

## The Standard of Accuracy

Up until now our multichannel switches have always been limited in either the wavelength range for single mode switches, or accuracy for multimode switches.

Our new PCF switches solve this problem. Using endlessly single mode photonic-crystal-fibers (PCF) allows us to produce a switch that offers single mode operation for all wavelengths. Using the PCF switch it is possible to switch between light-sources at any wavelength within the instrument's measurement range and maintain the full accuracy. Combining the PCF switch with other options such as PID control opens new possibilities.

Sold exclusively with all WS6-200, WS7 and WS8 instruments except for the UV-II range and IR-III range the PCF switches are available in two-channel, four-channel, and eight-channel configurations.

## Product Overview

### Technical Data

Measurement range	UV-II (192 – 800 nm)
	UV-I (248 – 1180 nm)
	Standard (330 – 1180 nm)
	VIS/IR-I (330 – 1750 nm) <sup>16)</sup>
	IR-I (630 – 1750 nm)
	VIS/IR-II (500 – 2250 nm) <sup>16)</sup>
	IR-II (1000 – 2250 nm)
Absolute accuracy <sup>1)</sup>	IR-III (1400 – 11000 nm)
	192 – 330 nm <sup>2)</sup>
	330 – 375 nm
	375 – 800 nm
	800 – 1180 nm
Quick coupling accuracy (with multi mode fiber)	1180 – 2250 nm
	1400 – 11000 nm
	Wavelength deviation sensitivity/Measurement resolution <sup>5)</sup>
	Linewidth option Estimation accuracy <sup>6)</sup>
Measurement speed	Standard (VIS)
	UV-I
Required input energy and power <sup>9)</sup>	UV-II
	IR-I
	IR-II <sup>9)</sup>
	IR-III
	FSR of the Fizeau interferometers (Fine/wide mode) <sup>10)</sup>
Calibration <sup>17)</sup>	
Recommended calibration period	
Warm-up time	
Dimensions L × W × H	
Weight	
Interface	
Power supply	

- 1) According to 3 $\sigma$  criterion, but never better than 20% of the laser linewidth.
- 2) With multi mode fiber.
- 3)  $\pm$  200 nm around calibration wavelength; outside of this range the accuracy as WS7-30.
- 4)  $\pm$  2 nm around calibration wavelength; outside of this range the accuracy as WS8-10; note 3 also applies.
- 5) Standard deviation. WS6-200 and higher models require singlemode or photonic crystal fibers to reach this resolution.
- 6) Not better than 20% of the linewidth.
- 7) Depending on PC hardware and settings. Highspeed models up to 76 kHz available.
- 8) The CW power interpretation in [ $\mu$ W] compares to an exposure of 1s (generally the energy needs to be divided by the exposure time to obtain the required power).

Unit	WS5	WS6-600	WS6-200	WS7-60	WS7-30	WS8-10	WS8-2
	■	■	■	■	□	□	□
	■	■	■	■	■	■	□
	■	■	■	■	■	■	■
	■	■	■	□	□	□	□
	□	□	□	■ <sup>21)</sup>	■	■	□
	■	■	■	□	□	□	□
	□	□	□	■	■ <sup>19)</sup>	□	□
	■	□	■	□	□	□	□
pm	3	0.6	0.3	0.2	0.1	0.1 <sup>22)</sup>	-
MHz	3000	900	300	100	50	20 <sup>3)</sup>	10 <sup>4)</sup>
	3000	600	200	60	30	10 <sup>3)</sup>	2 <sup>4)</sup>
Hz	2000	500	150	50	25	8 <sup>3)</sup>	2 <sup>4)</sup>
	2000	400	120	40	20	8 <sup>23)</sup>	-
$\mu$ J (or $\mu$ W)	3000	-	200	-	-	-	-
	3000	600	600	150	100	100	100
mW	500	20	4 <sup>20)</sup>	2	1	0.4	0.2 <sup>18)</sup>
	2000	500	400	200	200	100	100
GHz	950 (IR: 1500, IR-III: 100)	950 (IR: 1500) <sup>7)</sup>	500 (IR: 1500, IR-III: 100) <sup>7)</sup>	500	500	500	500
	0.02 – 15	0.02 – 15	0.02 – 15	0.02 – 15	0.08 – 60	0.08 – 60	0.08 – 60
mW	0.02 – 10	0.02 – 10	0.02 – 10	0.02 – 10	0.08 – 40	-	-
	0.02 – 200	0.02 – 200	0.02 – 200	0.04 – 400	-	-	-
GHz	2 – 200	2 – 200	2 – 200	2 – 200	8 – 800	8 – 800	-
	2 – 80	2 – 80	2 – 80	2 – 80	8 – 800	-	-
GHz	1	-	1	-	-	-	-
	100	16/100 <sup>11)</sup>	16/100 <sup>12)</sup>	8/32	4/32	2/20	2/20
Calibration <sup>17)</sup>	Built-in calibration <sup>13)</sup>			Built-in calibration <sup>14)</sup>	Stabilized HeNe laser or any other well known laser source $\Delta v < 5$ MHz	SLR-780 or any other well known laser source $\Delta v < 2$ MHz	12 stabilized HeNe or any well known laser source $\Delta v < 1$ MHz
	≤ 1 month			≤ 14 days	≤ 10 hours	≤ 1 hour	≤ 2 minutes
Recommended calibration period	No warm-up time under constant ambient conditions <sup>15)</sup>				> 30 minutes		
Warm-up time	360 × 120 × 120			360 × 200 × 120	360 × 200 × 120	360 × 200 × 120	360 × 200 × 120
Dimensions L × W × H	2.8	2.8	5.5 <sup>17)</sup>	5.9	6.1	6.4	6.4
Weight	High-speed USB 2.0 connection						
Interface	Power consumption < 2.3 W, power provided directly via USB cable IR-II, IR-III: external power supply included; WS7-60 IR-I, WS7-30 IR-I, WS8-10 IR-I: external power supply included						
Power supply							

- 9)  $\mu$ J interpretation for pulsed lasers. CW signals need more power in [ $\mu$ W] since the exposure is limited at IR-II instruments.
- 10) Each instrument in each mode can measure lasers with a linewidth up to 30% of the correspondig FSR.
- 11) For IR instruments: 32/32.
- 12) For IR-I and IR-II instruments: 16/16, for IR-III instruments: 8/80.
- 13) IR-III: external calibration source needed, e.g. SLR-1532.
- 14) IR and UV-II instruments: external calibration source needed, e.g. SLR-1532 or stabilized HeNe.
- 15) IR-II: > 30 min. warm-up, or until ambient equilibrium.
- 16) These instruments have a decreased sensitivity by a factor of 4, compared to the Standard and IR ranges in the required input fields, respectively.

- 17) 2.8 for IR-I and IR-II.
- 18) 100 kHz for special ranges on request.
- 19) Photonic crystal switches can be used up to 2000 nm. Please contact HighFinesse if you want to measure over 2000 nm.
- 20) IR-III: 20 MHz.
- 21) Measurement range WS7-60 IR-I: 530 – 1750 nm
- 22) Range is limited from 248 to 330 nm.
- 23) Range is limited up to 1750 nm.

