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DOCUMENT NUMBER S07-038-05E

FA100, FA110, FA115 Series

FC/SC Plug Type Fixed Attenuator

TECHNICAL SPECIFICATIONS

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FA100, FA110, 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
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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) FA110: F04 (SC type, plastic housing) FA115: F04 (SC type, metal housing)		00: 0dB 01: 1dB 02: 2dB 03: 3dB 04: 4dB 05: 5dB 06: 6dB 07: 7dB 08: 8dB 09: 9dB 10: 10dB 11: 11dB 12: 12dB 13: 13dB 14: 14dB 15: 15dB 16: 16dB 17: 17dB 18: 18dB 19: 19dB 20: 20dB		HP: PC polishing AP: APC polishing	5 : High performance (non) : Standard		1290 ~1330nm and 1530 ~ 1570nm

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%
Backrefrection		>= 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: <= 50um

(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

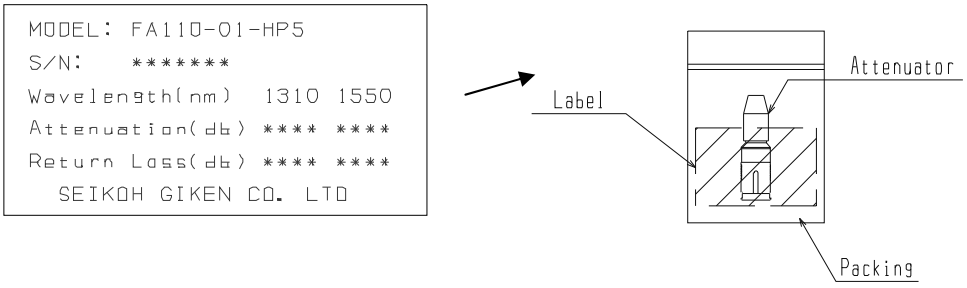
Test item	Conditions	Variation range of the attenuation		Backrefrection
		High performance	Standard	
Vibration	Frequency range: 10-55Hz Amplitude: 1.5mm 2 axis for 2 hours, 24 cycles (FC type) 3 axis for 2 hours, 24 cycles (SC type)	+/- 0.5dB (1-10dB)	+/- 1.0dB (1-10dB)	>= 50dB (HP)
Repeatability	Times 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		Backrefrection
		High performance	Standard	
Temperature cycle	-40 to +85 degree C, 10 cycles	+/- 0.5dB (1-10dB) +/- 5% (11-20dB)	+/- 1.0dB (1-10dB) +/- 10% (11-20dB)	>= 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			
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.

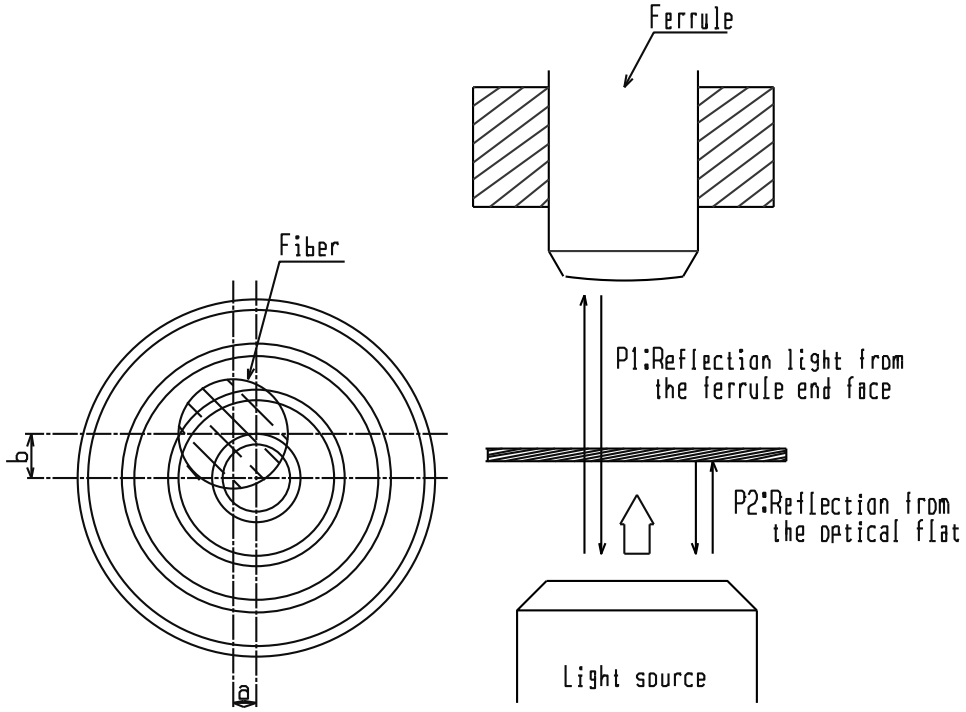
8.5 Disposal

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 Low.

