Electrically Tunable Fiber Optic Filter

(patent pending)

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Based on a proprietary thin film cavity filter technology, Agiltron offers Fiber Optic Tunable Filters with central wavelengths of 1060nm, 1310nm, 1550nm and 2000nm. It is tunable continuously over a wide spectral range up to 80 nm. The wavelength tuning is actuated by driving a build-in precise stepper motor through interface of USB or RS232.

Agiltron's unique high reliability and low insertion loss design presents a most cost-effective solution for OEM applications from fiber optic networks to fiber sensing interrogation.

These grating-based tunable filters block the off-bands.

Features

- Compact and Low Cost
- Wide Tune Range
- Wide Wavelength Coverage
- Low IL and PDL

Applications

- DWDM networks
- Fiber Sensing
- ASE control
- Tunable Fiber Laser

Specifications

Parameter		Min	Typical	Max	Unit
Center Wavelength		350		2400	nm
Tuning Range [1]		-	± 30	± 50	nm
Tuning Resolution		-	0.1	-	nm
Tuning Speed		-	21	-	nm/s
Insertion Loss [2]		1.5	2	3.5	dB
Bandwidth @-3dB		-	1	1.2	nm
Bandwidth @-20dB		-	10	-	nm
Off-Band Suppression		-	30	-	dB
PDL (SM fiber only)		-	0.15	0.35	dB
PMD (SM fiber only)		-	-	0.5	ps
Extinction Ratio (PM fiber only)		18	23	-	dB
Return Loss		40	-	-	dB
Optical Power Handling (CW)	Standard version	-	0.5		W
	High power version		10		W
Power Consumption (5V power supply)			1	1.5	W
Operating Temperature		0	20	60	°C
Storage Temperature		-10	-	70	°C

Notes:

[1]. Longer the wavelength, larger the tuning range

[2]. It is defined as the total light coupled out over the filter's spectral passing band. Measured using a broadband light source with integration of the transmission peak. Extra loss can occur if the laser source does not match the filter profile. A special filter can be made to match the application. The smaller the fiber core, the higher the loss. Excluding connector loss

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link]:

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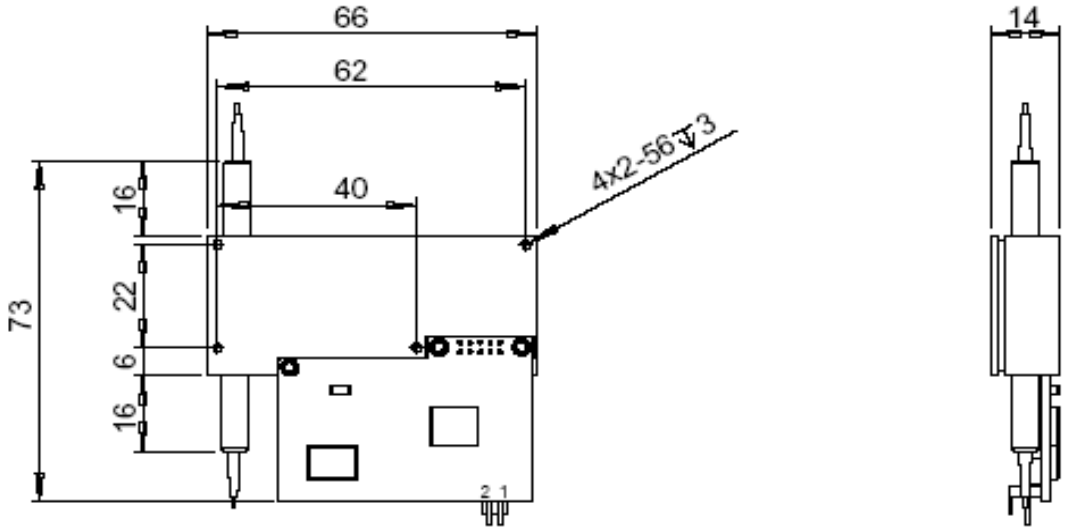
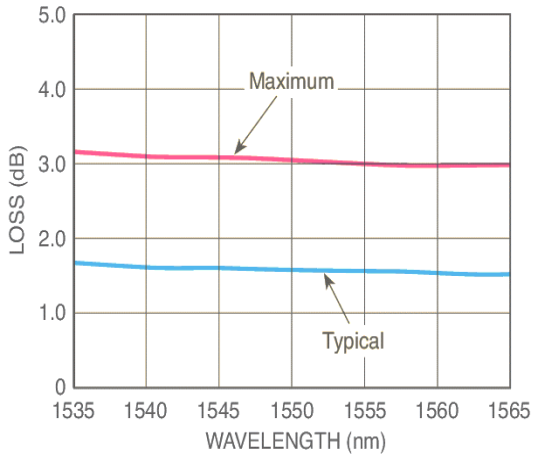
Mechanical Dimension (mm)

