

FA100, FA110, FA115 Series

FC/SC Plug Type Fixed Attenuator

TECHNICAL SPECIFICATIONS



SEIKOH GIKEN Co.,Ltd.

Fiber Optic Products Division

296-1, MATSUHIDAI, MATSUDO-SHI,
CHIBA, 270-2214 JAPAN.

TEL: +81-47-388-6111 FAX: +81-47-388-4477

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Please address any questions, comments, and suggestions to:

SEIKOH GIKEN USA, Inc.

Headquarters

4405 International Blvd., Suite B109
Norcross, GA 30093 U.S.A.
TEL: +1-770-279-6602 FAX: +1-770-279-8839

Western Field Office

21250 Hawthorne Boulevard, Suite 700
Torrance, CA 90503
TEL: +1-310-792-7450 FAX: +1-310-792-7451

SEIKOH GIKEN Europe GmbH

Siemensstrasse 9
D-63263 Neu-Isenburg, Germany
TEL: +49-6102-297-701
FAX: +49-6102-297-750

SEIKOH GIKEN Hong Kong Co.,Ltd.

Concordia Plaza 21/F Rm2111,
1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong.
TEL: +852-26206551 FAX: +852-26206525

1. SCOPE

This specification is applicable to plug type shinglemode 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			
FA110: F04 (SC type, plastic housing)	10: 10dB	AP: APC polishing	(non) : Standard	1290 ~1330nm and 1530 ~ 1570nm
	11: 11dB			
	12: 12dB			
	13: 13dB			
	14: 14dB			
	15: 15dB			
FA115: F04 (SC type, metal housing)	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	$IL \leq 0.5\text{dB}$
	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%
Backrefrection		$\geq 50\text{dB}$ (HP polishing) $\geq 60\text{dB}$ (AP polishing)
Polarization dependent loss		$\leq 0.5\text{dB}$

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: $\leq 50\mu\text{m}$

(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		Backrefrection
		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)	$\geq 50\text{dB}$ (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)	$\geq 60\text{dB}$ (AP)
Drop/free-fall	Dropping the specimen onto the steel plate from 1000 mm height for 3 times			

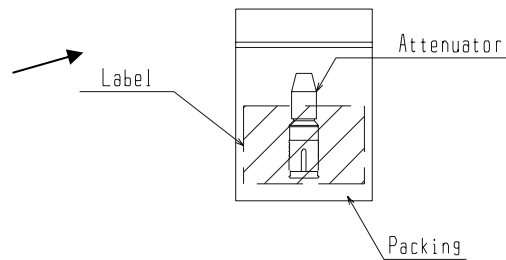
5.4 Environmental Characteristics

Test item	Conditions	Variation range of the attenuation		Backrefrection
		High performance	Standard	
Temperature cycle	-40 to +85 degree C, 10 cycles	+/- 0.5dB (1-10dB)	+/- 1.0dB (1-10dB)	>= 50dB (HP)
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			
Temperature/ humidity cycle	-10 to +65 degree C, 95%Rh, 10 cycles			
		+/- 5% (11-20dB)	+/- 10% (11-20dB)	>= 60dB (AP)

6. INSPECTION SHEET

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

MODEL: FA110-01-HP5
S/N: *****
Wavelength(nm) 1310 1550
Attenuation(db) **** ****
Return Loss(db) **** ****
SEIKOH GIKEN CO. LTD



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

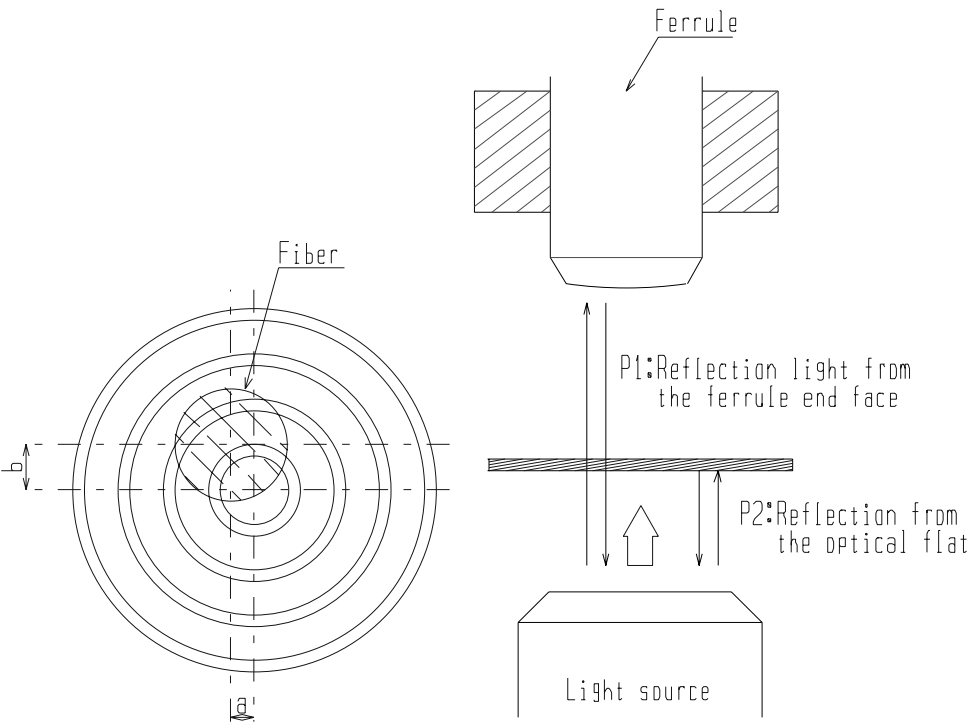
Disposal of the product shall be carried out as industrial waste in ecologically satisfactory manner.

9. OTHERS

This specification may not be amended or modified unless the parties so agree in writing.