Measurement Method for PC Polished Ferrule End Face Geometry



Description

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

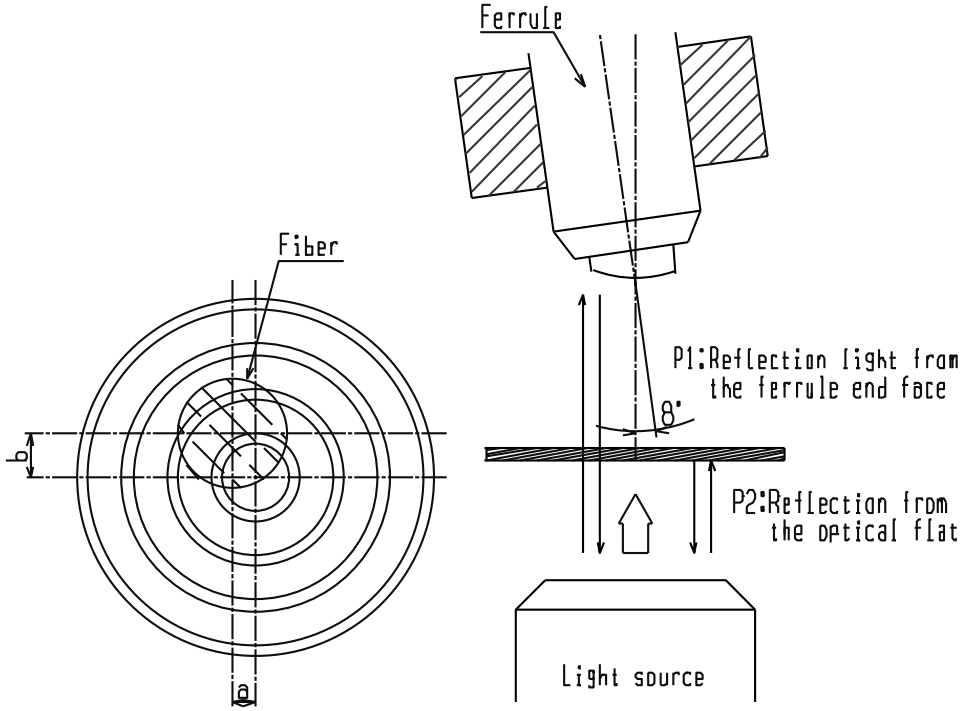
Apex offset : $e = \sqrt{a^2+b^2}$

Choose two fringes of the mth 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 : $R = (D_{m+p}^2 - D_m^2)/4p\lambda$

K01-0008n

Measurement Method for APC Polished Ferrule End Face Geometry



Description

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

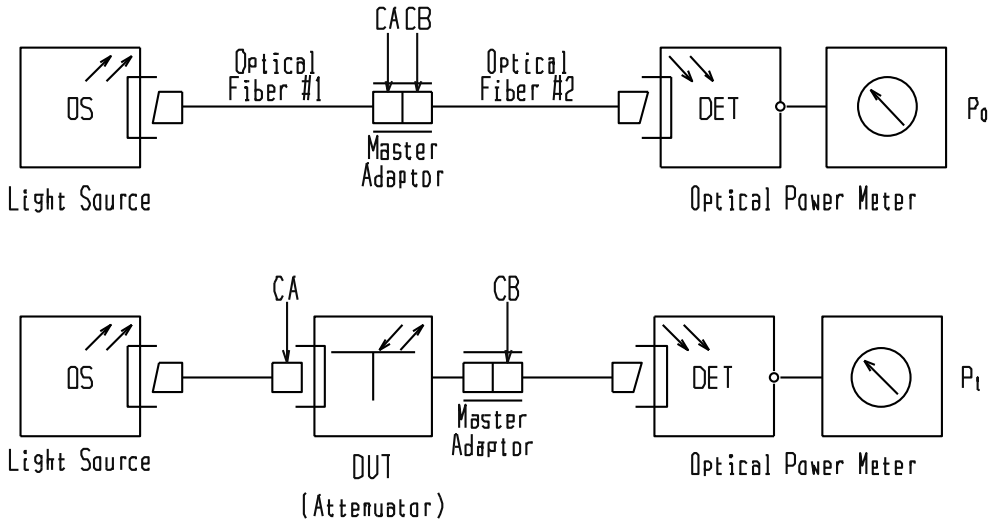
Apex offset : $e = \sqrt{a^2+b^2}$

Choose two fringes of the mth 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 : $R = (D_{m+p}^2 - D_m^2)/4p\lambda$

