Fiber-Fiber™
High Power Large Core Fiber Optical Switch
(up to 0.5 mm diameter, ultra-broadband UV-IR, 1x2, bidirectional)

(Protected by U.S. patent 6823102 and pending patents)

DATASHEET

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The HLCS Series fiber optic switch delivers exceptional performance with high optical power handling up to 15 W, ultra-broadband transmission from UV to IR, low insertion loss, minimal temperature dependence, high on/off contrast, vibration insensitivity, and a compact form factor. Optical channels are connected through direct fiber-to-fiber coupling, enabling low-loss transmission even with large-core multimode fibers. Channel switching is driven by an electrical relay, and the latching mechanism preserves the selected optical path after power is removed. The switch is bidirectional and can be conveniently controlled with a 4.5 V signal. The HLCS platform supports large-core fibers from 0.2 to 0.4 mm in diameter, with transmission characteristics identical to the fiber, and is inherently robust against temperature and vibration effects. Its transmission spectrum remains defined solely by the fiber, introducing no additional distortion, making the HLCS switch ideal for spectroscopic and analytical applications where spectral fidelity is critical.

Applications

- Sensor System
- Spectrometer
- Instrumentation

Features

- Low Optical Distortions
- 8 Ports Integration
- High Isolation
- High Reliability
- Fail-Safe Latching
- Epoxy-Free Optical Path
- Low Cost

Specifications

Parameter	Min	Typical	Max	Unit
Operating Wavelength	300		2600	nm
Insertion Loss [1]		0.7	1.2	dB
Polarization Depended Loss			0.1	dB
Wavelength Dependent Loss		0.05	0.1	dB
Cross Talk On/Off Ratio [1]	35	45	50	dB
Return Loss [1]	35			dB
Rise/Fall Time		10	50	ms
Repetition Rate			1	Hz
Repeatability			±0.05	dB
Durability	10^8			Cycles
Optical Power Handling		5	15	W
Switching Type	Latching / Non-Latching			
Operating Temperature	-20		+60	°C
Storage Temperature	-40		+60	°C
Fiber Type	, 200, 300, 400, 500, 600 Core, or equivalent			µm

Notes:

[1]. Excluding Connectors. Measure @ Light source CPR<14 dB.

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]:

Rev 01/08/26

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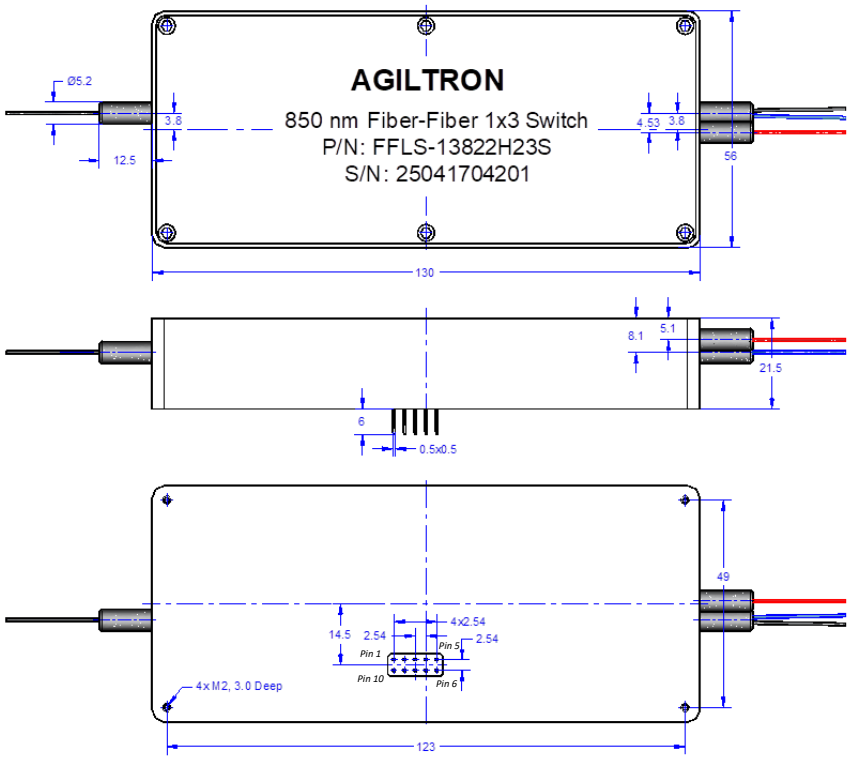
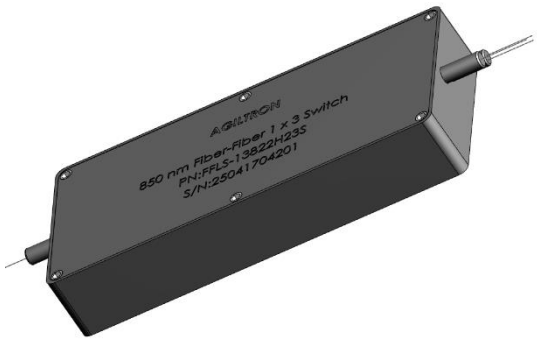
Mechanical Dimensions (mm)





