Betz & Limbach Projektkabel GmbH, Ringstraße 43, 74626 Bretzfeld,
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Plug -Type (Male/Female) Attenuators
CAA series – Singlemode

Description:

The plug-type singlemode attenuators are used directly on the ends of fiber optic jumpers prior to installation in adapters. These attenuators provide a fixed precise level of attenuation and feature excellent return loss. Low wavelength dependency determines them for using in WDM and DWDM transmission systems. The CAA series attenuators are available with UPC or APC polish for SC, FC, DIN and LC connector types and UPC for ST and MU connectors.

Features:

Connector/adapter plug type
Precise attenuation
Wide attenuation range, 1 dB step
Return loss:
> UPC 50 dB
> APC 60 dB
Low ripple broadband design for operation at wavelength 1250 to 1650 nm
High power endurance

Applica tion:

Fiber optic systems
Receiver padding for optical receiver protection
Optical power equalization
Linearity and dynamic range testing in laboratory equipment

Specifications:

Parameter		
Attenuation range	SC, FC, ST, MU: 1 – 20 dB, step 1 dB DIN: 5, 10, 15, 20 dB	
Operational wavelength	1250 to 1650 nm	
Stability[1]	Standard	Premium
attenuation range 1 - 4 dB	±0.5 dB	±0.5 dB
attenuation range 5 - 9 dB	±0.8 dB	±0.5 dB
attenuation range ≥10 dB	±10%	±0.5 dB
Return loss	Standard	Premium
UPC polishing	≥ 50 dB	≥ 55 dB
APC polishing	≥ 60 dB	≥ 65 dB
Side load test (EN 61300-2-24)	≤ 0.2 dB/1 N (OPTOKON adapter)	
Power durability	250 mW	
Operating temperature	-40 to 80 °C	
Storage temperature	-40 to 80 °C	

Note: 1) –40 to +80°C over 10 cycles

Herausgeber:
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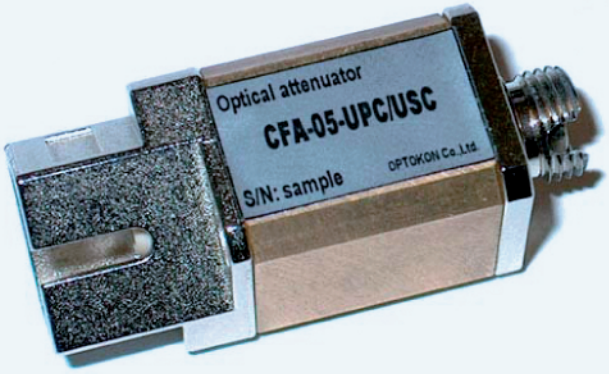
CFA series – Singlemode
Adaptor Type (Female/ Female) Attenuators

Description:

The adaptor type singlemode attenuators are used directly on the ends of fiberoptic jumpers prior to installation in adapters. These attenuators provide a fixed level of attenuation and feature excellent return loss. Low wavelength dependency determines them for using in WDM and DWDM transmission systems. The CFA series attenuators are available in UPC or APC polish for SC, FC connectors and UPC for ST connectors.



Features:

- Precise attenuation
- Return loss:
  - UPC 50 dB
  - APC 60 dB
- Low ripple broadband design for operation at wavelength 1250 to 1650 nm
- Attenuation range 1, 5, 10, 15 , 20 and 30 dB
- High power endurance

Application:

- Fiberoptic systems
- Receiver padding for optical receiver protection
- Optical power equalization
- Linearity and dynamic range testing in laboratory equipment

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In - Line Attenuators

Description:

The In-Line attenuators provide a fixed level of attenuation and feature excellent return loss. Low cost and performance determine them for universal using in optical networks.

Features:

Return loss	> 50 dB
Insertion loss	on customer´s demands
Fiber or cable version	
Pigtail with connector by specification	

Application:

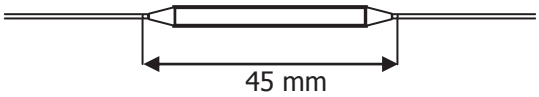
Fiber optic systems
Receiver padding for optical receiver protection
Optical power equalization
Linearity and dynamic range testing in laboratory equipment

Specifications:

