0.55nm, 0.50nm, 0.40nm, 0.35nm, 0.30nm, 0.25nm, 0.20nm, 0.18nm, 0.15nm.	
Wavelength Resolution	0.02nm							
Wavelength Repeatability	±0.02nm							
Polarization-Dependent Loss	0.08dB typ./0.15dB max over 60nm tuning range and 0.15dB typ./0.30dB max over 120nm tuning range (SM fiber pigtail only)							
Extinction Ratio	20dB (Connector exclusive, PM fiber pigtail only)							
Spectral Shape	Gaussian-Shape							
3/20 dB Bandwidth Ratio	~1/2.5							
Bandwidth Variation	±4% over 60nm and ± 6% over 120nm							
Max. Optical Power[2]	500mW (CW)							
Return Loss	>45dB							
Out-Band Suppression	>45dB (Transmission peak to the average of background)							
Polarization Mode Dispersion	<0.2ps (SM fiber pigtail only)							
Group Delay	<0.1ps/nm							
Pigtail Fiber Type[3]	HI1060		SMF-28 or SMF-28e					
	Panda PM980		Panda PM1300		Panda PM1550			
Operating Temp.	10°C to 50°C							
Storage Temp.	-10°C to 75°C							
Dimension	WLTF-NM-P-version: 30mm (H)x95mm (W)x110mm (L); WLTF-NM-S-version (pigtail only): 29mm(H)x70mm(W)x70mm(L)							
Weight	<0.5kg							
Other	RoHS compliant							
Note	[1] Up to 200nm tuning range is available on request.							
	[2] High power version up to 3.0W (CW) is available on request.							
	[3] PM fibers aligned in PM slow axes (fast-axis blocking), or specify others.							

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Specifications of Electric Tunable Filter (WLTF-NE-S-)

Center Wavelength	1060nm±15nm		1310nm±15nm		1550nm±20nm		1600nm±20nm	
Tuning Range	40nm	80nm	45nm	95nm	50nm	110nm	50nm	110nm
Insertion Loss	1.5dB typ., 2.5dB max. over 60nm tuning range and 3.0dB max. over 110nm tuning range (Connector exclusive)							
FWHM Bandwidth	0.80nm, 0.50nm, 0.50nm, 0.40nm, 0.35nm, 0.30nm, 0.25nm, 0.20nm, 0.15nm, 0.10nm,		1.40nm, 1.25nm, 1.15nm, 0.90nm, 0.85nm, 0.80nm, 0.75nm, 0.70nm 0.60nm, 0.55nm, 0.50nm, 0.40nm, 0.35nm, 0.30nm, 0.25nm, 0.20nm, 0.15nm, 0.10nm.		1.80nm, 1.50nm, 1.40nm, 1.20nm, 0.85nm, 0.80nm, 0.70nm, 0.60nm, 0.55nm, 0.50nm, 0.45nm, 0.40nm, 0.35nm, 0.30nm, 0.25nm, 0.20nm, 0.15nm, 0.11nm.		1.90nm, 1.60nm, 1.25nm, 1.00nm, 0.85nm, 0.75nm, 0.65nm, 0.55nm, 0.50nm, 0.40nm, 0.35nm, 0.30nm, 0.25nm, 0.20nm, 0.18nm, 0.15nm.	
Wavelength Resolution	0.01nm for S-grade version							
Wavelength Repeatability	±0.01nm for S-version version (from Home to Target)							
Max. Tuning Speed	80nm/Sec. for S-grade version							
Polarization-Dependent Loss	0.08dB typ./0.15dB max over 40nm tuning range and 0.15dB typ./0.30dB max over 110nm tuning range (SM fiber pigtail only)							
Extinction Ratio	20dB (Connector exclusive, PM fiber pigtail only)							
Spectral Shape	Gaussian-Shape							
3/20dB Bandwidth Ratio	~1/2.5							
Bandwidth Variation	±4% over 60nm and ± 6% over 120nm							
Max. Optical Power	500mW (CW) (up to 3.0W higher power handling available on request)							
Return Loss	>45dB							
Out-Band Suppression	>45dB (Transmission peak 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		Panda PM1300		Panda PM1550			
Electric Interface	USB 2.0, I²C, or SPI							
Electric Power Consumption	<0.5W							
Operating Temp.	10°C to 50°C							
Storage Temp.	-10°C to 75°C							
Dimension	The version with USB interface: 32mm (H)x80mm (W)x95mm (L); The version with I²C or SPI (pigtail only): 27mm(H)x73mm(W)x85mm(L)							
Weight	<0.5kg							
Other	RoHS compliant							