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

Latching Type

Optical Path	Relay 1				Relay 2			
	Electrical Drive			Status Sensor	Status Sensor	Electrical Drive		
	Pin 1	Pin 2	Pin 3	Pin 4-5	Pin 6-7	Pin 8	Pin 9	Pin 10
Common → Port 1	5V	0V	0V	Open	Open	0V	0V	5V
Common → Port 2	5V	0V	0V	Open	Close	0V	5V	0V

Non-Latching Type

Optical Path	Relay 1				Relay 2			
	Electrical Drive			Status Sensor	Status Sensor	Electrical Drive		
	Pin 1	Pin 2	Pin 3	Pin 4	Pin 6	Pin 8	Pin 9	Pin 10
Common → Port 1	0V	NC	0V	Open	Open	0V	NC	0V
Common → Port 2	0V		0V	Open	Close	0V		5V

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Electrical Connector Configurations

The load is a resistive coil which is activated by applying 5V (draw ~ 40mA). Agiltron offers a computer control kit with TTL and USB interfaces and Windows™ GUI. We also offer RS232 interface as an option

Latching Type – Single Coil

Application Note: Applying a constant driving voltage increases stability. The switches can also be driven by a pulse mode using Agiltron recommended circuit for energy saving.

Status	OpticalPath			Electric Drive			Status Sensor	
	1x1	Dual 1x1	1x2	Pin 1	Pin 2	Pin 3	Pin 4 - 5	Pin 6 - 7
Status I	Port 1 → 1'	Port 1 → 1' Port 2 → 2'	Port 1 → 1'	0	5V Pulse	NC	Open	Open
Status II	Dark	Dark	Port 1 → 2'	0	NC	5V Pulse	Close	Close

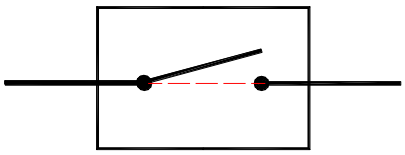
[1]. Typical Pulse width is 50 ms.
[2]. We can provide 3V or other Driving voltage switches, please call sales.
[3]. NC: No electric Connection.

Non-Latching Type

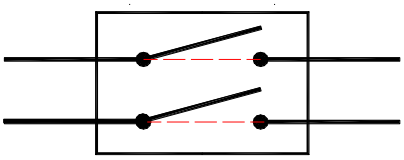
Status	OpticalPath					Electric Drive			Status Sensor	
	1x1 Transparent	1x1 Dark	Dual 1x1 Transparent	Dual 1x1 Dark	1x2	Pin 1	Pin 2	Pin 3	Pin 4 - 5	Pin 6 - 7
Status I	Port 1 → 1'	Dark	Port 1 → 1' Port 2 → 2'	Dark	Port 1 → 1'	0	NC	NC	Open	Open
Status II	Dark	Port 1 → 1'	Dark	Port 1 → 1' Port 2 → 2'	Port 1 → 2'	0	5V	NC	Close	Close

[1]. We can provide 3V or other Driving voltage switches, please call sales.
[2]. NC: No electric Connection.

