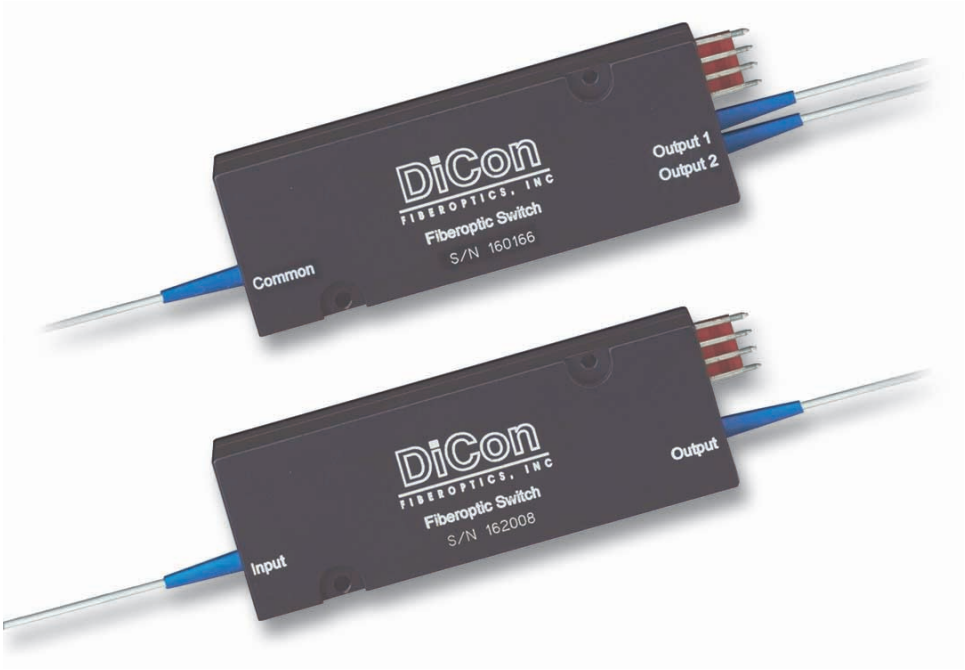
DiCon FIBEROPTICS, INC

1x2 Prism Switch
On-Off Switch

Operation Manual



91521 Revision D

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Warranty

DiCon Fiberoptics warrants this product to be free from defects in both workmanship and performance for a period of one year from the time of original shipment. During the warranty period, DiCon Fiberoptics will, at its option, repair or replace any material found to be defective.

The foregoing warranty extends to all cases, except where the product has been damaged through misuse, mishandling, inadequate maintenance, owner modification, failure to follow the installation and operating instructions provided by DiCon Fiberoptics, flood, fire or other events outside our reasonable control.

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All Returns

Contact DiCon Fiberoptics before returning any product. DiCon will provide a Return Material Authorization (RMA) number and shipping instructions. No product will be accepted for return without an RMA number clearly marked on the outside of the shipping material.

Any unit that is returned under warranty, but for which evidence of misuse or mishandling is found, will be subject to testing and processing fees, in addition to any repair costs.

DiCon Fiberoptics will cover any freight costs for returning warranty returned material to the customer. The customer is responsible for covering any freight costs for sending materials to DiCon Fiberoptics. The customer is responsible for all freight costs for returned materials found to be out of warranty.

Use the original packing materials when returning material to DiCon Fiberoptics. If the original packing materials are unavailable, the customer is responsible for ensuring adequate packing materials are used to prevent damage during shipping.

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Product Overview

DiCon's 1x2 Prism Switch provides channel selection from one input fiber to two output fibers using a moving prism between fixed collimators. The On-Off Switch provides channel control from one input fiber to one output fiber using a moving shutter between fixed collimators. The switches operate independently of data rate and signal format.

DiCon's On-Off and 1x2 switches are actuated electrically and requires +5VDC to switch position. The switches are housed in a compact, environmentally stable package designed for mounting on printed circuit boards or within a module.

Switch Control

The four-pin electrical interface is used to control and monitor switch position. The electrical connector is Molex part number 22-23-2041, and mates with Molex part number 22-01-3047 or equivalent.

Pin 4 is the position sensor output. The output alternates between normal open contact and normal close contact (low or high signal) depending on the switch position. The position sensor is powered with +5VDC on pin 3. Pins 1, 2, and 3 are used for control and power supply. Pin behavior depends upon the electrical configuration of your switch. The three possible electrical configurations are described in the following sections, and summarized in Table 1.