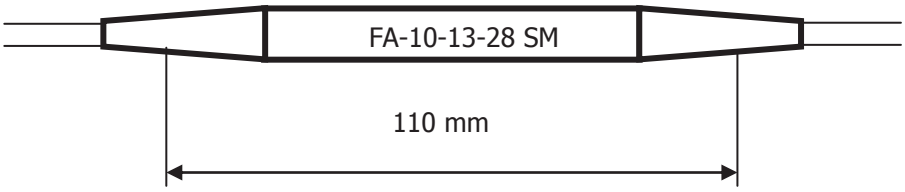
Loss	5, 10, 15, 20, 25, 30 dB ±10%
Wavelength SM	1310 nm, 1550 nm, 1625 nm
Wavelength MM	1300 nm, 850 nm, 820 nm
Return loss	> 50 dB
Type	Fiber, Cable
Length	by specification
Operation temperature	-40 to 75 °C Temperature stability 0.005dB / °C

Dimension :

Fiber Attenuator
Length - 45 mm
- 3 mm



Cable Attenuator
Length - 110 mm
- 7 mm



Herausgeber:
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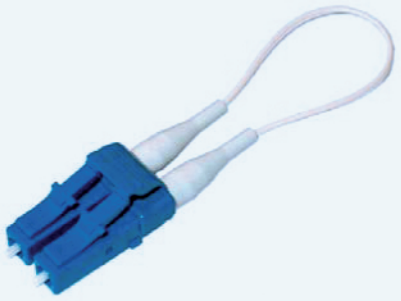
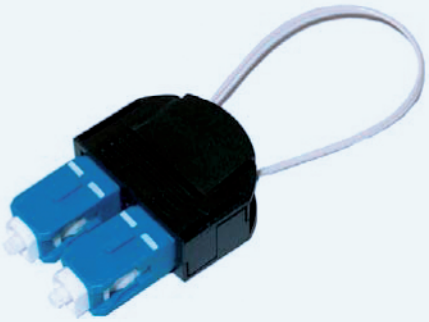
LBA series
Loopback Attenuator

Description:

The Loopback Attenuators are designed to meet low reflection requirement to optimize performance. Our revolutionary production process allows us to manufacture the most precise fixed Attenuators in the market place, by employing a special packaging process that improves thermal stability of insertion loss.



LBA-SLC-00-SM



LBA-SSC-05-SM

Features:

- Compact ruggerized armored shell protects Loopback fiber from damage
- Audible click indicates that connectors are latched properly
- Integraded storage area prevents loss of fiber optic ferrule dust caps
- Available in both Singlemode and Multimode versions at the most popular core diameters
- Multiple color code options to easily identify fiber size and wavelength
- Low Insertion Loss
- Variable attenuation levels available
- Fibre Channel, SDH, Gigabit Ethernet, ATM compatible

Application:

- Fiber optic transceivers testing

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Specifications:

	Singlemode		Multimode		Multimode	
Optical specifications	9/125		62.5/125		50/125	
Insertion Loss* (nominal)	type	IL (dB)	type	IL (dB)	type	IL (dB)
	00	1.0 max	00	0.5 max	00	0.5 max
	05	5±1	05	5±1	05	5±1
Temperature Range Operat ing	-40 °C to 85 °C		-40 °C to 85 °C		-40 °C to 85 °C	
Mating Durability (500 cycles)	< 0.2 dB		< 0.2 dB		< 0.2 dB	

*) Other IL upon request

Ordering Code:

LBA - AAA - XX - XX

AAA

Connector Type	Connector Description
LC	LC/PC (MM)
SLC	LC/SPC (SM)
SC	SC/PC (MM)
SSC	SC/SPC (SM)

Insertion Loss

00	According to
05	specifications

Fiber Type

M6	62.5/125 µm
M5	50/125 µm
SM	9/125 µm (G.652)

LC® is trademark of Lucent Technologies, Inc.

Herausgeber:
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SFT-A
In-Line attenuator
Wavelength Independent

Description:

The SFT-A In-Line attenuators provide a fixed level of attenuation and feature excellent return loss in wide range of working wavelengths. Low cost and performance determine them for universal using in optical networks.

The SFT-A attenuator can be used as attenuation patchcord – cable 2.8 mm or secondary coated fiber 0.9 mm and primary coated fiber installed inside the splice cassette.