K01-0099

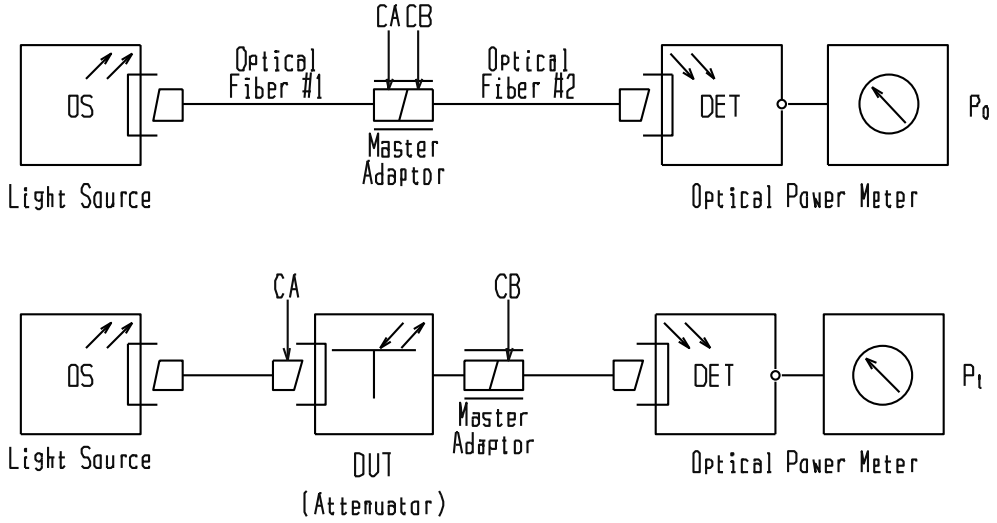
Attenuation Measurement Method - Plug Type Fixed Attenuator (PC)



DESCRIPTION
CA, CB: Master connector (satisfied the following specification)
·Fiber length : ≥2m
·Diameter of the ferrule : φ2.499±0.0005mm(FC, SC, ST),
φ1.249±0.0005mm(MU, LC)
·Fiber core eccentricity : ≦0.5μm(FC, SC, MU, LC)
·Vertex offset : ≦30μm
·Radius of curvature : 10~25mm(FC, SC, ST, MU), 7~25mm(LC)
·Protrusion of the fiber from the ferrule end face : -0.05~0.05μm
·Insertion loss : ≦0.1dB
·Backreflection : ≧55dB
Attenuation = $-10\log_{10}(P_1/P_0)$

L07-007n-2

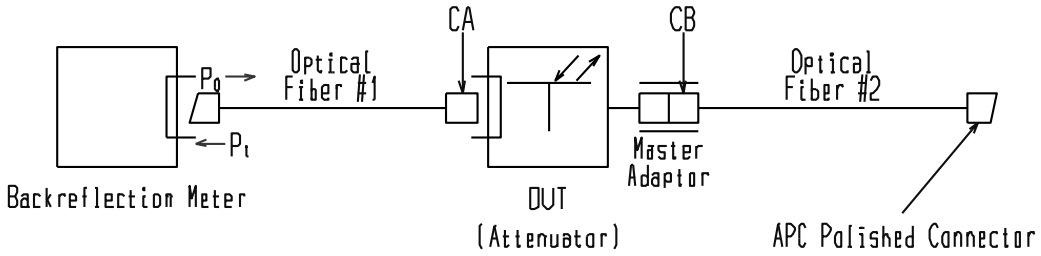
Attenuation Measurement Method - Plug Type Fixed Attenuator (APC)



DESCRIPTION
CA, CB: Master connector (satisfied the following specification)
·Fiber length : ≥2m
·Diameter of the ferrule : φ2.499±0.0005mm(FC, SC, ST), φ1.249±0.0005mm(MU, LC)
·Fiber core eccentricity : ≦0.5μm(FC, SC, MU, LC)
(For reference only since the value is measured before APC polishing.)
·Vertex offset : ≦30μm
·Radius of curvature : 5~12mm
·Protrusion of the fiber from the ferrule end face : -0.05~0.05μm
·Insertion loss : ≦0.1dB
·Backreflection : ≥65dB
$Attenuation = -10\log_{10}(P_t/P_0)$

L07-008n-2

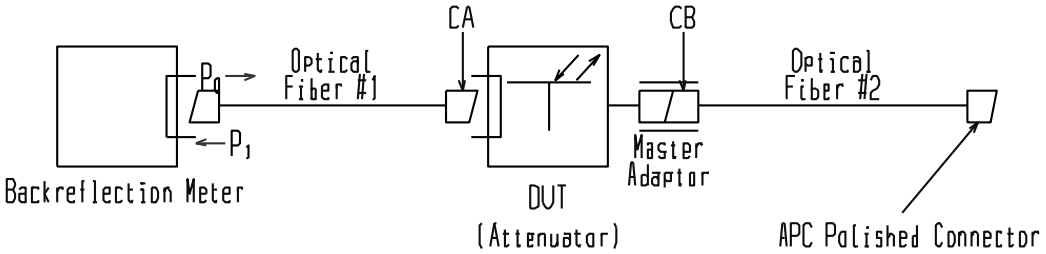
Backreflection Measurement Method - Plug Type Fixed Attenuator (PC)



