

FA100, FA115 Series

FC/SC Plug Type Fixed Attenuator

TECHNICAL SPECIFICATIONS



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**FA100, FA115 Series FC/SC PLUG TYPE FIXED ATTENUATOR
TECHNICAL SPECIFICATIONS**

S07-038-0E	April	2000
S07-038-1E	August	2001
S07-038-2E	September	2001
S07-038-3E	November	2002
S07-038-4E	June	2009
S07-038-5E	August	2015
S07-038-6E	June	2021

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1. SCOPE

This specification is applicable to plug type single mode fixed attenuator.

2. PART NUMBER

Plug type	-	Attenuation value	-	Polishing type	Grade	-	Measured Wavelength
FA100: F01 (FC type)		00: 0dB		HP: PC polishing	5: High performance		1290 ~1330nm and 1530 ~ 1570nm
		01: 1dB					
		02: 2dB					
		03: 3dB					
		04: 4dB					
		05: 5dB					
		06: 6dB					
		07: 7dB					
		08: 8dB					
		09: 9dB					
FA115: F04 (SC type, metal housing)		10: 10dB		AP: APC polishing	(non): Standard		
		11: 11dB					
		12: 12dB					
		13: 13dB					
		14: 14dB					
		15: 15dB					
		16: 16dB					
		17: 17dB					
		18: 18dB					
		19: 19dB					
		20: 20dB					

Example: For SC/APC metal housing plug type, 3 dB attenuation value, standard grade and measurement wavelength with 1310nm,

FA115-03-AP

SC/APC metal housing plug type, 0 dB attenuation value, standard grade.

FA115-00-AP

3. PATTERN

The construction and structure of the product are described in the attached drawing sheet.

4. APPEARANCE

There should be no burr, contamination or scratch which affect the product performance.

5. FEATURE

5.1 Optical characteristics

The following initial characteristics shall be confirmed.

Operating wavelength		1290 ~ 1330nm and 1530 ~ 1570nm
Initial attenuation measured with 1310 +/- 10nm and 1550 +/- 10nm LD	0dB	IL ≤ 0.5dB
	1-10dB	+/- 0.5dB (High performance) +/- 1.0dB (Standard)
	11-20dB	+/- 5% (High performance) +/- 10% (Standard)
Wavelength dependency variation of the attenuation within 1310 +/- 20nm and 1550 +/- 20nm LD	1-10dB	Initial attenuation +/- 0.5dB
	11-20dB	Initial attenuation +/- 5%
Back Reflection		>= 50dB (HP polishing) >= 60dB (AP polishing)
Polarization dependent loss		<= 0.5dB

Note: Measurement method is described in the attached sheet.

5.2 Polishing precision of the ferrule end face

a. Vertex offset from the center of fiber: <= 50μm

(Measurement method is described in the attached sheet.)

b. There should be no scratch or anything that affects optical performance of the product.

5.3 Mechanical Characteristics

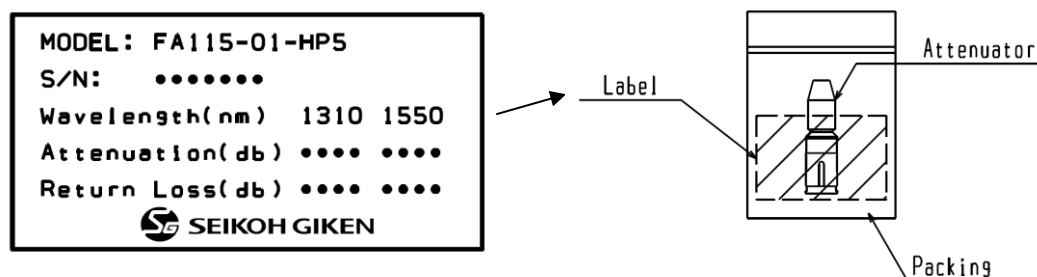
Test item	Conditions	Variation range of the attenuation		Back Reflection
		High performance	Standard	
Vibration	Frequency range: 10-55Hz Amplitude: 1.5mm 2 axis for 2 hours, 24 cycles (FC type) 3 axis for 2 hours, 24 cycles (SC type)	+/- 0.5dB (1-10dB)	+/- 1.0dB (1-10dB)	>= 50dB (HP)
Repeatability	Times of matching: 500 times (Plug in and pull out on both ferrule side and plug side for one matching)	+/- 5% (11-20dB)	+/- 10% (11-20dB)	>= 60dB (AP)
Drop/free-fall	Dropping the specimen onto the steel plate from 1000 mm height for 3 times			