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

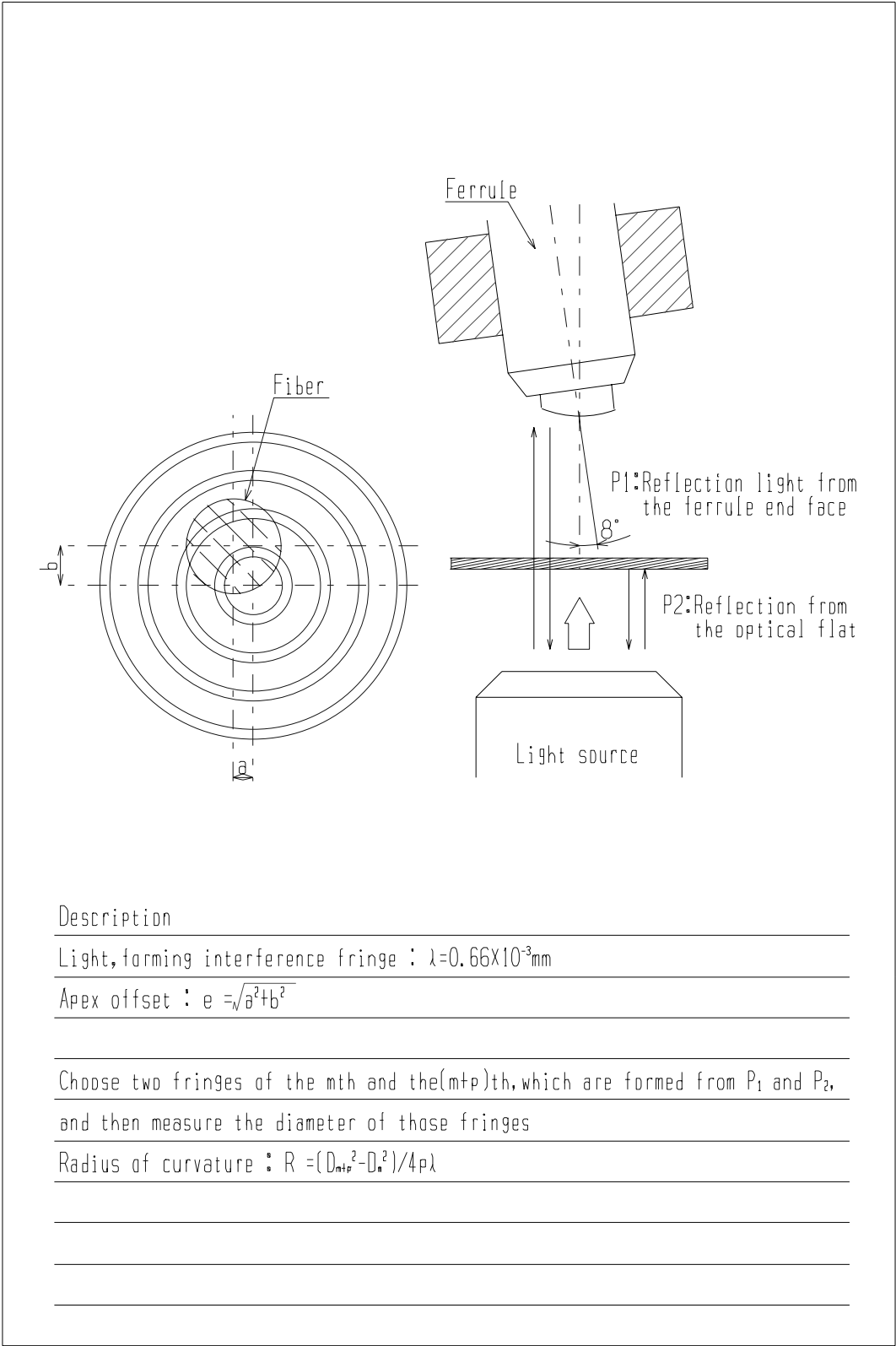
Light, forming interference fringe : $\lambda=0.66 \times 10^{-3} \text{mm}$

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

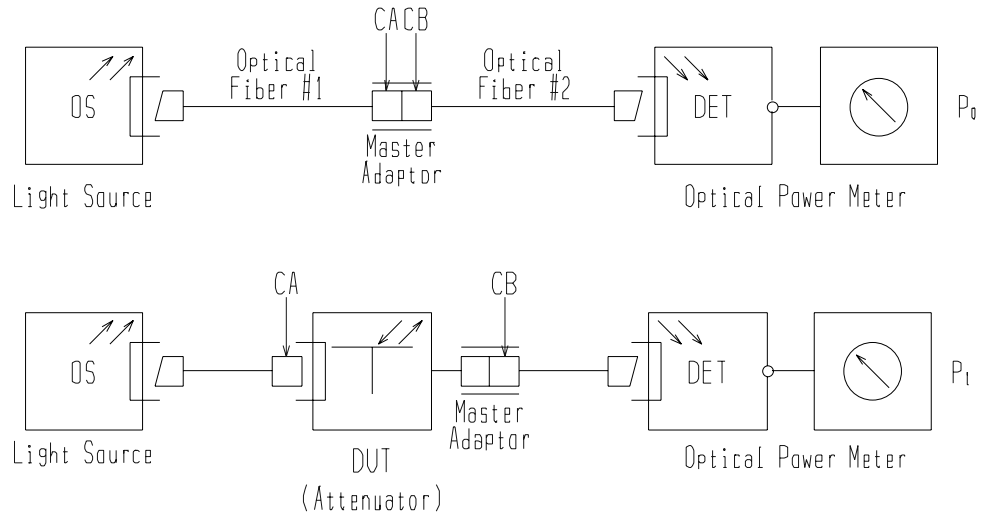
Radius of curvature : $R = (D_{m+p}^2 - D_m^2) / 4p\lambda$

Measurement Method for APC Polished Ferrule End Face Geometry



K01-009n

Attenuation Measurement Method - Plug Type Fixed Attenuator (HP)