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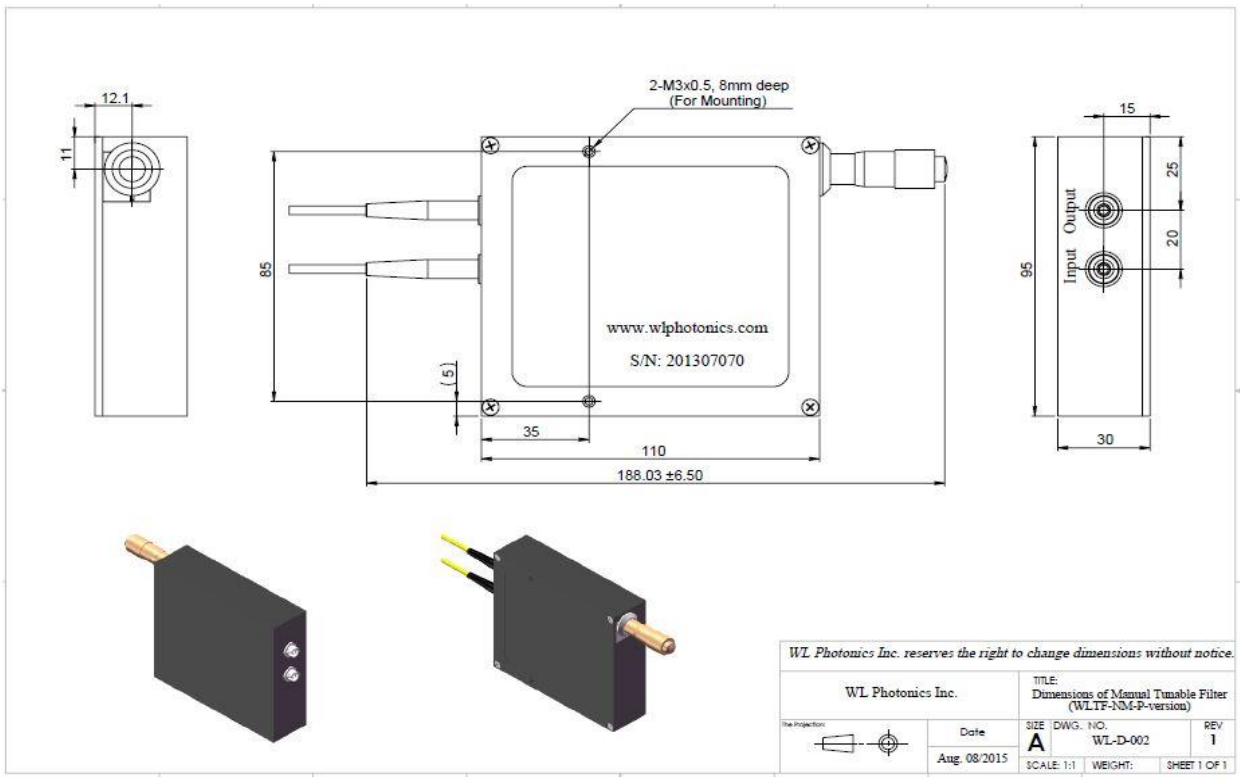
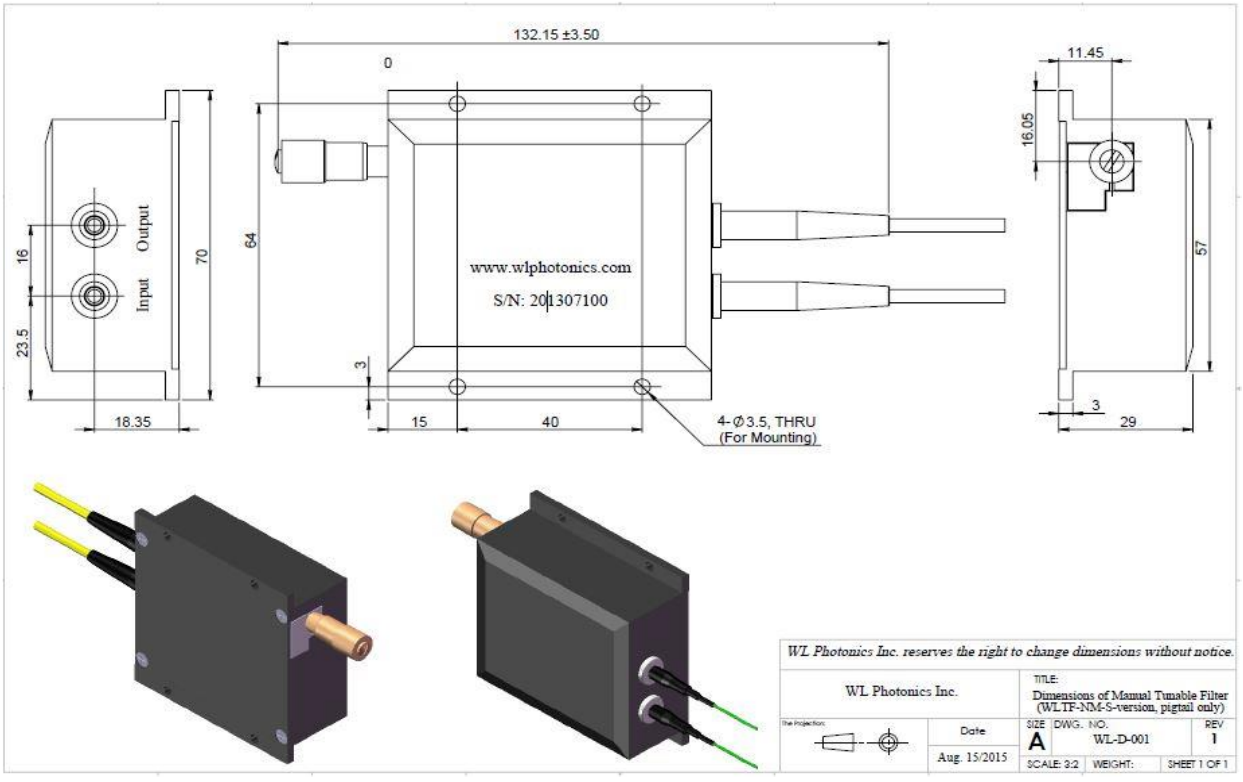
Dimensions of Manual Tunable Filter (WLTF-NM-P-version)