5.4 Environmental Characteristics

Test item	Conditions	Variation range of the attenuation		Back Reflection
		High performance	Standard	
Temperature cycle	-40 to +85 degree C, 10 cycles	+/- 0.5dB (1-10dB)	+/- 1.0dB (1-10dB)	>= 50dB (HP) >= 60dB (AP)
Heat resistance	+85 degree C, 240 hours			
Cold resistance	-40 degree C, 240 hours			
High humidity resistance (Constant temp.)	+40 degree C, 90 to 95%Rh, 240 hours	+/- 5% (11-20dB)	+/- 10% (11-20dB)	>= 60dB (AP)
Temperature/humidity cycle	-10 to +65 degree C, 95%Rh, 10 cycles			

6. INSPECTION SHEET

Data label including Serial Number, Attenuation value and Back reflection is placed on individual package.



7. PACKAGING

The product(s) shall be packed to prevent from any damage on its appearance or performance during transportation.

8. HANDLING AND CARE

8.1 Conditions of Storage

- a. Operating temperature/humidity:
-20 to +70 degree C / 30 to 80%Rh
- b. Storage temperature/humidity:
-40 to +80 degree C / 30 to 90%Rh (No condensation)

8.2 Joining

Do not join the product with a connector or an adapter at a tilt or not add excess force. It may cause scratch or contamination on the end face of optical fiber and its damage.

Do not see the end face of the product that is joined to an instrument, because high power light may come out from the instrument. Read the operating manual of the instrument.

8.3 Cleaning

Make sure to clean ferrule end face of the product and inside the matching adapter with alcohol and lint-free tissue before each use.

8.4 Storage

When not in use, make sure to put a protection cap on the product for storage.

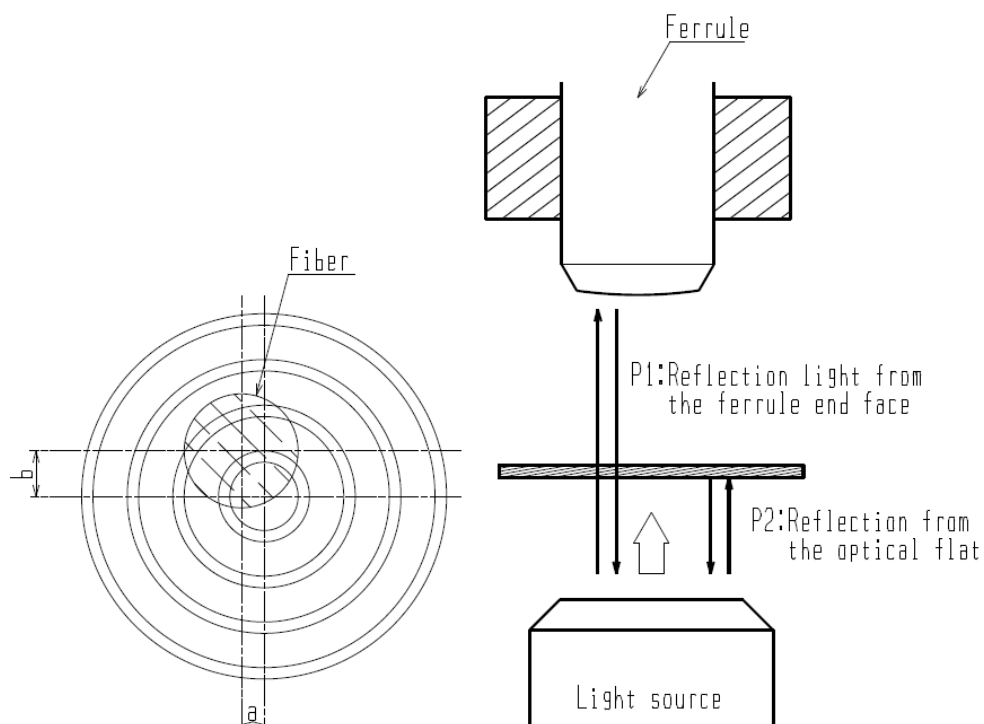
8.5 Disposal

Disposal of the product shall be carried out as industrial waste in ecologically satisfactory manner.