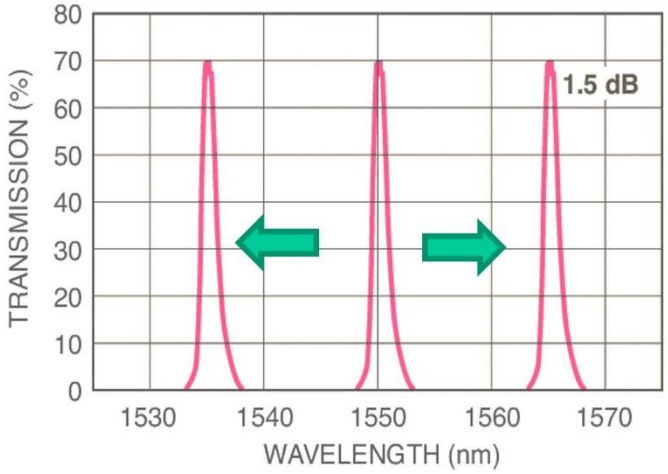


Ship with a 5V DC power supply, an USB-micro USB cable, an USB flash disk, and user manual.

*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Typical Transmission Curve





Electrical Driving

Agiltron provides communication protocols and a computer control kit with USB or RS232 interface and Windows™ GUI.

Connector Pin Definition:

Power	Pin 1	GND
	Pin 2	5V

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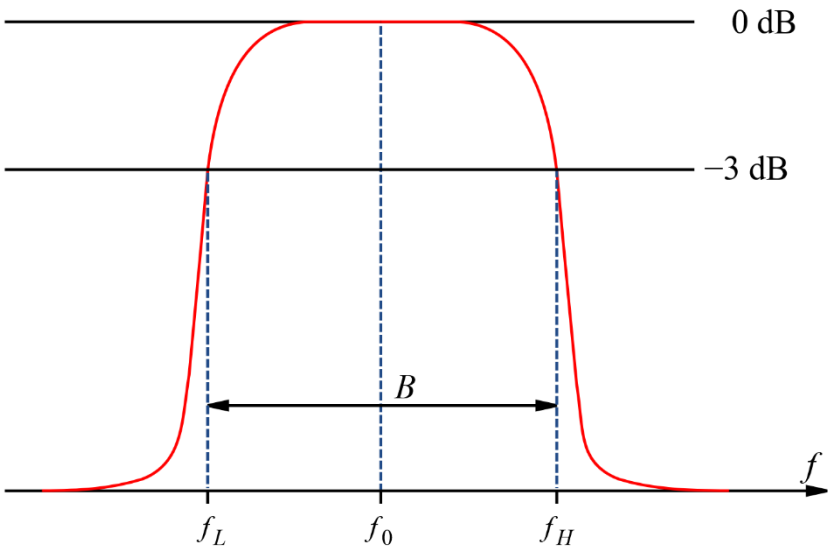
Bandwidth Definition