REFERENCE

CA, CB: PC(master side)-APC hybrid master connectors with $\geq 2\text{m}$ optical fiber
 Light source/Power meter: RX/RM series (1310 \pm 30nm, 1550 \pm 30nm LD) - JDS Uniphase

SPECIFICATION FOR MASTER CONNECTOR

Ferrule outer diameter: $\phi 2.499 \pm 0.0005\text{mm}$

Angle between ferrule axis and insertion hole for fiber ≤ 0.2 degree(°)

Vertex Offset $\leq 30\mu\text{m}$

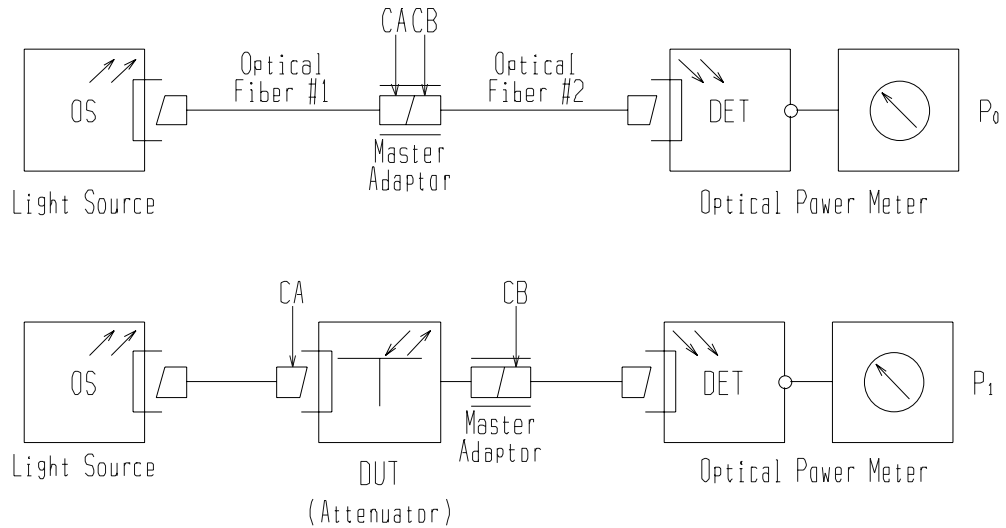
Insertion Loss $\leq 0.1\text{dB}$

Backreflection $\geq 50\text{dB}$

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

L07-007

Attenuation Measurement Method - Plug Type Fixed Attenuator (AP)



REFERENCE

CA, CB: APC master connector with $\geq 2\text{m}$ optical fiber

Light source/Power meter: RM/RX series (1310 \pm 30nm, 1550 \pm 30nm LD) - JDS Uniphase

SPECIFICATION FOR MASTER CONNECTOR

Ferrule outer diameter: $\phi 2.499 \pm 0.0005\text{mm}$

Angle between ferrule axis and insertion hole for fiber ≤ 0.2 degree(°)

Vertex Offset $\leq 30\mu\text{m}$

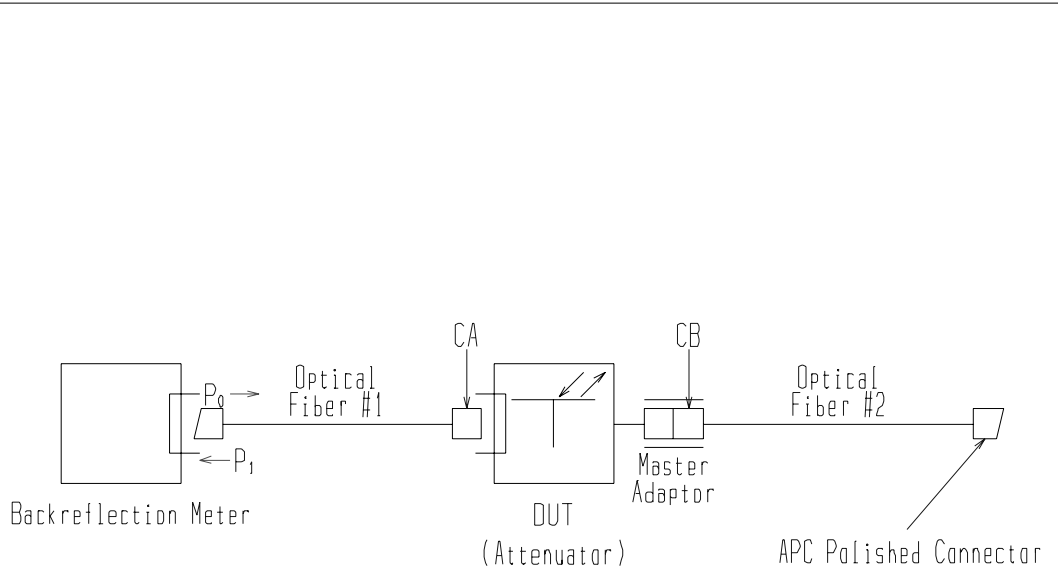
Insertion Loss $\leq 0.1\text{dB}$

Backreflection $\geq 60\text{dB}$

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

L07-008

Backreflection Measurement Method - Plug Type Fixed Attenuator (HP)



REFERENCE

CA, CB: PC(master side)-APC hybrid master connectors with $\geq 2\text{m}$ optical fiber
 Light source/Power meter: RX/RM series (1310 \pm 30nm, 1550 \pm 30nm LD) - JDS Uniphase

SPECIFICATION FOR MASTER CONNECTOR

Ferrule outer diameter: $\phi 2.499 \pm 0.0005\text{mm}$

Angle between ferrule axis and insertion hole for ferrule ≤ 0.2 degree(°)