9. OTHERS

The product does not apply to the strategic goods, material, or service defined by Foreign Exchange and Foreign Trade Control Law.

Measurement Method for PC Polished Ferrule End Face Geometry



Description

Light, forming interference fringe : $\lambda = 0.66 \times 10^{-3} \text{ mm}$

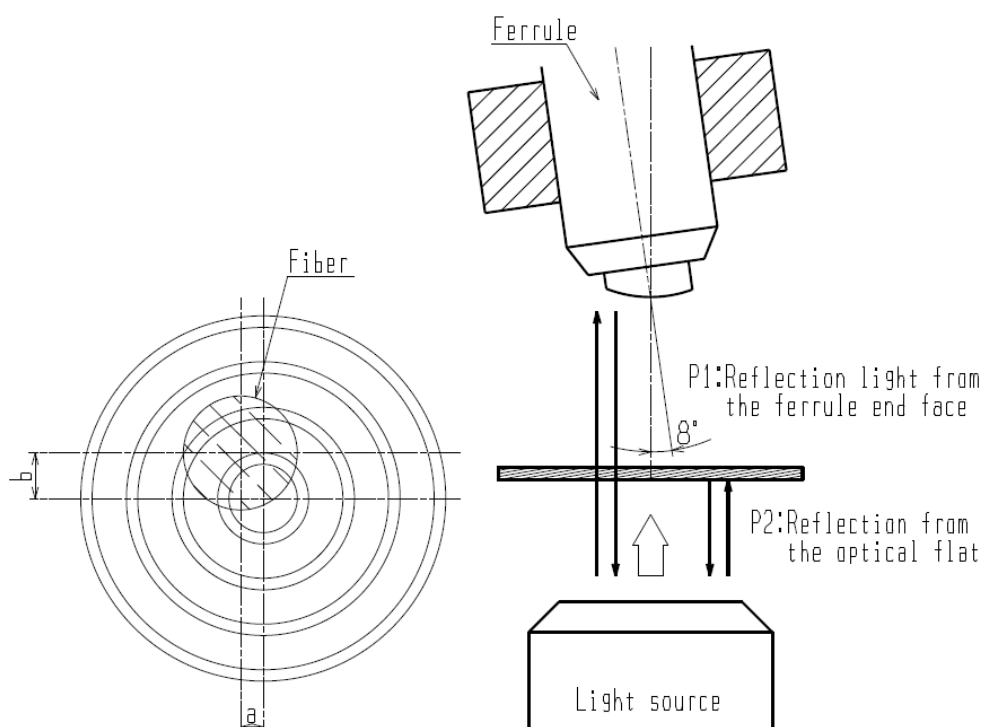
Apex offset : $e = \sqrt{a^2 + b^2}$

Choose two fringes of the m th and the $(m+p)$ th, which are formed from P_1 and P_2 , and then measure the diameter of those fringes

