



The FFSY Series fiber optic switch is a turn-key system with a user-friendly GUI interface. The FFSY is designed to be compatible with any custom light path configurations. It provides exceptional optical performances of nearly lossless transition, ultra-broadband with little wavelength dependence that is only limited by fiber characters, fast optical switching of less than ms, little temperature dependence, large on/off ratio, and vibration insensitivity. It connects optical channels by fiber-to-fiber direct coupling using a silicon-based micro-mechanical auto-alignment platform that is wafer-level produced in-house. The established optical path is filled with an index-matching liquid, eliminating air gaps, lenses, and coatings. The optical transition is continuous without mode distortions or unwanted surface reflection-related issues. The platform is robust and insensitive to temperature and vibration. The FFSY Series switch can accommodate all types of fibers with 0.125mm outer diameter, including SM, MM, PM, double cladding, bendable, large core, small core. The FF switches uniquely provide performance no other technologies can match.

The switch is controlled by RS232 or USB computer interface. GPIB and LabVIEW version is also available.

The order table includes a list of standard control interfaces. Additionally, we provide a list of commands to assist customer engineers in coding. For those who require it, we offer a code-writing service for customer interfaces at an additional charge.

This switch uses a specially formulated index-matching liquid that does not generate fluorescent. The liquid fills a gap of less than 5 μm .

Switches with PM fibers transmit both polarizations the same way as the fiber.

Each switch driver includes a GUI for programming and a command set (API) so customers can develop their own control software. Python and LabVIEW interface libraries; integration support is available for a fee.

Features

- No Signal Distortion
- Ultra Low Insertion Loss
- Broad Band
- Latching
- All Fiber Types

Applications

- Quantum System
- Sensor System
- Instrument
- Spectroscopy



Specifications

Parameter	Min	Typical	Max	Unit
Operation Wavelength	400	1260~1650	1800	nm
Insertion Loss ^[1]	0.5	1	3	dB
Crosstalk, On/Off Ratio	55	60	70	dB
Extinction Ratio (PM Fiber)	22		30	dB
Switch Speed (Rise, Fall)		0.7	2	ms
Durability	10 ⁷			cycle
Polarization Dependent Loss		0.04	0.2	dB
Wavelength Dependence Loss ^[2]		0.01	0.02	dB
Return Loss	45	55		dB
Repeatability		0.05	0.1	dB
Power Consumption		5	10	W
Operating Temperature	-5		65	°C
Optical Power Handling		300	500	mW
Storage Temperature	-40		85	°C
Switch type	Non-Latching/Latching			

Notes:

[1]. It is related to the light path configuration. Measured without connectors for 1xN. For multimode fiber, use a laser source with CPR<15

[2]. Limited only by the fiber

Rev 03/16/26

[+1 781-935-1200](tel:+17819351200)

sales@agiltron.com

www.agiltron.com

Module Mechanical Dimensions

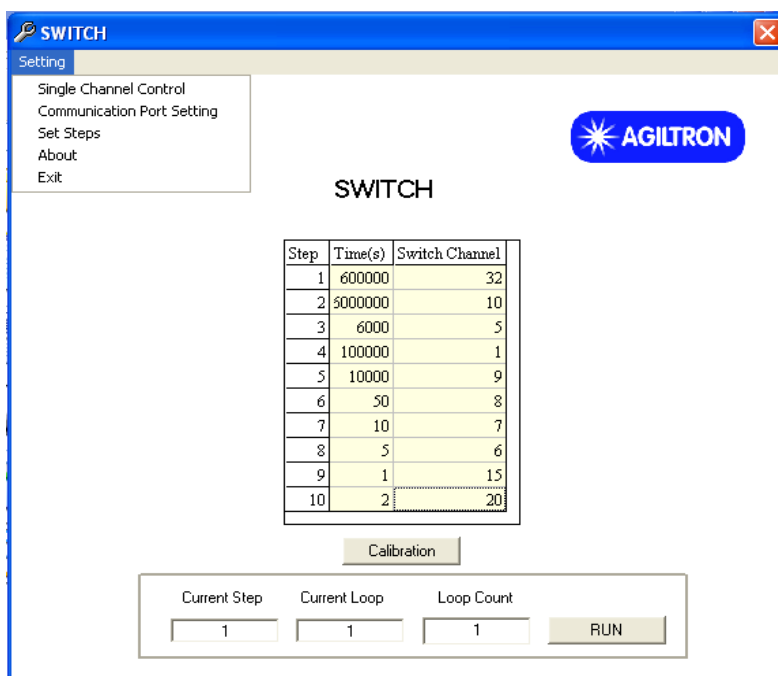
2RU 19" mount rack typically. The input and output connectors are on the front panel, while the control interface and power supplier are on the rear panel.