Vertex Offset $\leq 30\mu\text{m}$

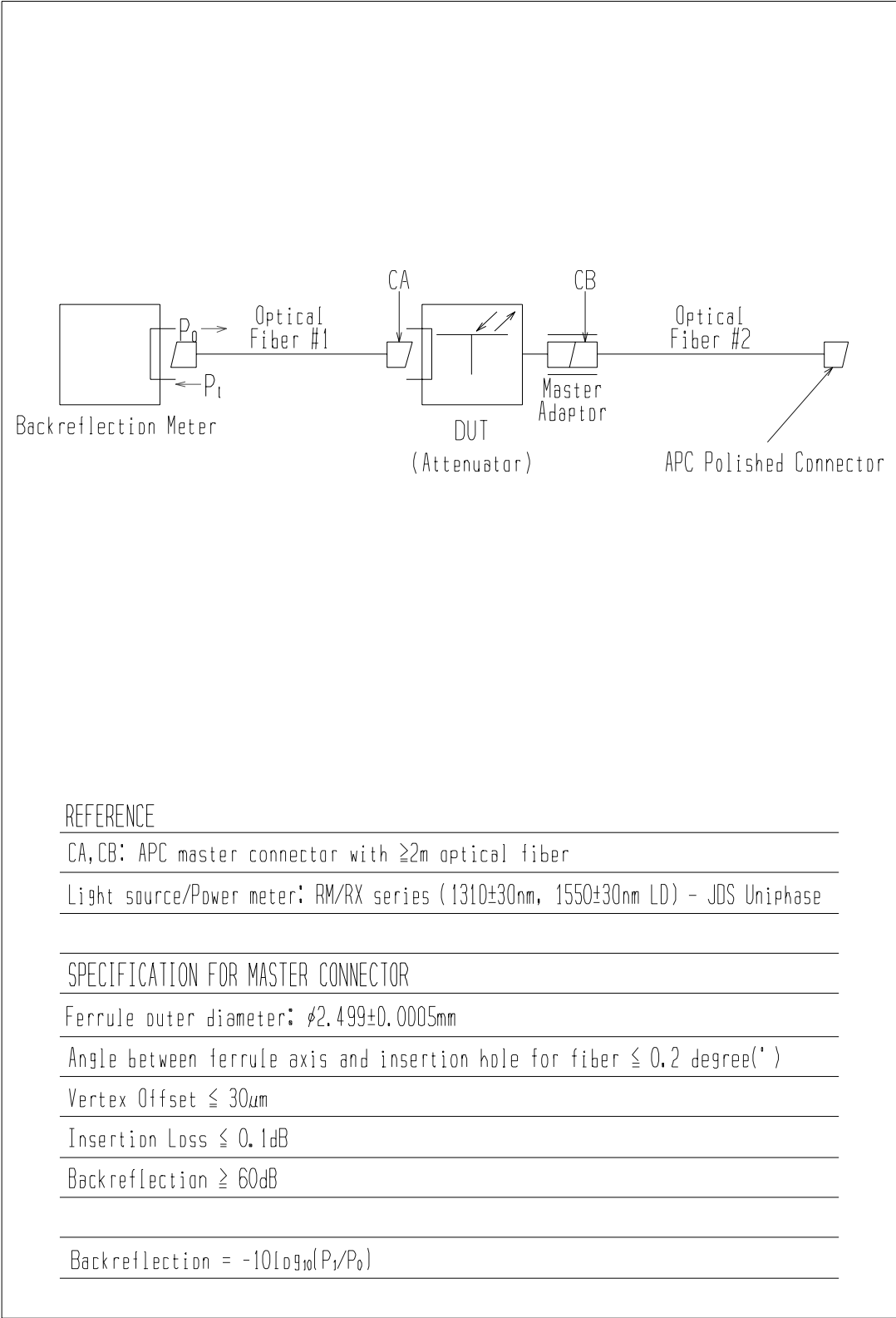
Insertion Loss $\leq 0.1\text{dB}$

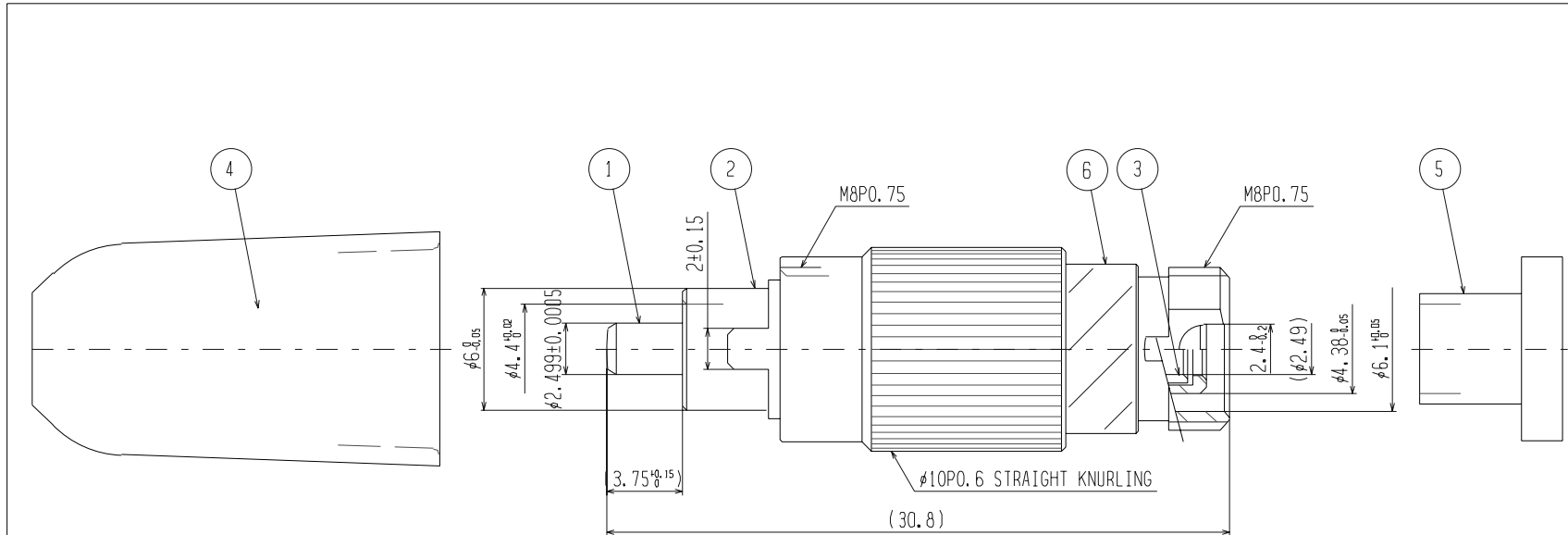
Backreflection $\geq 50\text{dB}$

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

R07-007

Backreflection Measurement Method - Plug Type Fixed Attenuator (AP)