DESCRIPTION
CA,CB: Master connector (satisfied the following specification)
·Fiber length : ≥2m
·Diameter of the ferrule : φ2.499±0.0005mm(FC,SC,ST),
φ1.249±0.0005mm(MU,LC)
·Fiber core eccentricity : ≦0.5μm(FC,SC,MU,LC)
·Vertex offset : ≦30μm
·Radius of curvature : 10~25mm(FC,SC,ST,MU), 7~25mm(LC)
·Protrusion of the fiber from the ferrule end face : -0.05~0.05μm
·Insertion loss : ≦0.1dB
·Backreflection : ≧55dB
Backreflection = $-10\log_{10}(P_1/P_0)$

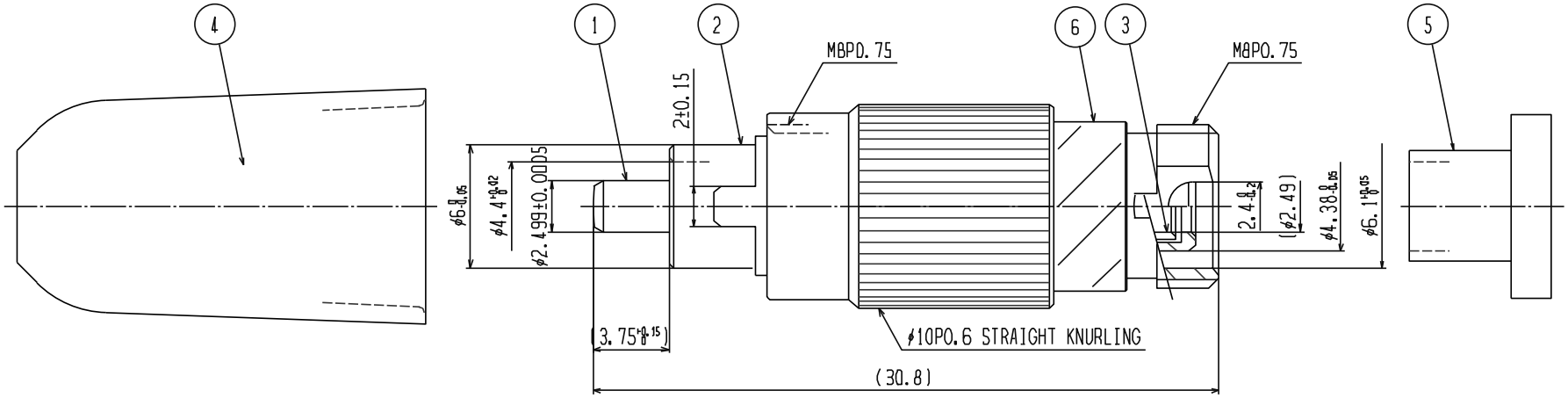
R07-007n-2

Backreflection Measurement Method - Plug Type Fixed Attenuator (APC)



DESCRIPTION
CA,CB: Master connector (satisfied the following specification)
·Fiber length : ≥2m
·Diameter of the ferrule : φ2.499±0.0005mm(FC,SC,ST), φ1.249±0.0005mm(MU,LC)
·Fiber core eccentricity : ≦0.5μm(FC,SC,MU,LC)
(For reference only since the value is measured before APC polishing.)
·Vertex offset : ≦30μm
·Radius of curvature : 5~12mm
·Protrusion of the fiber from the ferrule end face : -0.05~0.05μm
·Insertion loss : ≦0.1dB
·Backreflection : ≧65dB
Backreflection = $-10\log_{10}(P_1/P_0)$

R07-008n-2





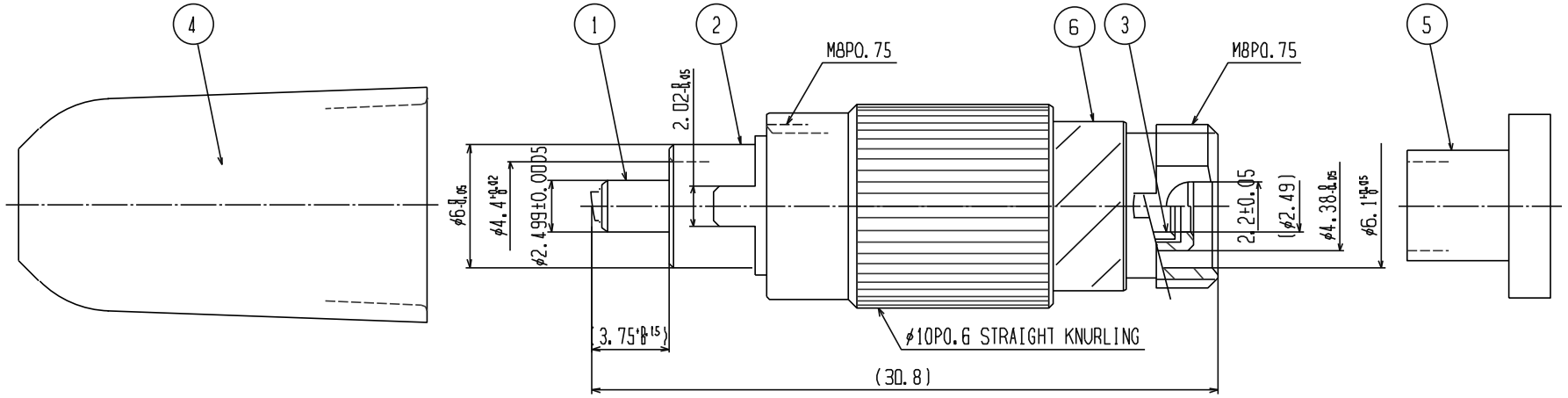
PART No	QTY	ITEM	MATERIAL / FINISH
6	1	LABEL	ALUMINUM / ——
5	1	ADAPTOR CAP	PP / WHITE
4	1	FERRULE CAP	PVC / BLACK
3	1	SLEEVE	ZIRCONIA / ——
2	1	HOUSING	BRASS / Ni PLATING
1	1	FERRULE	ZIRCONIA / ——