Dimensions of Manual Tunable Filter (WLTF-NM-S-version/pigtail only)



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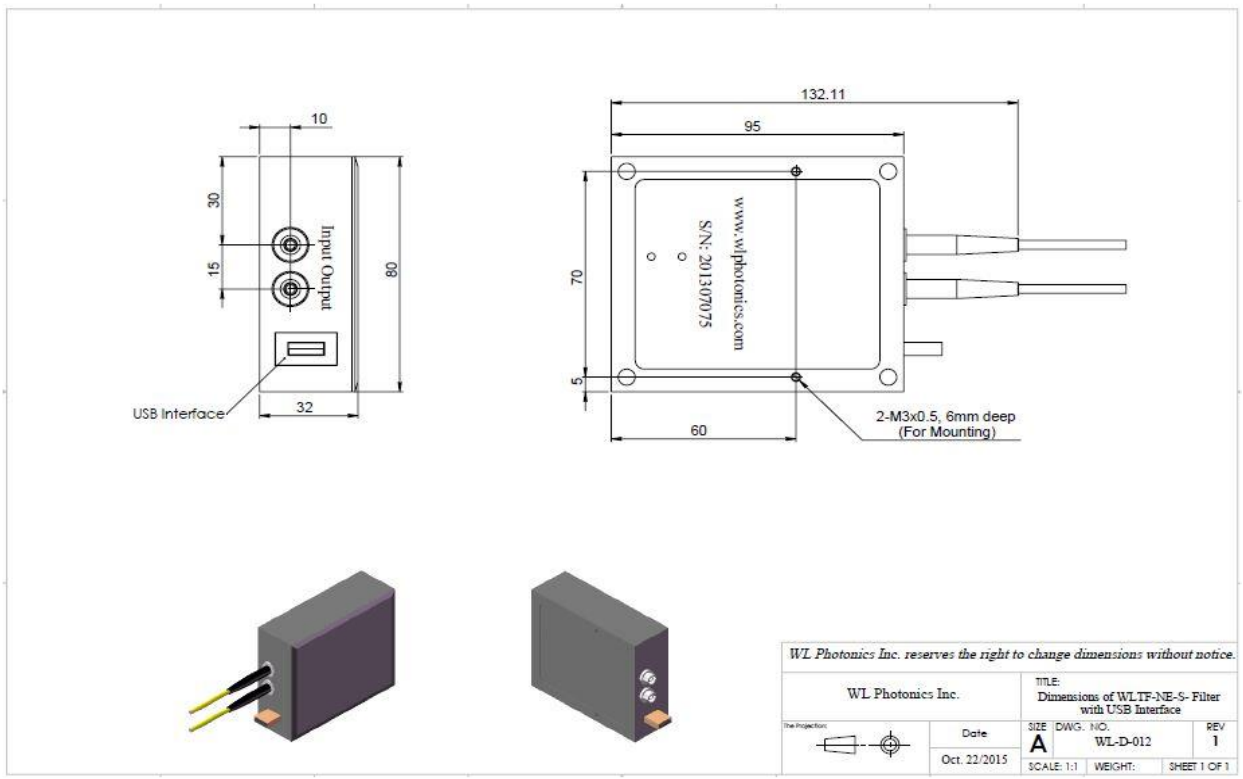
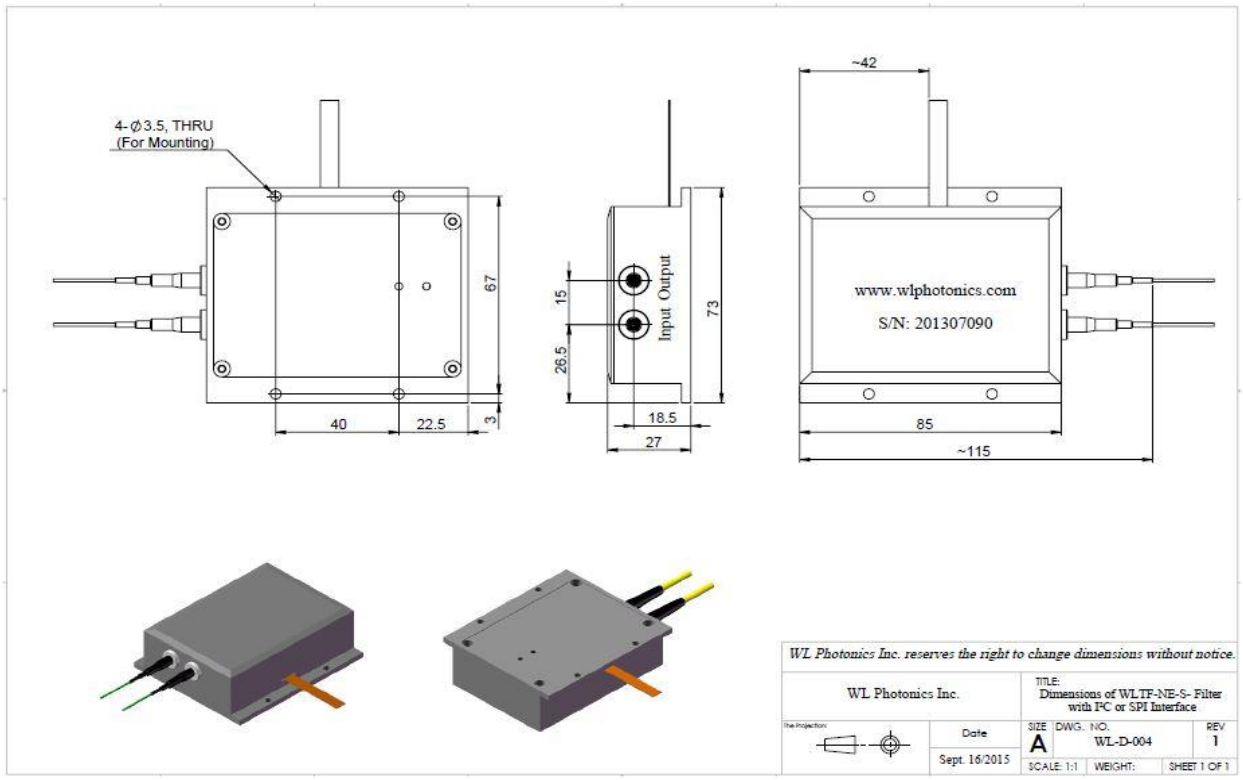
Dimensions of Electric Tunable Filter (WLTF-NE-S-version with USB interface)



Dimensions of Electric Tunable Filter (WLTF-NE-S-version with I²C or SPI interface)



