

PARAMETER	HA1	HA9	HA9W	HA9P	HA10	HA11
Operating wavelength range	1200-1700 nm	1200-1700 nm	750-1700 nm	980-1100 nm	1520-1630 nm	1200-1700 nm
Attenuation ¹ range	100 dB	100 dB	60 dB	60 dB	30 dB	60 dB
resolution	0.001 dB	0.01 dB	0.01 dB	0.01 dB	0.01 dB	0.01 dB
repeatability ²	± 0.01 dB	± 0.01 dB	± 0.01 dB	± 0.01 dB	± 0.01 dB	± 0.01 dB
change rate	< 2.5 s	< 2.5 s	< 1.5 s	< 1.5 s	< 1.0 s	< 1.5 s
accuracy ³	± 0.1 dB	± 0.1 dB	± 0.1 dB	± 0.1 dB	± 0.1 dB	± 0.1 dB
Insertion loss ^{4,5,6} single-mode (SM)	< 1.5 dB	< 1.5 dB	< 5.0 dB	-	< 0.8 dB	< 1.5 dB
multimode (MM), 50/125µm	-	< 2.2 dB	< 3.2 dB	-	-	-
MM, other	-	< 2.9 dB	< 3.9 dB	-	-	-
Flexcor 1060	-	-	-	< 2.5 dB	-	-
Return loss ⁷ SM	-	> 45 dB	> 45 dB	-	-	-
SM, analog ⁷	> 60 dB	> 60 dB	> 60 dB	-	> 60 dB	> 60 dB
MM, 50/125 µm	-	> 35 dB	> 35 dB	-	-	-
MM, other	-	> 30 dB	> 30 dB	-	-	-
Flexcor 1060	-	-	-	> 60 dB	-	-
Wavelength dependence ⁸ (1530-1625 nm)	-	-	-	-	± 0.1 dB	-
Maximum optical input power	200 mW	200 mW	200 mW	200 mW	100 mW	500 mW
Recalibration period (recommended)	2 years					
Polarization dependent loss ⁹	0.03 dB typical, 0.08 dB maximum					
Beam block attenuation	> 90 dB					
Input voltage	90-240 V AC, 50-60 Hz					
Power consumption	80 VA maximum					
Dimensions (W x H x D)	21.2 x 8.9 x 35.5 cm 19 inch (48.26 cm) rack mounting 2U high					
Weight	4 kg					
Operating temperature	0 to 40 °C					
Storage temperature	- 40 to 60 °C					
Humidity	maximum 90 % up to 40 °C decreasing 5 % from 40 to 60 °C					

- The attenuation range is a continuous function of wavelength.
- At constant temperature, wavelength, and polarization state after half hour warm-up.
- With optimization of the calibration wavelength or user slope. If optimization is not performed, accuracy is the greater of ± 0.1 dB or ± 0.004 dB/dB from 1260-1360 nm and from 1450-1570 nm. At other wavelengths, the accuracy is the greater of ± 0.1 dB or ± 0.015 dB/dB if optimization is not performed.
- Measured at 23 °C with a laser source.
- Not including connectors, switch, or coupler (if installed).
- Over 850-1600 nm. Insertion loss is typically highest at wavelength extremes.
- Total of discrete reflections. Does not include distributed reflection in fiber.

Sample Order: HA097+28KFA1

HA +2

CODE	MODEL
01	HA1
09	HA9
9P	HA9P
9W	HA9W
10	HA10
11	HA11

CODE	FIBER TYPE (µm)
7	9/125
1	50/125 (HA9 and HA9W only)
2	62.5/125 (HA9 and HA9W only)
8	Flexcor 1060 (HA9P only)

CODE	BUILT-IN OPTIONS
0	None
1	50/50 coupler (HA1 and HA9 only)
4	2/98 coupler (HA1 and HA9 only)
5	30/70 coupler (HA1 and HA9 only)
8	1:2 switch (HA1 and HA9 only)
9	10/90 coupler (HA1 and HA9 only)

CODE	PORT TYPE
1	Bulkheads on front
2	Bulkheads on back
3	Pigtails on front (2.5 m)
4	Pigtails on back (2.5 m)
7	UCA bulkheads on front

CODE	CONNECTOR TYPE (ALL PORTS)
FP	FC/HPC
FA	FC/APC
SC	SC/HPC
SU	SC/APC
SP	ST/HPC
NC	No connector

CODE	RETURN LOSS
K	Low (HA9 and HA9W)
A	Analog

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 U1 is a registered trademark of Underwriters Laboratories Inc.
 ST is a registered trademark of Lucent Technologies.