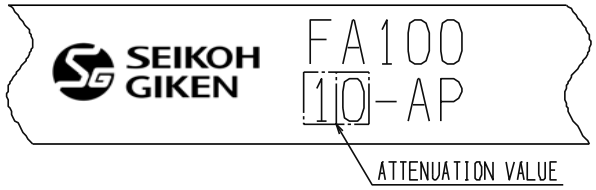
PARTS LIST

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

④	DRAWN	DATE	SEIKOH GIKEN	
③	CHECKED	DATE	TITLE: FA100-HP PLUG ATTENUATOR	
②	APPROVED	DATE		
①	MATERIAL		UNIT:<mm>	DWG.No. S07-038-3
DESIGN CHANGE	FINISH		SCALE:5/1	SHEET OF 1 OF 1





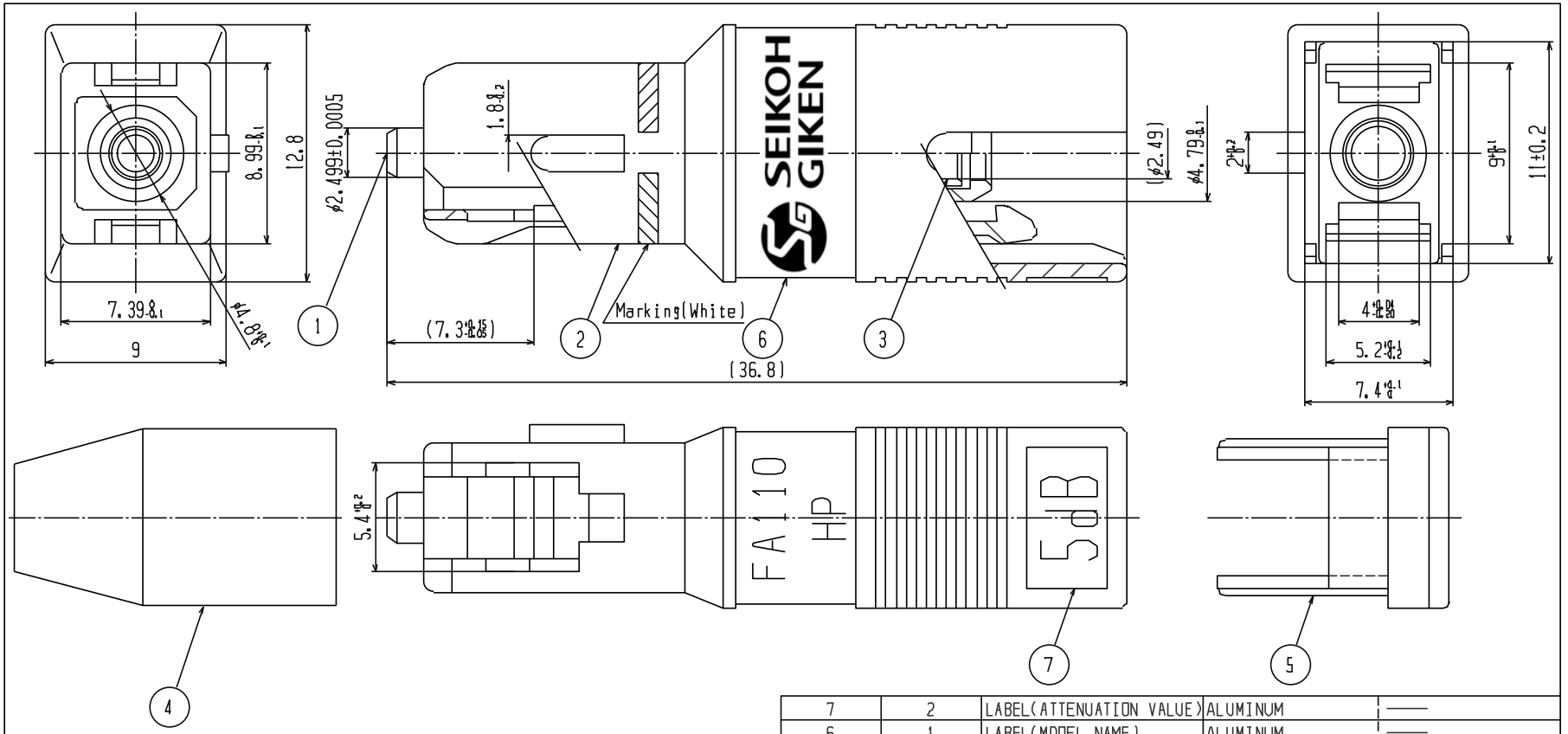
PART No	QTY	ITEM	MATERIAL / FINISH	
6	1	LABEL	ALUMINUM	——
5	1	ADAPTOR CAP	PP	GREEN
4	1	FERRULE CAP	PVC	GREEN
3	1	SLEEVE	ZIRCONIA	——
2	1	HOUSING	BRASS	Ni PLATING
1	1	FERRULE	ZIRCONIA	——