Radius of curvature : $R = (D_{m+p}^2 - D_m^2) / 4p\lambda$

K01-008n

Measurement Method for APC Polished Ferrule End Face Geometry



Description

Light, forming interference fringe : $\lambda = 0.66 \times 10^{-3} \text{mm}$

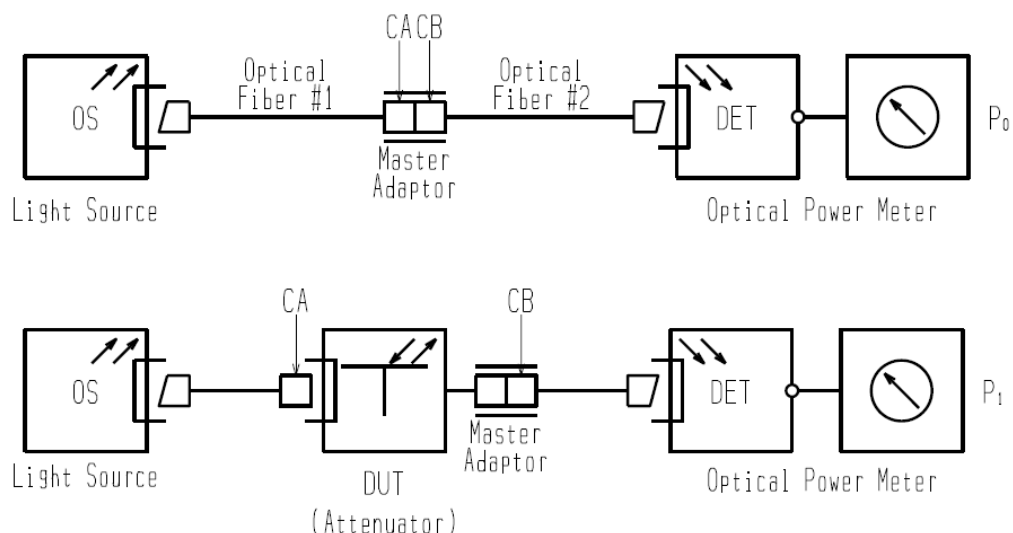
Apex offset : $e = \sqrt{a^2 + b^2}$

Choose two fringes of the m th and the $(m+p)$ th, which are formed from P_1 and P_2 , and then measure the diameter of those fringes

Radius of curvature : $R = (D_{m+p}^2 - D_m^2) / 4p\lambda$

K01-009n

Attenuation Measurement Method - Plug Type Fixed Attenuator (PC)



DESCRIPTION

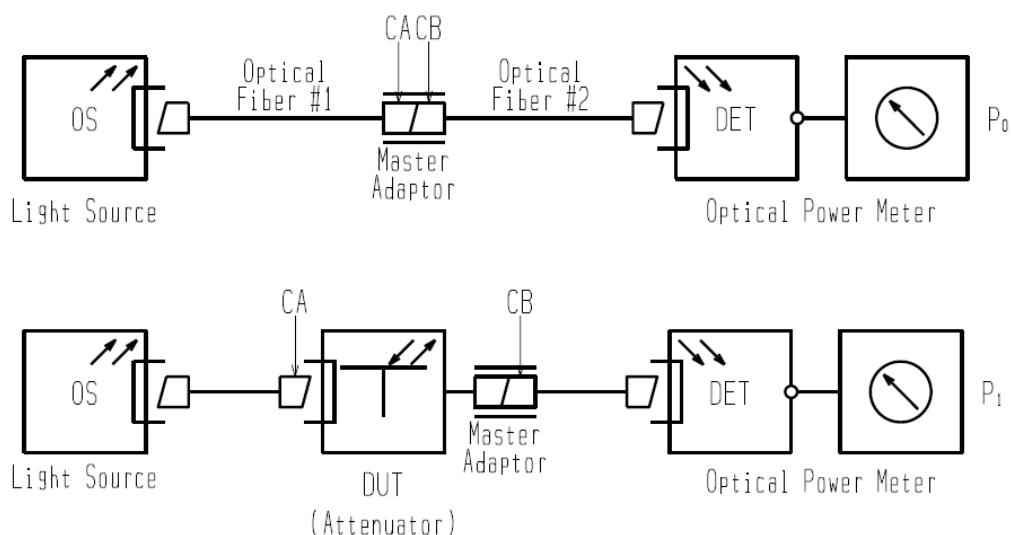
CA,CB: Master connector (satisfied the following specification)

- Fiber length : $\geq 2\text{m}$
- Diameter of the ferrule : $\phi 2.499 \pm 0.0005\text{mm}$ (FC, SC, ST),
 $\phi 1.249 \pm 0.0005\text{mm}$ (MU, LC)
- Fiber core eccentricity : $\leq 0.5\mu\text{m}$ (FC, SC, MU, LC)
- Vertex offset : $\leq 30\mu\text{m}$
- Radius of curvature : $10 \sim 25\text{mm}$ (FC, SC, ST, MU), $7 \sim 25\text{mm}$ (LC)
- Protrusion of the fiber from the ferrule end face : $-0.05 \sim 0.05\mu\text{m}$
- Insertion loss : $\leq 0.1\text{dB}$
- Backreflection : $\geq 55\text{dB}$

$$\text{Attenuation} = -10 \log_{10}(P_1/P_0)$$

L07-007n-2

Attenuation Measurement Method - Plug Type Fixed Attenuator (APC)



DESCRIPTION

CA,CB: Master connector (satisfied the following specification)

•Fiber length : $\geq 2\text{m}$

•Diameter of the ferrule : $\phi 2.499 \pm 0.0005\text{mm}$ (FC, SC, ST),
 $\phi 1.249 \pm 0.0005\text{mm}$ (MU, LC)

•Fiber core eccentricity : $\leq 0.5\mu\text{m}$ (FC, SC, MU, LC)

(For reference only since the value is measured before APC polishing.)