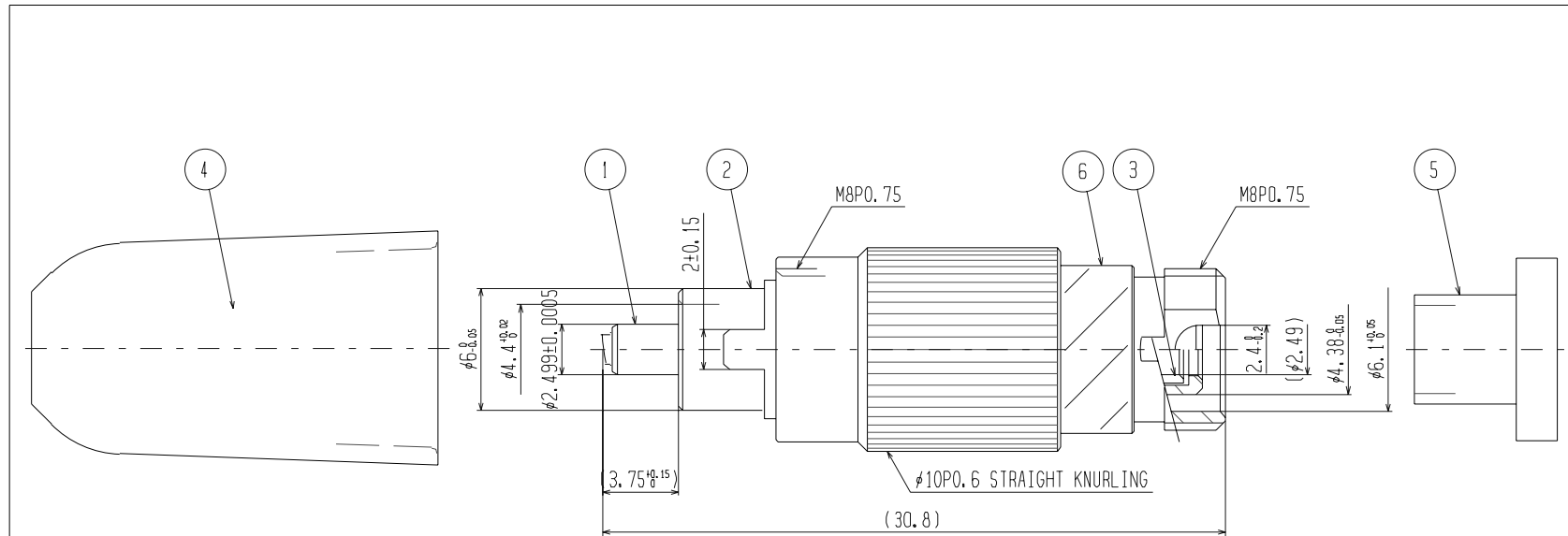


COLORS FOR DIFFERENT TYPES OF ATTENUATIONS

ATTENUATION	COLOR	CHARACTOR
3dB	ORANGE	BLACK
5dB	YELLOW	BLACK
10dB	BLUE	WHITE
15dB	RED	WHITE
20dB	BLACK	WHITE
OTHERS	SILVER	BLACK

PART No	QTY	ITEM	MATERIAL / FINISH
6	1	LABEL	ALUMINUM
5	1	ADAPTOR CAP	PP WHITE
4	1	FERRULE CAP	PVC BLACK
3	1	SLEEVE	ZIRCONIA
2	1	HOUSING	BRASS Ni PLATING
1	1	FERRULE	ZIRCONIA