PARTS LIST

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

④	DRAWN	DATE	SEIKOH GIKEN	
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②	APPROVED	DATE		
① DESIGN CHANGE	MATERIAL		UNIT:<mm>	DWG. No. S07-038-3
	FINISH		SCALE:5/1	SHEET OF 1 OF 1



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	PVC	BLUE
3	1	SLEEVE	ZIRCONIA	——
2	1	HOUSING	PBT	BLUE
1	1	FERRULE	ZIRCONIA	——

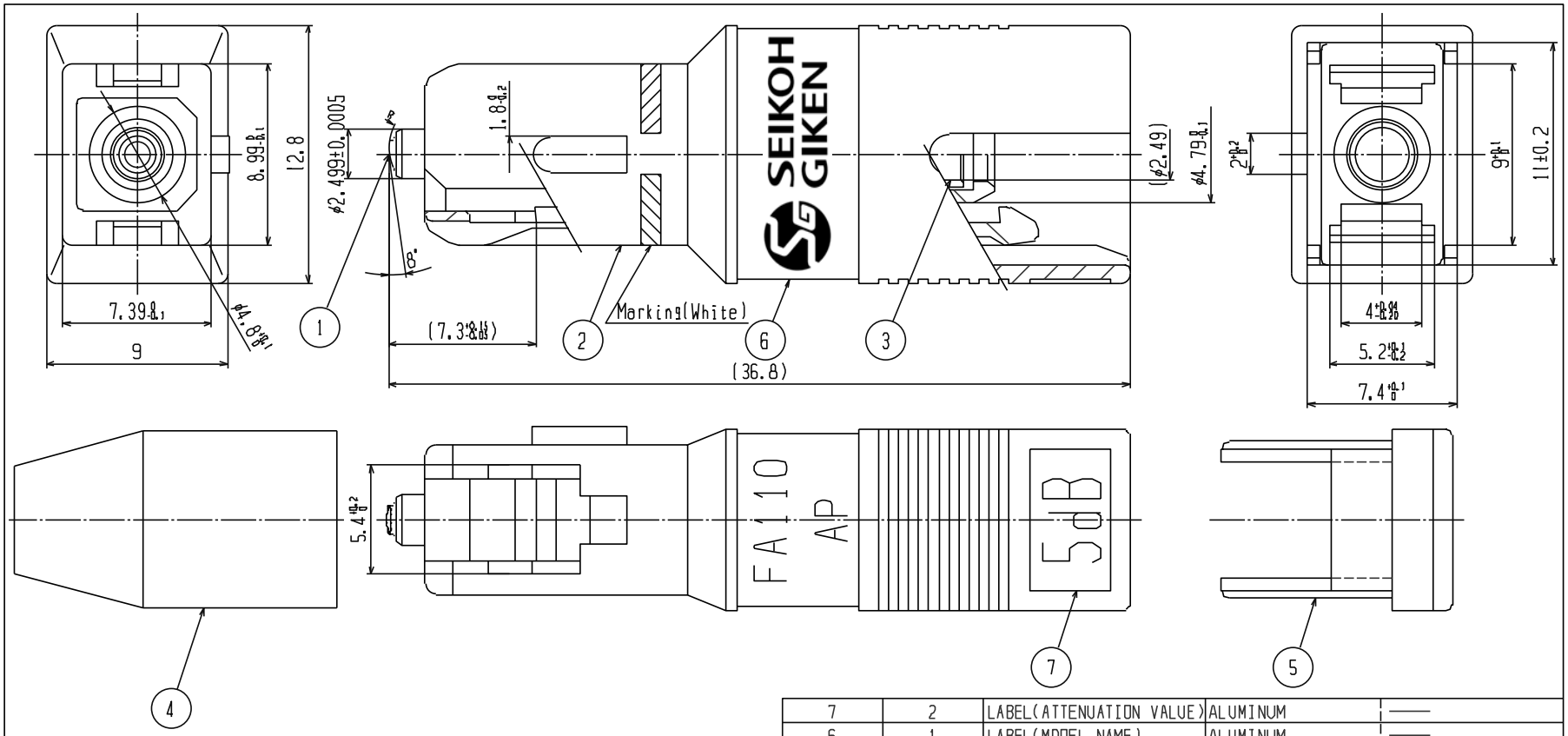
PARTS LIST

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

DESIGN CHANGE	DRAWN / DATE	SEIKOH GIKEN	
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	APPROVED / DATE		
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	FINISH	SCALE:5/1	SHEET OF 1 OF 1