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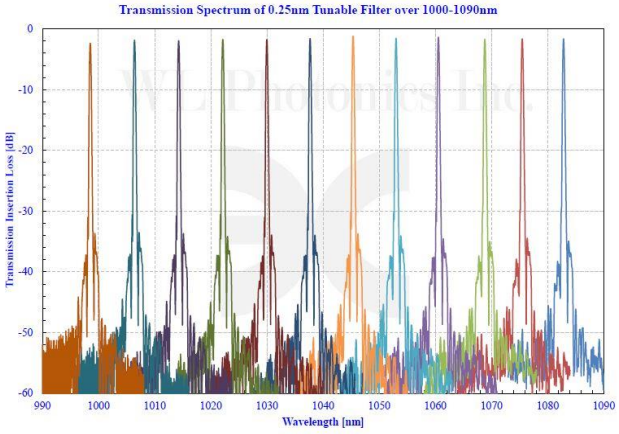
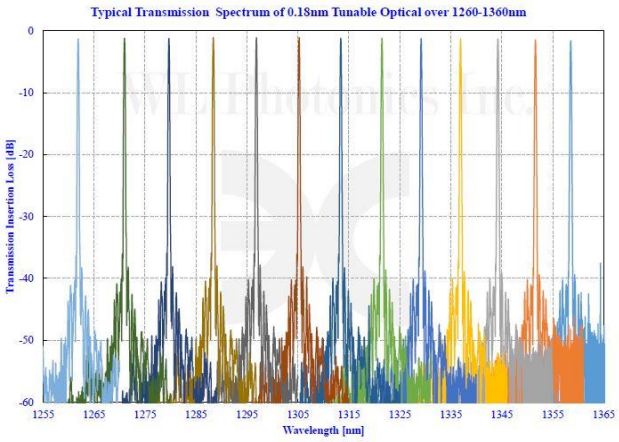
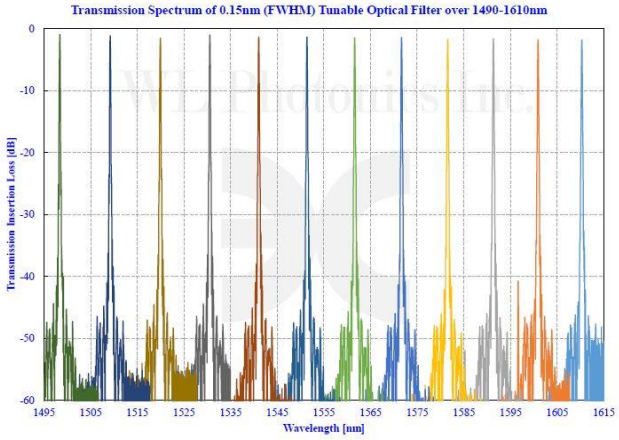
Example: Typical Transmission Spectrum and Tuning Dispersion of 0.25nm Filter over X-Band

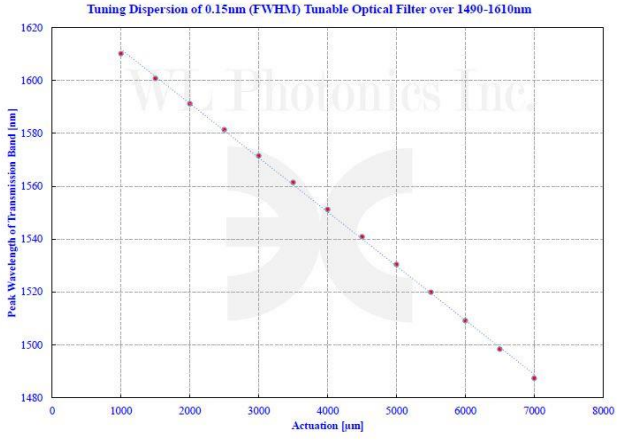


Example: Typical Transmission Spectrum and Tuning Dispersion of 0.18nm Filter over O-Band



Example: Typical Transmission Spectrum and Tuning Dispersion of 0.15nm Filter over S/C/L-Band