•Vertex offset : $\leq 30\mu\text{m}$

•Radius of curvature : $5 \sim 12\text{mm}$

•Protrusion of the fiber from the ferrule end face : $-0.05 \sim 0.05\mu\text{m}$

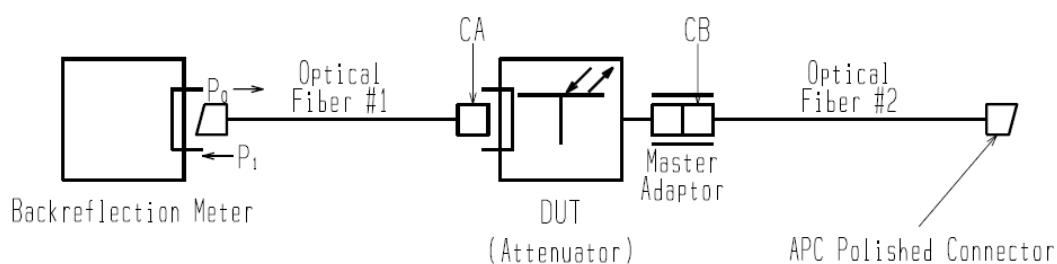
•Insertion loss : $\leq 0.1\text{dB}$

•Backreflection : $\geq 65\text{dB}$

$$\text{Attenuation} = -10 \log_{10}(P_1/P_0)$$

L07-008n-2

Backreflection Measurement Method - Plug Type Fixed Attenuator (PC)



DESCRIPTION

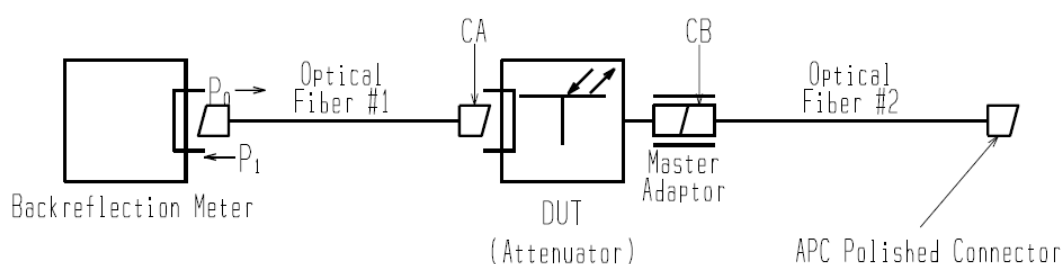
CA, CB: Master connector (satisfied the following specification)

- Fiber length : $\geq 2\text{m}$
- Diameter of the ferrule : $\phi 2.499 \pm 0.0005\text{mm}$ (FC, SC, ST),
 $\phi 1.249 \pm 0.0005\text{mm}$ (MU, LC)
- Fiber core eccentricity : $\leq 0.5\mu\text{m}$ (FC, SC, MU, LC)
- Vertex offset : $\leq 30\mu\text{m}$
- Radius of curvature : $10 \sim 25\text{mm}$ (FC, SC, ST, MU), $7 \sim 25\text{mm}$ (LC)
- Protrusion of the fiber from the ferrule end face : $-0.05 \sim 0.05\mu\text{m}$
- Insertion loss : $\leq 0.1\text{dB}$
- Backreflection : $\geq 55\text{dB}$

$$\text{Backreflection} = -10 \log_{10}(P_1/P_0)$$

R07-007n-2

Backreflection Measurement Method - Plug Type Fixed Attenuator (APC)



DESCRIPTION

CA, CB: Master connector (satisfied the following specification)

•Fiber length : $\geq 2\text{m}$

•Diameter of the ferrule : $\phi 2.499 \pm 0.0005\text{mm}$ (FC, SC, ST),
 $\phi 1.249 \pm 0.0005\text{mm}$ (MU, LC)

•Fiber core eccentricity : $\leq 0.5\mu\text{m}$ (FC, SC, MU, LC)

(For reference only since the value is measured before APC polishing.)

•Vertex offset : $\leq 30\mu\text{m}$

•Radius of curvature : 5~12mm

•Protrusion of the fiber from the ferrule end face : $-0.05 \sim 0.05\mu\text{m}$

•Insertion loss : $\leq 0.1\text{dB}$

•Backreflection : $\geq 65\text{dB}$

$$\text{Backreflection} = -10\log_{10}(P_1/P_0)$$

R07-008n-2