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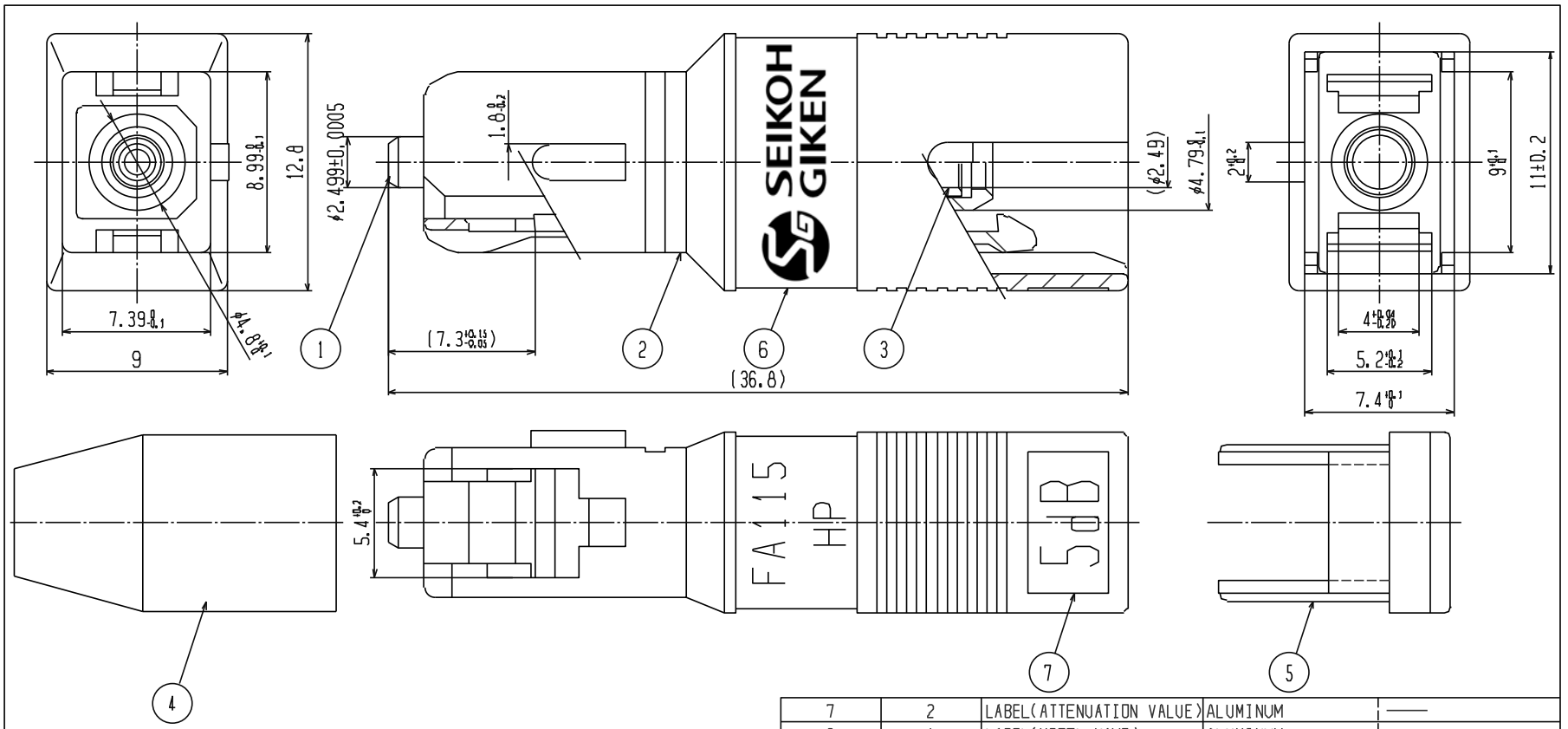
PART No	QTY	ITEM	MATERIAL / FINISH	
7	2	LABEL(ATTENUATION VALUE)	ALUMINUM	——
6	1	LABEL(MODEL NAME)	ALUMINUM	——
5	1	ADAPTOR CAP	PP	GREEN
4	1	FERRULE CAP	PVC	GREEN
3	1	SLEEVE	ZIRCONIA	——
2	1	HOUSING	PBT	GREEN
1	1	FERRULE	ZIRCONIA	——

