ITU Optical Channel Tunable Filter

CWDM, WDM, DWDM(100GHz/50GHz)

(patent pending)

DATASHEET

Return to the Webpage

Agiltron's ITU Channel Tunable Filter provides computer-selectable wavelength passband control over telecom ITU grid channels through a USB/RS232 interface with a user-friendly GUI. Configurations are available for up to 22 CWDM channels, 80 DWDM channels at 100 GHz spacing, and 96 DWDM channels at 50 GHz spacing. The design employs passive WDM components to ensure excellent channel accuracy, low distortion, and high-fidelity spectral profiles.

Due to inherent computer delays under Windows, response speed can be improved by using a Linux-based controller or executing stored switching sequences directly on the board. In this mode, the host computer simply issues start, pause, and repeat commands.

Features

- Up to 96 ITU Channel Selection
- High Stability
- Cost-Effective

Applications

- DWDM networks
- Fiber Sensing
- Test

Specifications

Parameter	Min	Typical	Max	Unit
Wavelength Tuning Range [1]	850		1630	nm
Tuning Resolution		ITU		
Tuning Speed		5	20	ms
Insertion Loss		1	2	dB
Bandwidth @-3dB	-	0.7	0.25	nm
Bandwidth @-20dB	-	0.75	-	nm
Polarization Dependent Loss	-	0.25	-	dB
Off-Band Suppression	-	45	-	dB
Polarization Mode Dispersion	-	-	0.5	ps
Return Loss	40	-	-	dB
Optical Power Handling (CW)	-	-	500 [2]	mW
Operating Temperature	0	20	60	°C
Storage Temperature	-10		70	°C
Fiber	SM28			

Notes:

[1]. The transmission is only the wavelength band on the ITU grids, lights between the ITU are blocked.

RoHS COMPLIANT

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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Rev 08/13/26

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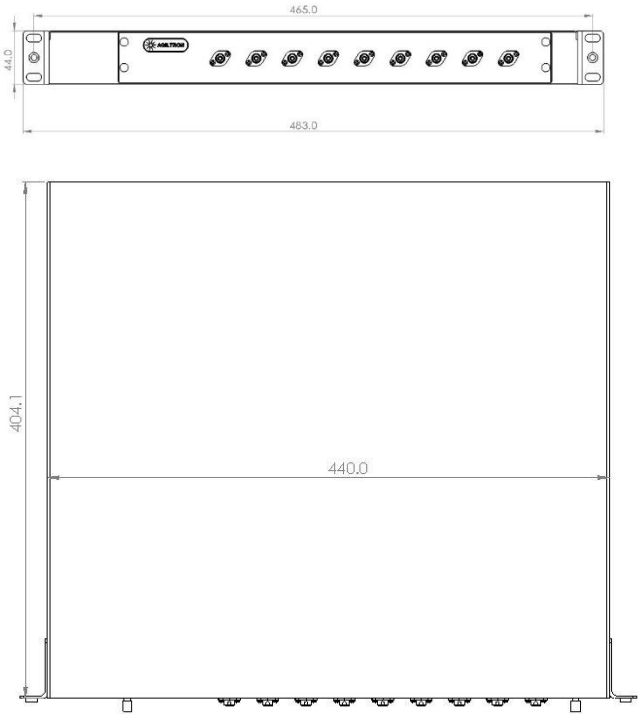
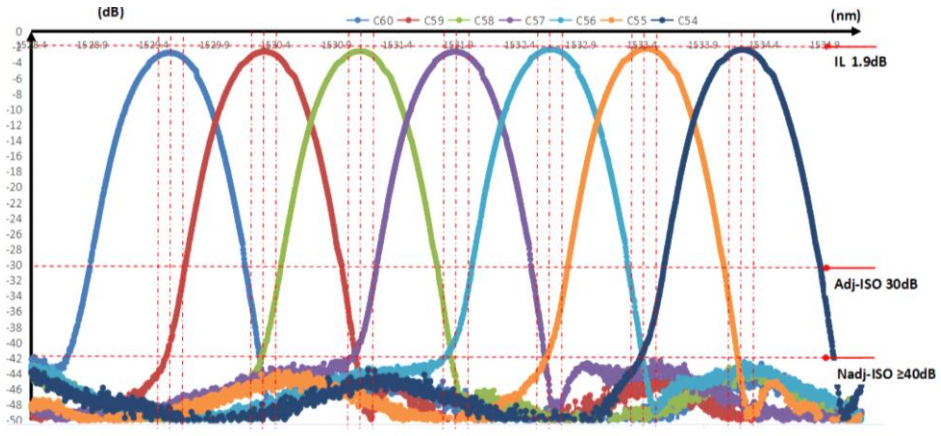
Mechanical Dimension (mm) 1U