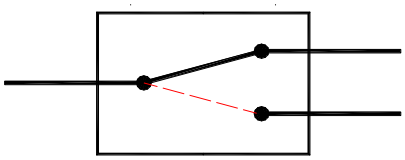
Functional Diagram



1x1



Dual 1x1



1x2

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Ordering Information

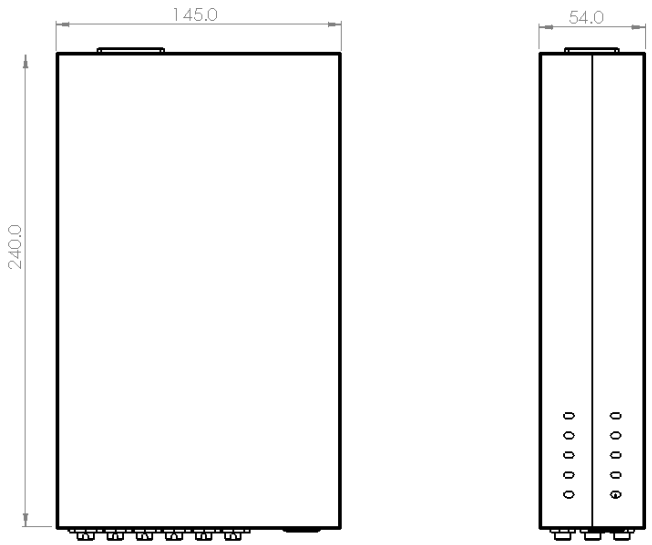
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Configuration**	**Test Wavelength [1]**	**Type**	**Package**	**Fiber Core Size**	**Fiber Cover**	**Fiber Length**	**Connector**	**Driver**	**Benchtop [2]**
LCFF-	1x1 = 1 1x2 = 2 1x3 = 3	488 = 4 630 = 6 780 = 7 850 = 8 980 = 9 1060 = 1 1310 = 3 1550 = 5 2000 = 2 Special = 0	Latching = 1 Non-latching = 2 Special = 0	Standard = 1 Special = 0	100 µm (NA0.22) = E 200 µm (NA0.22) = F 300 µm (NA0.22) = G 400 µm (NA0.22) = H 500 µm (NA0.22) = I 600 µm (NA0.22) = J UV180nm = U Special = 0	Bare fiber = 1 2 mm Jacket = 2 3mm jacket = 3 Special = 0	0.25m = 1 0.5m = 2 1.0m = 3 Special = 0	None = 1 FC/PC = 2 SMA = 3 Special = 0	Non = 1 USB = 2 RS232 = 3 TTL = 4	Non = 1 Yes = 2

[1]. The device is intrinsically ultra-broadband limited by the fiber's transmission. We only test at one selected wavelength to save cost. If a customer needs to test at several wavelengths, the selection is special =0 with added cost.

[2]. The benchtop integrates the modulator, driver, and power supply. Front Panel: SMA 0-5V electrical control input port for precise modulation. Fiber input and output ports with standard FC/APC connectors. Back Panel: 100-240 VAC power input for global compatibility and a Power switch for easy on/off control.
This all-in-one design simplifies setup and operation

Red – Special Order

Benchtop Box Mechanical Dimension



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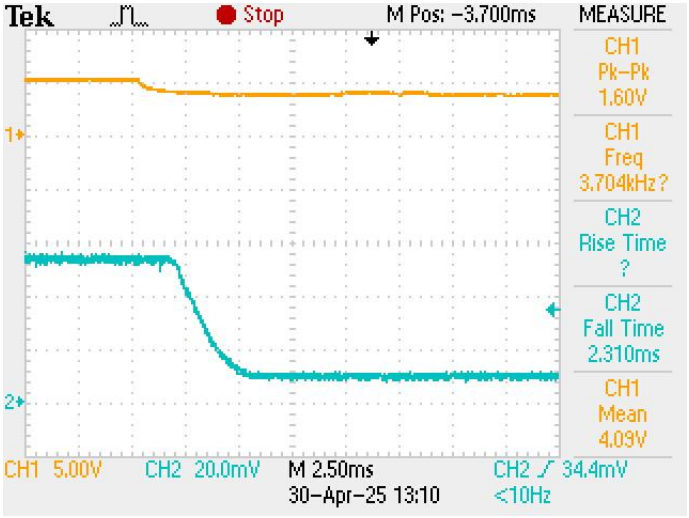
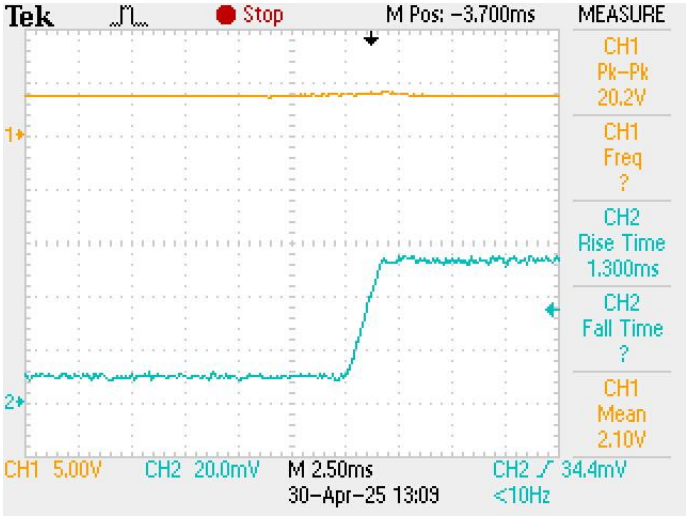
Typical Response