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

Control Interface and Power Supply

- RS 232
- Ethernet 10/100 with definable IP address
- USB
- GUI
- 110-220V (0.6 A) Power Input

Typical Graphic User Interface



DATASHEET

Ordering Information (Part Number)

	☐ ☐ ☐	☐	☐	☐	☐ ☐	☐	☐
Prefix	Type	Test Wavelength	Switch Type	Interface	Fiber Type	Connector ^[1]	Interface Code ^[2]
FFSY-	Custom abbreviation	1240-1640 = A	Latching = 1	USB = U	<i>Select from below table</i>	None = 1	Non = N
	Attach light path diagram	1060 = 1	Non-latching = 0	RS232 = R		FC/PC = 2	Python = P
		1310 = 3		Ethernet = E		FC/APC = 3	LabVIEW = L
	Special = 000	1410 = 4		GPIO = G		SC/PC = 4	
		1550 = 5		PLC = P		SC/APC = 5	
		1310/1550 = 2				ST/PC = 6	
		650 = 6				LC/PC = 7	
		780 = 7				Duplex LC/PC = 8	
		850 = 8				Quad LC/PC = 9	
		Special = 0				LC/UPC = U	
						MPO = Y	
						Special = 0	

[1]. 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.

[2]. GUI and a command set (API) are included. Python **\$860**. LabVIEW interface libraries **\$750**

* Rack Mount Depth ~ 430mm.

RED is Special Order

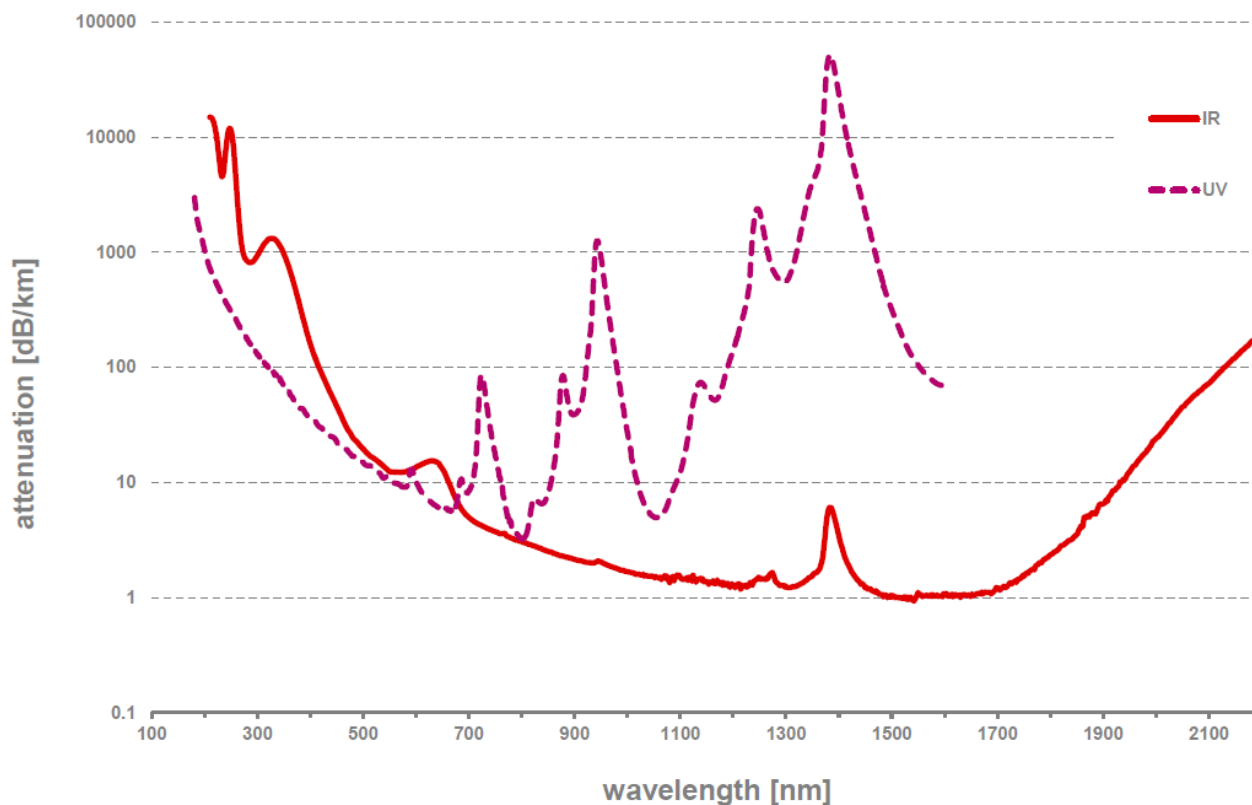
Note:

- ☐ **PM1550** fiber works well for **1310nm** and the short fiber in the switch does not affect system performance. **PM1550** can be spliced with **PM1310**

Fiber Type Selection Table:

01	SMF-28	34	PM1550	71	MM 50/125μm
02	SMF-28e	35	PM1950	72	MM 62.5μm
03	Corning XB	36	PM1310	73	105/125μm
04	SM450	37	PM400	74	FG105LCA
05	SM1950	38	PM480	75	FG50LGA
06	SM600	39	PM630	76	STP 50/125
07	Hi780	40	PM850	77	IRZS23
08	SM800	41	PM980	78	IRFS32
09	SM980	42	PM780	79	
10	Hi1060	43		80	
11	SM400	44	PM405	81	UV180nm
12		45	PM460	82	LMA-PM-10
13		46			

Typical Fiber Transmissions



Ethernet Remote Control with Python

Several options: Telnet, HTTP/JSON API, or VISA Raw Socket mode (SCPI over TCP/IP)

```
#####
Telnet:

import telnetlib

HOST = "192.168.0.1"
PORT = 23

#####
username = "admin"
password="admin"
#####
tn=telnetlib.Telnet(HOST,PORT)

reply=tn.read_until(b"username:",timeout=10)
print(reply.decode("ascii"))#debug
tn.write(username.encode("ascii")+b"\r\n")

reply=tn.read_until(b"password:",timeout=10)
print(reply.decode("ascii"))#debug
tn.write(password.encode("ascii")+b"\r\n")

reply=tn.read_until(b"telnet>",timeout=10)
print(reply.decode("ascii"))#debug

tn.write(b"setswitch 31 32 0 0\r\n")
reply=tn.read_until(b"telnet>",timeout=10)
print(reply.decode("ascii"))#debug

tn.write(b"runswitch\r\n")
reply=tn.read_until(b"telnet>",timeout=10)
print(reply.decode("ascii"))#debug

tn.write(b"quit\r\n")

#####
```

Ethernet Remote Control with Python (ending)

Several options: Telnet, HTTP/JSON API, or VISA Raw Socket mode (SCPI over TCP/IP)

```
#####
API:
import requests

BASE_URL = "
TOKEN = "TOKEN"
def api_post(path, payload):
    r = requests.post(
        BASE_URL + path,
        json=payload,
        headers={"X-Auth-Token": TOKEN},
        timeout=3,
    )
    r.raise_for_status()
    return r.json()

def api_get(path):
    r = requests.get(
        BASE_URL + path,
        headers={"X-Auth-Token": TOKEN},
        timeout=3,
    )
    r.raise_for_status()
    return r.json()

# Set port 3
print(api_post("/api/set_permanent_port", {"port": 3}))
# Read status
print(api_get("/api/status"))

#####
pyVISA:
import pyvisa

HOST = "192.168.0.1"
TOKEN = "TOKEN"

rm = pyvisa.ResourceManager()

inst = rm.open_resource(f"TCPIP0::{HOST}::5025::SOCKET")
inst.read_termination = "\n"
inst.write_termination = "\n"
inst.timeout = 2000 # ms

print("IDN:", inst.query("*IDN?").strip())

# Set port
inst.write("SWITCH:PERMANENTPORT 3")
print("PORT?:", inst.query("SWITCH:PERMANENTPORT?").strip())

# Status
print("STATUS:", inst.query("SWITCH:STATUS?").strip())

#####
```

Questions and Answers

Q: If the device were to fail, would the switch continue to pass the fiber light through the switch as configured before failure? When power is restored, does the IN/OUT configuration before failure remain in place?

A: This depends, if one mirror fails, it only affects the light go through that mirror. Yes, when power back up it will go to the previous points

Q: When power is restored, does the IN/OUT configuration before failure remain in place?

A: Yes, when power back up it will go to the previous flightpath

Q: If power to the device were shutoff, would the device continue to pass the fiber light as configured before failure?

A: This function is call latching. We uniquely offer MEMS latching switch but cost more.

Q: With the Ethernet Control Option, does the switch support SNMPv3

A: Yes. This internet standard protocol allows user to write their own control code

Q: With the Ethernet Control Option, what type of encryption does the SNMPv3 use?

A: MD5/DES

Q: With the Ethernet Control Option, could this device be controlled by multiple users at different locations and all users will also see the configuration updates?

A: Yes

Q: With the Ethernet Control Option, could this switch be controlled by multiple users at different locations and all users will also see the configuration updates?

A: Yes

Q: With the Ethernet Control Option, does the user need to install any software on their computer other than a web browser?

A: No

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.