PARTS LIST

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

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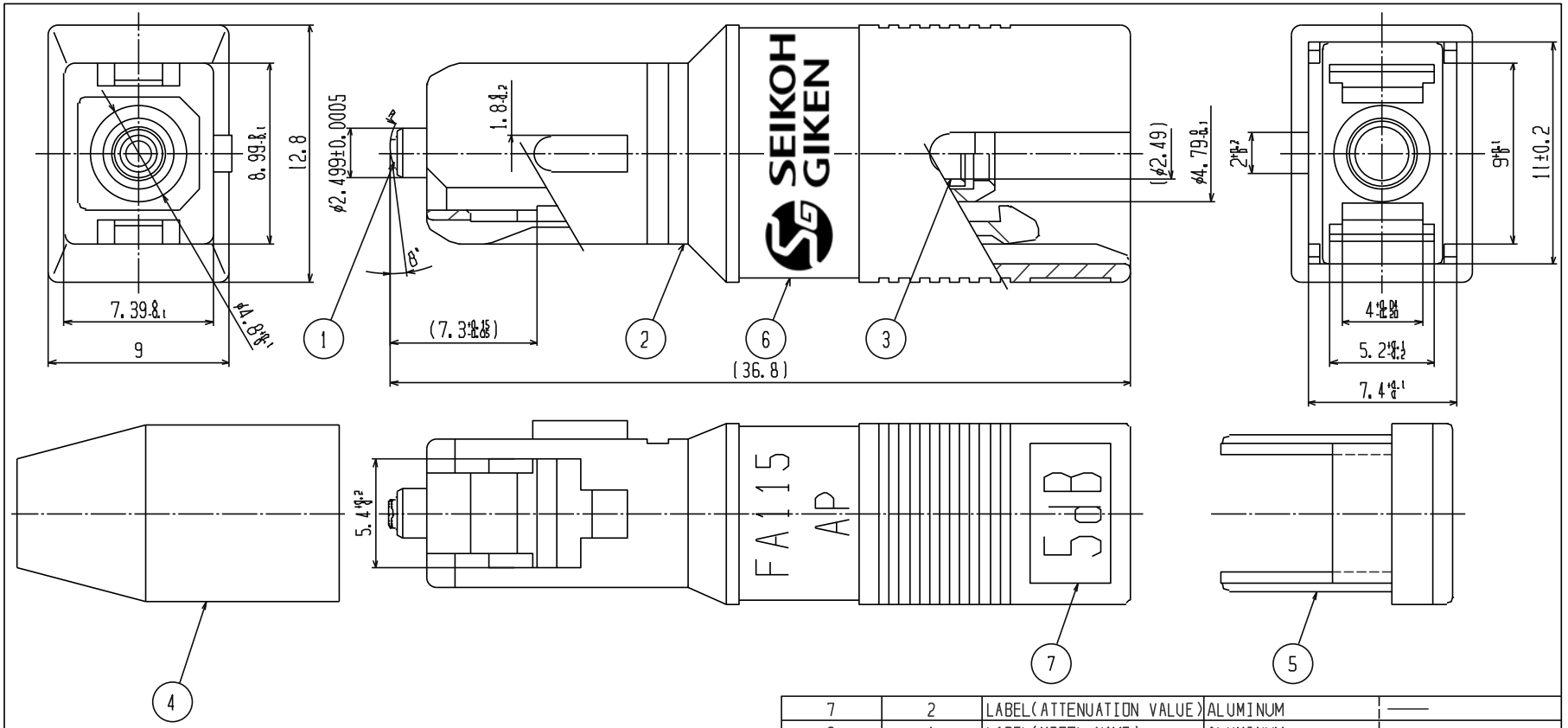
PART No	QTY	ITEM	MATERIAL / FINISH	
7	2	LABEL(ATTENUATION VALUE)	ALUMINUM	——
6	1	LABEL(MODEL NAME)	ALUMINUM	——
5	1	ADAPTOR CAP	PP	WHITE
4	1	FERRULE CAP	PVC	BLUE
3	1	SLEEVE	ZIRCONIA	——
2	1	HOUSING	BRASS	——
1	1	FERRULE	ZIRCONIA	——

PARTS LIST

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

④	DRAWN	DATE	SEIKOH GIKEN	
③	CHECKED	DATE	TITLE FA115-HP PLUG ATTENUATOR	
②	APPROVED	DATE		
①	MATERIAL		UNIT:<mm>	DWG.No. S07-038-3
DESIGN CHANGE	FINISH		SCALE:5/1	SHEET OF 1 OF 1



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

PARTS LIST

DESIGN CHANGE	DRAWN / DATE		SEIKOH GIKEN	
	CHECKED / DATE		TITLE: FA115-AP PLUG ATTENUATOR	
	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

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5dB	YELLOW	BLACK
10dB	BLUE	WHITE
15dB	RED	WHITE
20dB	BLACK	WHITE
OTHERS	SILVER	BLACK

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