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

Spectrum



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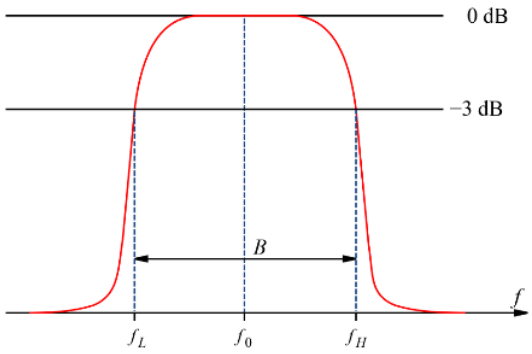
Bandwidth Definition



How to test the insertion loss of a tunable optical filter

Because of potential mode-profile mismatch between the signal and the filter, part of the transmitted signal may be cut off. To accurately measure the intrinsic insertion loss (IL) of the filter, perform the following optical insertion loss test:

- Connect a broadband, fiber-coupled laser source directly to the Optical Spectrum Analyzer (OSA). Sweep once over the specified wavelength range of the tunable filter, and store this spectrum as Trace A (reference).
- Connect the broadband laser source to the input fiber of the fiber-optic tunable filter. Connect the output fiber of the tunable filter to the OSA.
- Set Trace B to *Write* mode and Trace C to *Calculate: B – A*. Perform an automatic sweep of Trace C over the specified wavelength range.
- Adjust the micrometer to shift the filter transmission peak to different wavelengths.
- Use the Peak Search function to record the insertion loss at each wavelength.

Ordering Information (Part Number) System

	☐	☐☐	☐☐☐	☐	☐	☐	☐	☐
Prefix	**Wavelength Spacing**	**Channel**	**Start ITU [1]**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector [3]**	**API [2]**
FITU-	CWDM = 2 WDM100GHz = 1 DWDM50GHz = 5	8 = 08 16 = 16 40 = 40 48 = 48 60 = 60 96 = 96	***Select from table***	SMF-28 = 1	900um loose 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]. Start from lower wavelength ITU 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 default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber 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 may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

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DATASHEET

CWDM ITU Table following standard ITU-T G.694.2 defined center wavelengths: Red are common 8

Channel #	Wavelength (nm)
C23	850
C24	880
C25	910
C26	940
C27	1270
C29	1290
C31	1310
C33	1330
C35	1350
C37	1370
C39	1390
C41	1410
C43	1430
C45	1450
C47	1470
C49	1490
C51	1510
C53	1530
C55	1550
C57	1570
C59	1590
C61	1610

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DATASHEET

WDM ITU 100GHz Spacing

Channel	Frequency (GHz)	Wavelength (nm)	Channel	Frequency (GHz)	Wavelength (nm)
GG1	190,100	1577.03	G38	193,800	1546.92
GG2	190,200	1576.20	G39	193,900	1546.12
GG3	190,300	1575.37	G40	194,000	1545.32
GG4	190,400	1574.54	G41	194,100	1544.53
GG5	190,500	1573.71	G42	194,200	1543.73
GG6	190,600	1572.89	G43	194,300	1542.94
GG7	190,700	1572.06	G44	194,400	1542.14
GG8	190,800	1571.24	G45	194,500	1541.35
GG9	190,900	1570.42	G46	194,600	1540.56
G10	191,000	1569.59	G47	194,700	1539.77
G11	191,100	1568.77	G48	194,800	1538.98
G12	191,200	1567.95	G49	194,900	1538.19
G13	191,300	1567.13	G50	195,000	1537.40
G14	191,400	1566.31	G51	195,100	1536.61
G15	191,500	1565.50	G52	195,200	1535.82
G16	191,600	1564.68	G53	195,300	1535.04
G17	191,700	1563.86	G54	195,400	1534.25
G18	191,800	1563.05	G55	195,500	1533.47
G19	191,900	1562.23	G56	195,600	1532.68
G20	192,000	1561.42	G57	195,700	1531.90
G21	192,100	1560.61	G58	195,800	1531.12
G22	192,200	1559.79	G59	195,900	1530.33
G23	192,300	1558.98	G60	196,000	1529.55
G24	192,400	1558.17	G61	196,100	1528.77
G25	192,500	1557.36	G62	196,200	1527.99
G26	192,600	1556.55	G63	196,300	1527.22
G27	192,700	1555.75	G64	196,400	1526.44
G28	192,800	1554.94	G65	196,500	1525.66
G29	192,900	1554.13	G66	196,600	1524.89
G30	193,000	1553.33	G67	196,700	1524.11
G31	193,100	1552.52	G68	196,800	1523.34
G32	193,200	1551.72	G69	196,900	1522.56
G33	193,300	1550.92	G70	197,000	1521.79
G34	193,400	1550.12	G71	197,100	1521.02
G35	193,500	1549.32	G72	197,200	1520.25
G36	193,600	1548.51	G73	197,300	1519.48
G37	193,700	1547.72			