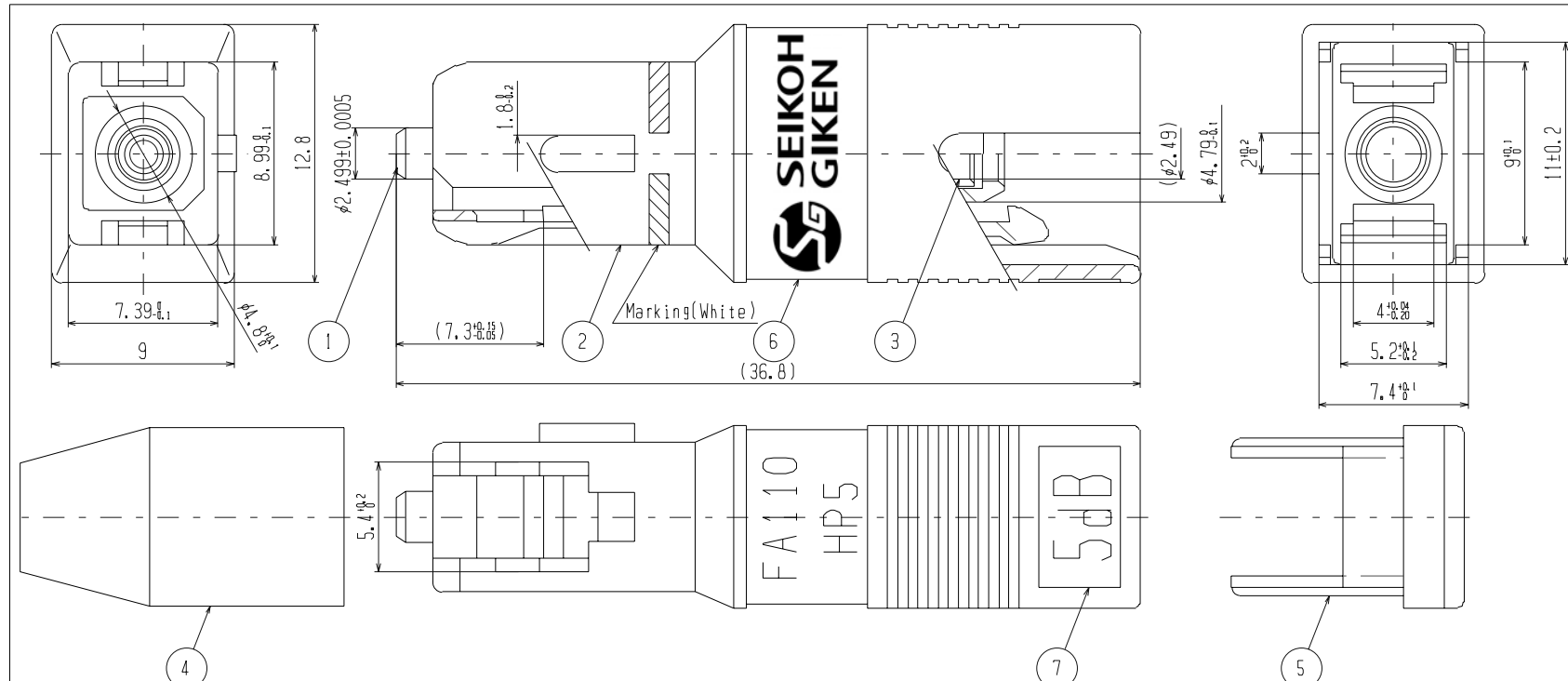
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△	CHECKED	DATE	TITLE
△	APPROVED	DATE	FA100-HP* PLUG ATTENUATOR
△	MATERIAL	UNIT:<mm>	DWG.No. S07-038-3
△	DESIGN CHANGE	FINISH	SCALE:5/1 SHEET OF 1 OF 1



COLORS FOR DIFFERENT TYPES OF ATTENUATIONS

ATTENUATION	COLOR	CHARACTOR
3dB	ORANGE	BLACK
5dB	YELLOW	BLACK
10dB	BLUE	WHITE
15dB	RED	WHITE
20dB	BLACK	WHITE
OTHERS	SILVER	BLACK

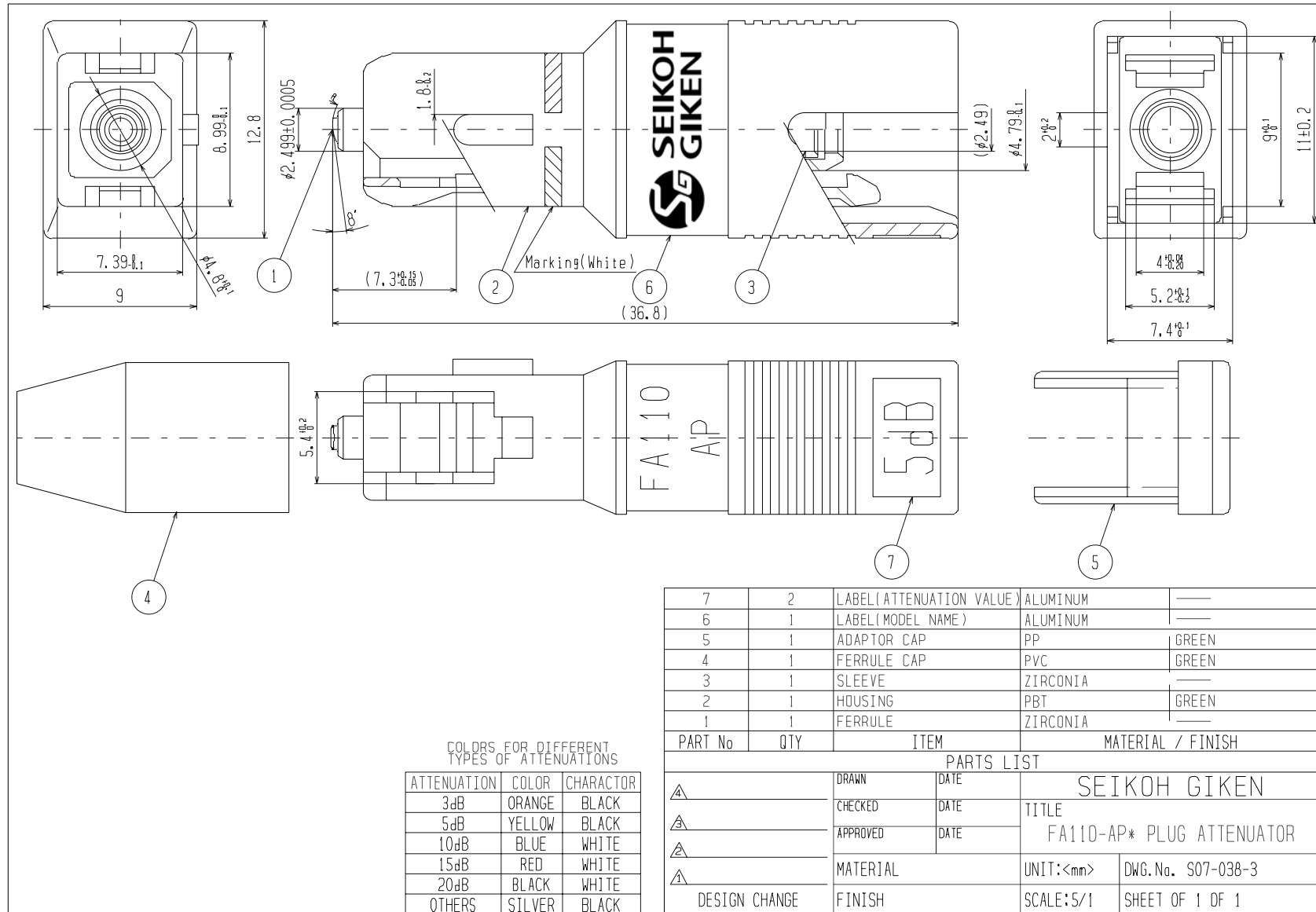
6	1	LABEL	ALUMINUM	---
5	1	ADAPTOR CAP	PP	GREEN
4	1	FERRULE CAP	PVC	GREEN
3	1	SLEEVE	ZIRCONIA	---
2	1	HOUSING	BRASS	Ni PLATING
1	1	FERRULE	ZIRCONIA	---
PART No	QTY	ITEM	MATERIAL / FINISH	
PARTS LIST				
△		DRAWN	DATE	SEIKOH GIKEN
△		CHECKED	DATE	
△		APPROVED	DATE	
△		MATERIAL	UNIT:<mm>	DWG. No. S07-038-3
△		FINISH	SCALE:5/1	SHEET OF 1 OF 1