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Ordering Information

Part Number of Manual Version: WLTF-NM-A-B-C/D-E-F/G-H

Part Number of Electric Version: WLTF-NE-A-B-C/D-E-F/G-H -I

A. P is P-grade version of either pigtail or receptacle interfaces. S is for S-grade version of pigtail version only.
B. Center wavelength in nanometer: 1550 is for 1550nm center wavelength and 1310 is for 1310nm center wavelength.
C. Tuning wavelength range in nanometer: 60 is for 60nm tuning range and 120 is for 120nm tuning wavelength range.
D. FWHM bandwidth in nanometer: 0.5 is for 0.5nm FWHM bandwidth.
E. Fiber type: SM for single mode fiber and PM for Panda polarization maintaining fiber.
F. 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).
G. Pigtail length in meter: 0.5 is for 0.5m long and 1.0 is for 1M long (only existing for pigtail version).
H. Connector type of either pigtail termination or receptacle adapter, such as FC/APC, FC/UPC SC/APC or LU/UPC and 00 is for no connector.
I. USB is for USB interface, I^2C is for I^2C interface and SPI is for SPI interface (for electric version only).

Example 1: **WLTF-NM-P-1550-120/0.25-SM-3.0/1.0-FC/APC**
Description: P-grade fiber optic polarization-insensitive manually tunable optical filter of 0.25nm FWHM bandwidth over 1490-1610nm tuning range with 1M long, 3.0mm OD loose cabled SMF-28 single mode fiber pigtails and FC/APC connectors on both pigtail ports. 500mW (CW) input optical power.

Example 2: **WLTF-NM-P-1310-60/0.5-SM-FC/APC**
Description: P-grade fiber optic polarization-insensitive manually tunable optical filter of 0.50nm FWHM bandwidth over 1280-1340nm tuning range with receptacle input and output for FC/APC connectors. SMF-28 operating fiber and 500mW (CW) optical input power.

Example 3: **WLTF-NM-S-1060-80/0.1-PM-0.9/1.0-00**
Description: S-grade fiber optic polarization-sensitive manually tunable optical filter of 0.1nm FWHM bandwidth over 1020-1100 tuning range with 1M long, 900μm OD loose cabled Panda PM980 fiber pigtail aligned in PM slow axes (fast-axis blocking) and no connectors on both pigtail ends. 500mW optical input power.

Example 4: **WLTF-NM-P-1550-120/0.11-PM-3.0/1.0-FC/APC-3.0**
Description: P-grade fiber optic polarization-sensitive manually tunable optical filter of 0.11nm FWHM bandwidth over 1490-1610 tuning range with 1M long, 3.0mm OD loose cabled Panda PM1550 fiber pigtail aligned in PM slow axes (fast-axis blocking) and FC/APC connectors on both pigtail ends. 3.0W (CW) optical input power.

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Example 5: **WLTF-NE-S-1550-120/0.35-SM-3.0/1.0-FC/APC-USB**
Description: S-grade fiber optic polarization-insensitive electrically tunable optical filter of 0.35nm FWHM bandwidth over 1490-1610 with 1M long, 3.0mm OD loose cabled SMF-28 single mode fiber pigtails and FC/APC connectors on both ports. 500mW (CW) optical input power and USB interface.

Example 6: **WLTF-NE-S-1310-100/0.5-PM-FC/APC-USB**
Description: S-grade fiber optic polarization-sensitive electrically tunable optical filter of 0.50nm FWHM bandwidth over 1260-1360nm tuning range with receptacle input and output for FC/APC connectors. Panda PM1300 operating fiber aligned in PM slow axes (fast-axis Blocking), 500mW (CW) optical input power and USB interface.

Example 7: **WLTF-NE-S-1060-80/0.1-SM-0.9/1.0-00-SPI**
Description: S-grade fiber optic polarization-insensitive electrically tunable optical filter of 0.1nm FWHM bandwidth over 1020-1100nm tuning range with 1M long, 900μm OD loose cabled HI1060 single mode fiber pigtails and no connectors on both ports. 500mW (CW) optical input power and SPI digital control interface.

Example 8: **WLTF-NE-S-1060-80/0.1-PM-0.9/1.0-00-USB-3.0**
Description: S-grade fiber optic polarization-sensitive electrically tunable optical filter of 0.1nm FWHM bandwidth over 1020-1100nm tuning range with 1M long, 900μm OD loose cabled Panda PM980 fiber pigtails aligned 8n PM slow axes (fast-axis blocking) and no connectors on both ports. 3.0W (CW) optical input power and USB interface.

Customization

Besides the specifications above, other customizations in terms of operating band, transmission bandwidth, power handling, interface and foot print, or other type functionalities related to spectral manipulations are available, please ask our sales for solutions.

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