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DATASHEET

ITU Grid Table 50GHz Spacing

Channel	f (GHz)	λ (nm)
L48	184800	1622.25
Q48	184850	1621.81
L49	184900	1621.38
Q49	184950	1620.94
L50	185000	1620.50
Q50	185050	1620.06
L51	185100	1619.62
Q51	185150	1619.19
L52	185200	1618.75
Q52	185250	1618.31
L53	185300	1617.88
Q53	185350	1617.44
L54	185400	1617.00
Q54	185450	1616.57
L55	185500	1616.13
Q55	185550	1615.70
L56	185600	1615.26
Q56	185650	1614.83
L57	185700	1614.39
Q57	185750	1613.96
L58	185800	1613.52
Q58	185850	1613.09
L59	185900	1612.65
Q59	185950	1612.22
L60	186000	1611.79
Q60	186050	1611.35
L61	186100	1610.92
Q61	186150	1610.49
L62	186200	1610.06
Q62	186250	1609.62
L63	186300	1609.19
Q63	186350	1608.76
L64	186400	1608.33
Q64	186450	1607.90
L65	186500	1607.47
Q65	186550	1607.04
L66	186600	1606.60
Q66	186650	1606.17
L67	186700	1605.74
Q67	186750	1605.31
L68	186800	1604.88
Q68	186850	1604.45
L69	186900	1604.03
Q69	186950	1603.60
L70	187000	1603.17
Q70	187050	1602.74
L71	187100	1602.31
Q71	187150	1601.88
L72	187200	1601.46
Q72	187250	1601.03
L73	187300	1600.60
Q73	187350	1600.17
L74	187400	1599.75
Q74	187450	1599.32
L75	187500	1598.89
Q75	187550	1598.47
L76	187600	1598.04
Q76	187650	1597.62
L77	187700	1597.19
Q77	187750	1596.76
L78	187800	1596.34
Q78	187850	1595.91
L79	187900	1595.49
Q79	187950	1595.06
L80	188000	1594.64
Q80	188050	1594.22
L81	188100	1593.79
Q81	188150	1593.37
L82	188200	1592.95
Q82	188250	1592.52
L83	188300	1592.10
Q83	188350	1591.68
L84	188400	1591.26
Q84	188450	1590.83
L85	188500	1590.41
Q85	188550	1589.99
L86	188600	1589.57
Q86	188650	1589.15
L87	188700	1588.73
Q87	188750	1588.30
L88	188800	1587.88
Q88	188850	1587.46
L89	188900	1587.04
Q89	188950	1586.62
L90	189000	1586.20
Q90	189050	1585.78
L91	189100	1585.36
Q91	189150	1584.95
L92	189200	1584.53
Q92	189250	1584.11
L93	189300	1583.69
Q93	189350	1583.27
L94	189400	1582.85
Q94	189450	1582.44
L95	189500	1582.02
Q95	189550	1581.60
L96	189600	1581.18
Q96	189650	1580.77
L97	189700	1580.35
Q97	189750	1579.93
L98	189800	1579.52
Q98	189850	1579.10
L99	189900	1578.69
Q99	189950	1578.27
L00	190000	1577.86
Q00	190050	1577.44
C01	190100	1577.03
H01	190150	1576.61
C02	190200	1576.20
H02	190250	1575.78
C03	190300	1575.37
H03	190350	1574.95
C04	190400	1574.54
H04	190450	1574.13