Ordering Information (Part Number) System

	E1	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Power**	**Control**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**[3]	**API** [2]
FOTF-	01 [1]	2100 ± 60nm = 1 2295 ± 55nm = K 2195 ± 55nm = J 2095 ± 55nm = I 2050 ± 50nm = H 2000 ± 50nm = 2 1960 ± 40nm = 4 1850 ± 50nm = A 1800 ± 50nm = G 1620 ± 40nm = 7 1550 ± 50nm = 9 1550 ± 40nm = 5 1480 ± 40nm = 8 1395 ± 55nm = F 1310 ± 40nm = 3 1230 ± 50nm = E 1145 ± 45nm = D 1130 ± 40nm = C 1060 ± 40nm = 6 1005 ± 45nm = B Special = 0	Standard = 1 High Power = 2	USB = 1 RS232 = 2	SMF-28 = 1 HI1060 = 2 PM980 = 3 PM1550 = 4 SM1950 = 5 PM1950 = 6 Special = 0	Bare fiber = 1 900um tube = 3 Special = 0	0.25m = 1 0.5m = 2 1.0 m = 3 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 Special = 0	Non = N Python = P LabVIEW = L

[1]. Old part number

[2]. We provide a complete command list for customer integration but do not offer debugging support for customer code. However, an Application Programming Interface (API) service is available for an additional fee to assist with system integration and remote connectivity.

[3]. The connector cannot be installed directly onto bare fiber, as it is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer can remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SM28 fiber and decreases further with smaller core fibers.

Red Items require NRE of $1950 to make the filter

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Communication protocol

Users can use the following protocol to communicate with the Tunable Filter and control its position.

Hardware setting: com port, 9600 bits per second, No parity, Data bits 8, 1 stop bit.

Command description:
When powered up, the device sends 'V2'. After successfully initialization, the device sends 'o', otherwise it sends 'e' if there is an error on hardware.
Each command is terminated with ','.
When there is a hardware error, unrecognized command, incorrect command format or the previous command has not completed the device replies with 'e'.

Command	Format	Range	Reply
Select channel	C[n],	[n] wavelength(nm); 1060<[n]<1100	[n]
Scan start	S[n],	[n]: scan span; 1<[n]<30	S: start; S[n]: current wavelength; O: finish
Scan start wavelength	L[n],	[n]: start wavelength(nm); 1060<[n]<1100	L[n]: previous value
Scan end wavelength	H[n],	[n]: end wavelength(nm); 1060<[n]<1100	H[n]: previous value
Scan pause time each wavelength	T[n],	[n]: wait time(second); 1<[n]<30; default 1	T[n]: previous value
Increase the wavelength	I[n],	[n]: Fine tuning up n steps 1<[n]<30	I
Decrease the wavelength	D[n],	[n]: Fine tuning down n steps 1<[n]<30	D
Version	V,		V2

Operation Manual

1. Connect the accompanied wall pluggable power supply
2. Install the accompanied GUI into a computer
3. Connect the device with the computer using the accompanied cable
4. Connect the optical fibers, normally with one end to a source and the other to a system
5. Open the GUI and start scanning the wavelength

How to test the insertion loss of a tunable optical filter

The filter only works in a specific range. Beyond this range, extra peaks may show. These peaks can be blocked with special order. Please follow these instructions to do an optical insertion loss test:

1. Connect a broadband fiber-coupled laser source to OSA, sweep one time over the specified range of the tunable filter, and then fix the curve in Trace A as a reference.

2. Connect the broadband laser source to the fiberoptic tunable filter fiber as input, then connect the other fiber port of the tunable filter as the output to the OSA.

3. Set OSA Trace B as 'write,' Trace C as 'Calculate: B-A.' Auto sweep Trace C from the specific range. Tune the micrometer to shift the peak at a different wavelength. Use 'Peak search' to record IL at a different wavelength."