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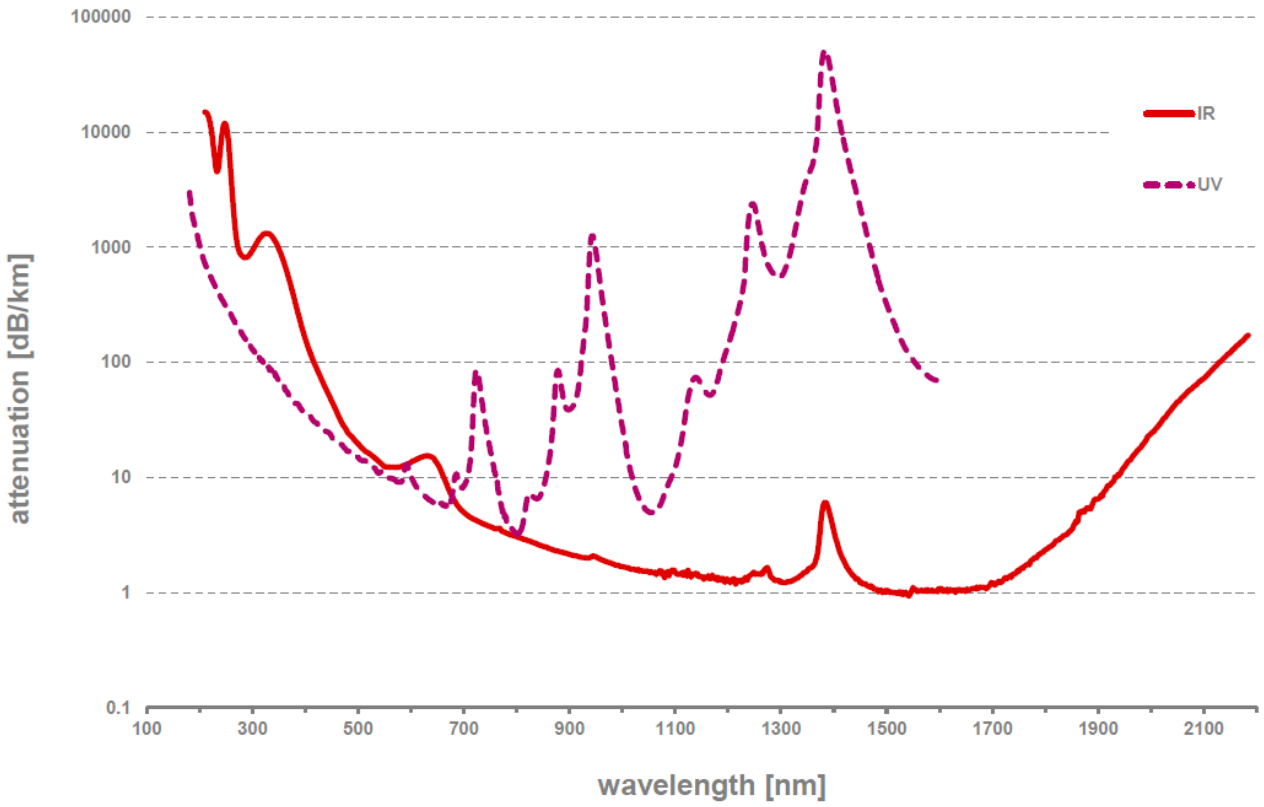
Typical Fiber Transmissions



Application Notes

Fiber Core Alignment
Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness
Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power
Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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