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ITU Grid Table

Channel	f (GHz)	λ (nm)	Channel	f (GHz)	λ (nm)	Channel	f (GHz)	λ (nm)
C05	190500	1573.71	C24	192400	1558.17	C43	194300	1542.94
H05	190550	1573.30	H24	192450	1557.77	H43	194350	1542.54
C06	190600	1572.89	C25	192500	1557.36	C44	194400	1542.14
H06	190650	1572.48	H25	192550	1556.96	H44	194450	1541.75
C07	190700	1572.06	C26	192600	1556.55	C45	194500	1541.35
H07	190750	1571.65	H26	192650	1556.15	H45	194550	1540.95
C08	190800	1571.24	C27	192700	1555.75	C46	194600	1540.56
H08	190850	1570.83	H27	192750	1555.34	H46	194650	1540.16
C09	190900	1570.42	C28	192800	1554.94	C47	194700	1539.77
H09	190950	1570.01	H28	192850	1554.54	H47	194750	1539.37
C10	191000	1569.59	C29	192900	1554.13	C48	194800	1538.98
H10	191050	1569.18	H29	192950	1553.73	H48	194850	1538.58
C11	191100	1568.77	C30	193000	1553.33	C49	194900	1538.19
H11	191150	1568.36	H30	193050	1552.93	H49	194950	1537.79
C12	191200	1567.95	C31	193100	1552.52	C50	195000	1537.40
H12	191250	1567.54	H31	193150	1552.12	H50	195050	1537.00
C13	191300	1567.13	C32	193200	1551.72	C51	195100	1536.61
H13	191350	1566.72	H32	193250	1551.32	H51	195150	1536.22
C14	191400	1566.31	C33	193300	1550.92	C52	195200	1535.82
H14	191450	1565.90	H33	193350	1550.52	H52	195250	1535.43
C15	191500	1565.50	C34	193400	1550.12	C53	195300	1535.04
H15	191550	1565.09	H34	193450	1549.72	H53	195350	1534.64
C16	191600	1564.68	C35	193500	1549.32	C54	195400	1534.25
H16	191650	1564.27	H35	193550	1548.91	H54	195450	1533.86
C17	191700	1563.86	C36	193600	1548.51	C55	195500	1533.47
H17	191750	1563.45	H36	193650	1548.11	H55	195550	1533.07
C18	191800	1563.05	C37	193700	1547.72	C56	195600	1532.68
H18	191850	1562.64	H37	193750	1547.32	H56	195650	1532.29
C19	191900	1562.23	C38	193800	1546.92	C57	195700	1531.90
H19	191950	1561.83	H38	193850	1546.52	H57	195750	1531.51
C20	192000	1561.42	C39	193900	1546.12	C58	195800	1531.12
H20	192050	1561.01	H39	193950	1545.72	H58	195850	1530.72
C21	192100	1560.61	C40	194000	1545.32	C59	195900	1530.33
H21	192150	1560.20	H40	194050	1544.92	H59	195950	1529.94
C22	192200	1559.79	C41	194100	1544.53	C60	196000	1529.55
H22	192250	1559.39	H41	194150	1544.13	H60	196050	1529.16
C23	192300	1558.98	C42	194200	1543.73	C61	196100	1528.77
H23	192350	1558.58	H42	194250	1543.33	H61	196150	1528.38

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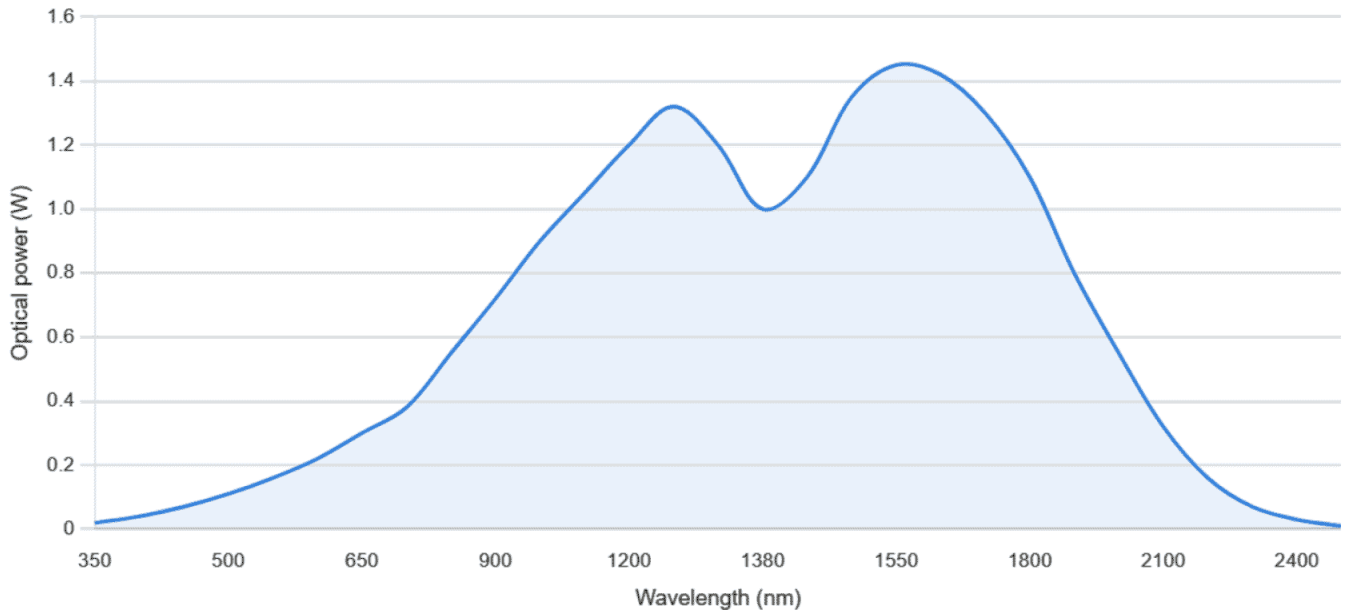
Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

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