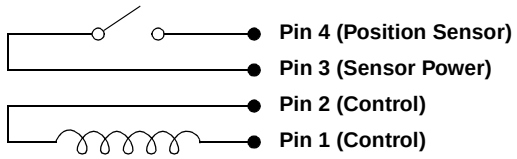
Non-Latching Two-Pin Control

Switches configured for non-latching two-pin control require no power to maintain one position and a constant +5VDC across pins 1 and 2 to maintain the other position.

Latching Two-Pin Control

Switches configured for latching two-pin control change position when the polarity of the +5-VDC signal to pins 1 and 2 is reversed. When no power is applied to pins 1 and 2 the switch is latched in place.

Figure 1: *Two-pin control electrical schematic*



Latching Three-Pin Control

Pins 1, 2, and 3 are used for control in switches configured for latching three-pin control. Pin 3 is a center tap. Switch position changes when pin 1 or pin 2 is held to ground. When no power is applied to pins 1 and 2 the switch is latched in place.

Figure 2: *Three-pin control electrical schematic*

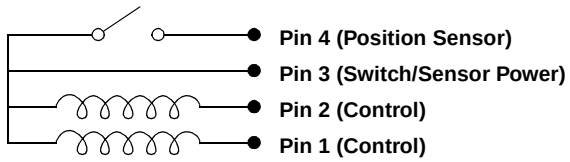
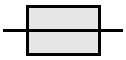
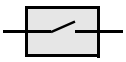
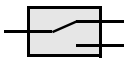


Table 1: *Switch Control*

Actuation Style	**On-Off Switch** Optical ON 		**1x2 Switch** Output 2 		**On-Off Switch** Optical OFF 		**1x2 Switch** Output 1 	
	Switch Control		**Position Sensor**		**Switch Control**		**Position Sensor**	
	Pin 1	**Pin 2**	**Pin 3**	**Pin 4**	**Pin 1**	**Pin 2**	**Pin 3**	**Pin 4**
Non-Latching 2-Pin	GND	GND	+5VDC	Low[a]	GND	+5VDC	+5VDC	High[b]
Latching 2-Pin	GND	+5VDC	+5VDC	Low[a]	+5VDC	GND	+5VDC	High[b]
Latching 3-Pin	GND	+5VDC	+5VDC	Low[a]	+5VDC	GND	+5VDC	High[b]

a. Normal open contact.
b. Normal close contact.

Specifications

Table 2: *Optical Specifications*[a]

Parameter	Minimum	Typical	Maximum	Units
wavelength range	1290		1570	nm
insertion loss	—	0.6	1.1	dB
back-reflection (singlemode)	—	—	-55	dB
back-reflection (multimode)	—	—	-20	dB
switching time	—	10	15	ms
cross-talk	—	—	-80	dB
durability	10			megacycles
repeatability[b]	—	—	±0.01	dB
PDL[c]			0.05	dB

a. All specifications referenced without connectors.
b. Repeatability for 100 cycles at constant temperature.
c. Singlemode only. Measured at 1550 nm.

Table 3: *Electrical Specifications*

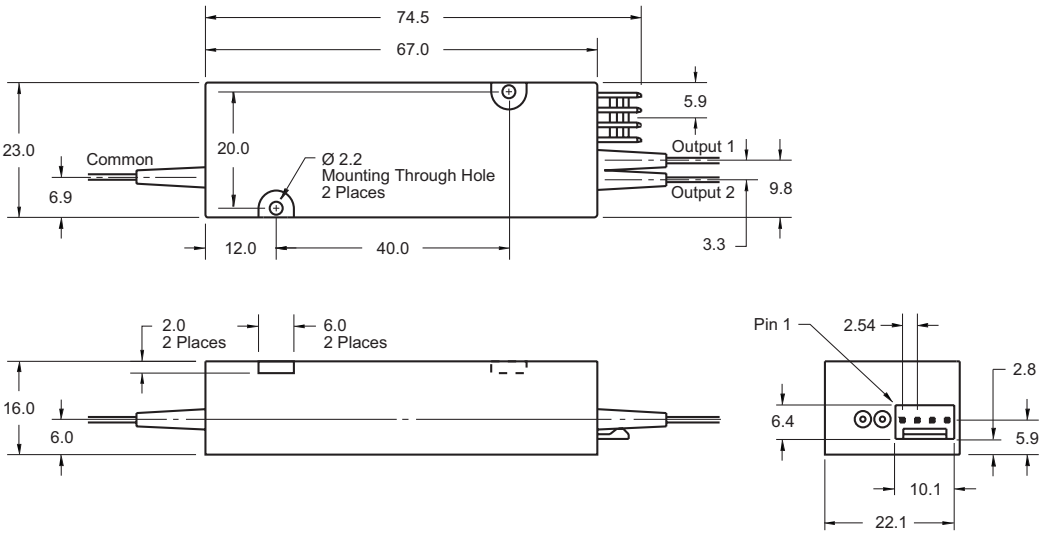
Parameter	Actuation Style	Minimum	Maximum	Units
switching voltage	—	4.5	6.0	VDC
switching current[a]	non-latching 2-pin	36	48	mA
	latching 2-pin	65	87	mA
	latching 3-pin	90	120	mA
coil resistance[a]	non-latching 2-pin	112.5	137.5	ohm
	latching 2-pin	62.5	76.5	ohm
	latching 3-pin	45.0	55.0	ohm
control pulse width[b]	—	40	—	ms
sensor input voltage	—	4.3	6.0	VDC
sensor input current	—	90	120	mA