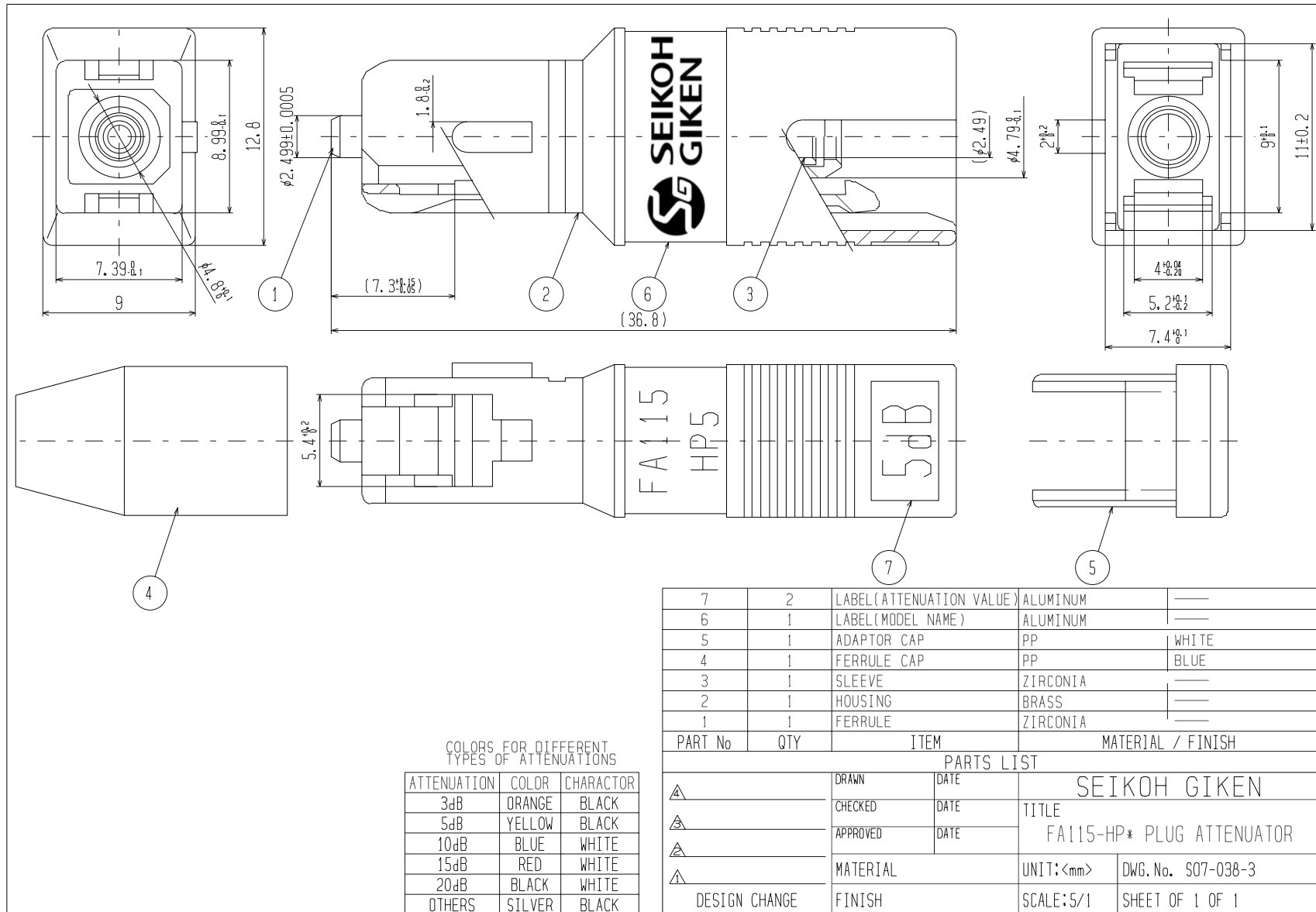
COLORS FOR DIFFERENT TYPES OF ATTENUATIONS

ATTENUATION	COLOR	CHARACTOR
3dB	ORANGE	BLACK
5dB	YELLOW	BLACK
10dB	BLUE	WHITE
15dB	RED	WHITE
20dB	BLACK	WHITE
OTHERS	SILVER	BLACK

7	2	LABEL (ATTENUATION VALUE)	ALUMINUM	---
6	1	LABEL (MODEL NAME)	ALUMINUM	---
5	1	ADAPTOR CAP	PP	WHITE
4	1	FERRULE CAP	PVC	BLUE
3	1	SLEEVE	ZIRCONIA	---
2	1	HOUSING	PBT	BLUE
1	1	FERRULE	ZIRCONIA	---
PART No	QTY	ITEM	MATERIAL / FINISH	
PARTS LIST				
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△		MATERIAL	UNIT: <mm>	DWG. No. S07-038-3
		DESIGN CHANGE	FINISH	SCALE: 5/1 SHEET OF 1 OF 1