a. Switches with serial numbers 160000 through 163939 may have different electrical specifications. Contact DiCon if you are unsure about the electrical specifications of your device.
b. Pulse width required to change position of latching 2-pin or latching 3-pin switch.

Table 4: *Environmental Specifications*

Parameter	Minimum	Typical	Maximum	Units
operating temperature	-20	—	75	°C
storage temperature	-40	—	85	°C
humidity	60°C / 90% RH / 14 days			—

Housing Dimensions



Units: mm
Note: On-Off Switch channels “Input” and “Output” replace “Common” and Output 2,” respectively.

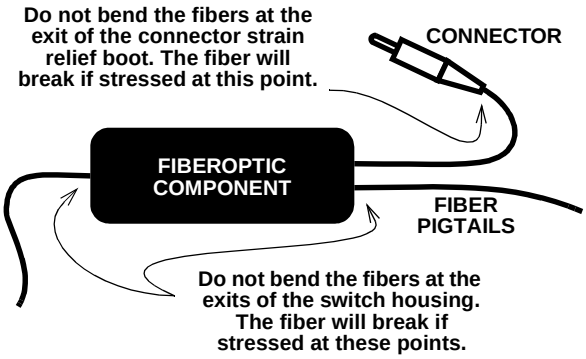
Handling Fiberoptic Components and Cables

Handling Fiberoptic Cables

Your switch may come with fiber pigtail outputs. Treat cables with care to avoid cable damage and minimize optical loss. The minimum bend radius for most optical cables is 35mm. Never bend an optical cable more sharply than this specification. Optical performance will degrade and the cable may break.

- Avoid bending the optical cable near a cable strain relief boot. Bending an optical cable near a strain relief boot is one of the easiest ways to permanently damage the optical fiber.
- Avoid bending the optical cable over a sharp edge.
- Avoid using cable tie wraps to hold optical cable. Tie wraps when tightened can create micro-bends or break an optical cable. Microbends can cause a dramatic reduction in optical performance.
- Do not pull on the bare fiber as this can break the fiber inside the component.
- Avoid using soldering irons near optical cable. Accidental damage can easily occur when an soldering iron is used near an optical cable. In addition, solder splatter can contaminate and permanently damage optical fiber connectors.

- In order to obtain the most stable, repeatable optical performance, immobilize optical cables using wide pieces of tape or some form of mechanical cushion after the optical cables have been connected.



Storing Optical Connectors

All switches are shipped with dust caps in place covering all optical connectors. Optical connectors should remain covered at all times when the instrument is not in use.

Cleaning Optical Connectors

Clean any exposed connector using a cleaning kit supplied by the connector manufacturer or high-grade isopropyl alcohol and a cotton swab. To clean with alcohol and a swab, dab the tip of a cotton swab in alcohol and then shake off any excess alcohol. The tip should be moist, *not* dripping wet. Stroke the swab tip gently across the surface of the connector and around the connector ferrule. Either allow the connector a minute to dry, or blow dry the connector using compressed air. Be careful when using compressed air because improper use may deposit a spray residue.

Mating Optical Connectors

- Clean both connectors prior to mating. Any small particles trapped during the mating process can permanently damage the connector.
- Insert the appropriate connector ferrule into the adapter smoothly. Do not allow the fiber tip to contact any surface. If the tip accidentally contacts a surface before mating, *stop*. Re-clean the connector and try again.
- Tighten the connector until it is finger tight, or to the torque specified by the connector manufacturer. Do not over-tighten the connector as this can lead to optical loss and connector damage.
- Check the optical insertion loss. If the loss is unacceptable, Remove the connector, re-clean both ends of the mate, and reconnect. You may have to repeat this process several times before a low-loss connection is made.
- After you make the connection, monitor the stability of the optical throughput for a few minutes. Optical power trending (slowly increasing or decreasing) is caused by the slow evaporation of alcohol trapped in the connection. Continue to monitor optical power until it stabilizes. If the loss is unacceptable, reclean the connectors and start again.d

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