S07-038-4E
FC/SC Plug Type Fixed Attenuator

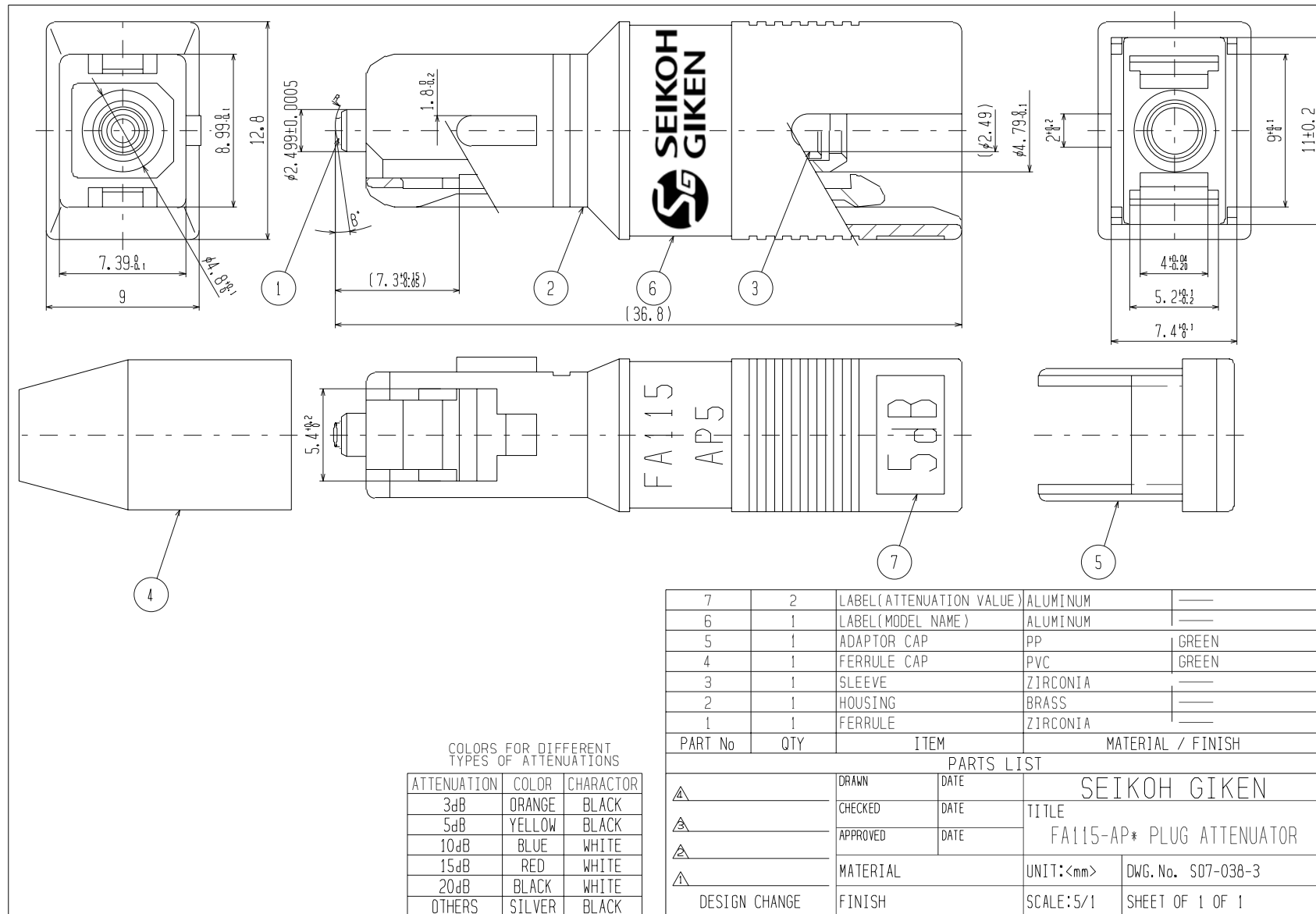


COLORS FOR DIFFERENT TYPES OF ATTENUATIONS

ATTENUATION	COLOR	CHARACTOR
3dB	ORANGE	BLACK
5dB	YELLOW	BLACK
10dB	BLUE	WHITE
15dB	RED	WHITE
20dB	BLACK	WHITE
OTHERS	SILVER	BLACK

PART No	QTY	ITEM	MATERIAL / FINISH
7	2	LABEL (ATTENUATION VALUE)	ALUMINUM
6	1	LABEL (MODEL NAME)	ALUMINUM
5	1	ADAPTOR CAP	PP WHITE
4	1	FERRULE CAP	PP BLUE
3	1	SLEEVE	ZIRCONIA
2	1	HOUSING	BRASS
1	1	FERRULE	ZIRCONIA

PARTS LIST			
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△	CHECKED	DATE	TITLE
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△	MATERIAL	UNIT: <mm>	DWG. No. S07-038-3
△	FINISH	SCALE: 5/1	SHEET OF 1 OF 1



COLORS FOR DIFFERENT TYPES OF ATTENUATIONS

ATTENUATION	COLOR	CHARACTOR
3dB	ORANGE	BLACK
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7	2	LABEL(ATTENUATION VALUE)	ALUMINUM	---
6	1	LABEL(MODEL NAME)	ALUMINUM	---
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3	1	SLEEVE	ZIRCONIA	---
2	1	HOUSING	BRASS	---
1	1	FERRULE	ZIRCONIA	---
PART No	QTY	ITEM	MATERIAL / FINISH	
PARTS LIST				
△		DRAWN	DATE	SEIKOH GIKEN
△		CHECKED	DATE	TITLE
△		APPROVED	DATE	FA115-AP* PLUG ATTENUATOR
△		MATERIAL	UNIT:<mm>	DWG. No. S07-038-3
		FINISH	SCALE:5/1	SHEET OF 1 OF 1