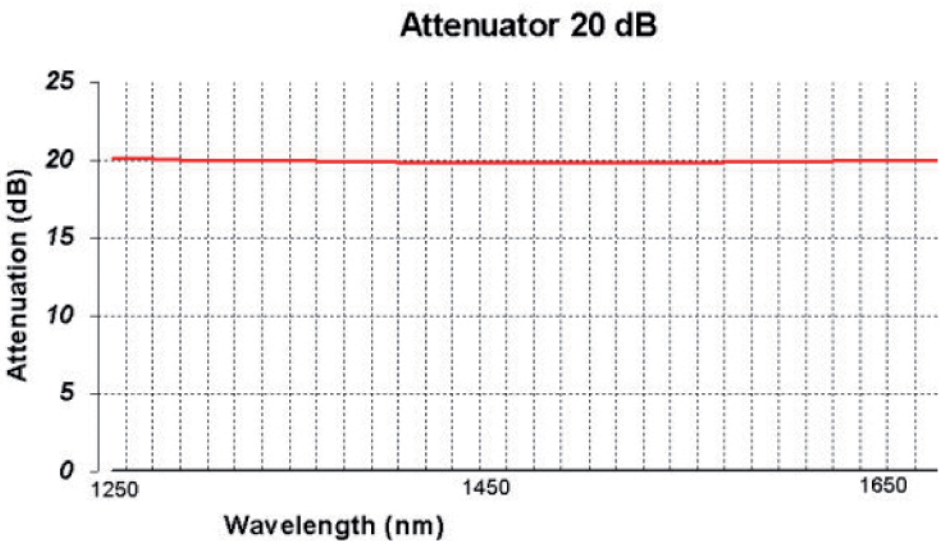
Features:

- Return loss
  UPC > 50 dB
  APC > 60 dB
- Attenuation according to definition
- Low ripple broadband design for operation at wavelength range 1250 to 1650 nm
- Fiber (primary coated) or cable version
- Patchcord with connector according to specification

Applications:

- Fiberoptic systems
- Receiver padding for optical receiver protection
- Optical power equalization
- Linearity and dynamic range testing in laboratory equipment

Wavelength characteristic of 20 dB Attenuator



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Technical specifications:

ITEM	
Operating Wavelength, nm	1250 – 1650
Attenuation range*, dB	1, 2, 3, 5, 10, 15, 20
Return Loss, dB	UPC > 50 APC > 60
Operating Temperature, °C	-40 to +85**
Storage Temperature, °C	-50 to +85**

Note: *) Other attenuation on request
**) Depends on the cable type

Ordering Code:

SFT-A - XX - XXX - NC-NC

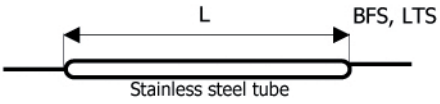
attenuation

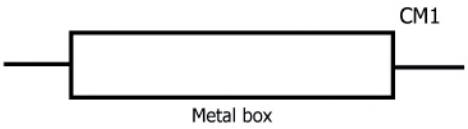
01	1 dB
03	3 dB
05	5 dB
10	10 dB
15	15 dB
20	20 dB

packaging

BFS	Bare fiber 250 µm standard tube L=54, Ø 3 mm
LTS	Fiber 0.9 mm standard tube L=54, Ø 3 mm
CM1	Cable 2.8 mm metal box 100x15x9 mm

no input and output connectors
connector type:
-can be defined according to CON_14-01
(Jumper Ordering Code)
Note: standard fiber/cable length = 1 m





Packaging variants:

SFT-A-05-BFS-NC

SFT-A-10-CM1-NC

Herausgeber:
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VA A - Variable Attenuators Connector type

Description:

The fiber optical variable connector type attenuators are fully compliance with FC and SC types optical connector requirements. Fiber attenuators can be applied to adjust power level of signal in the optical communication at the output of light sources, E/O converters and for the linear or dynamic range of power meter. Furthermore, they can be used in optical amplifier systems to balance the gain across the different operating wavelengths. The VCA series attenuator uses standard fibers currently deployed in optical systems. No special fibers, filters nor optical elements are used.

Attenuators are compatible with standard fiber optic connectors and adapters allowing the user to quickly and easily introduce a variable insertion loss into the optical network. Attenuation variation is achieved by controlling longitudinal offset. Ultra polished ferrules provide excellent optical performance.

Features :

- Fully compatible with FC/PC and SC/PC connectors
- Attenuation stability
- Perfect environmental stability and reliability
- Wavelength stability
- Wide attenuation range
- High resolution
- Excellent return loss
- Easy installation & well package
- Air gap style
- Continuous variation

Applications :

- Telecommunications networks, CATV
- Local area networks
- Optical fiber sensors
- Test equipment
- Fiber to the home
- Power Equalizers
- Optical Sensors
- Light Transmission Systems
- Laboratory Test
- Dynamic Gain Flattening

Herausgeber:
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Specifications:

Type	Plug-In Type			
Connector type	SC, FC			
Grade	N	A (FC only)		S
Applicable optical connector (Female to Male)	UPC to UPC	UPC to APC	APC to APC	APC to APC
Attenuation Variable Range	28 dB	28 dB	28 dB	28 dB
Minimum attenuation Value	4 dB	1 dB	1 dB	1 dB
Return Loss @> 4 dB	13 dB	35 dB 50 dB	50 dB	60 dB
Resolution	0.5 dB			
Operation Temp.	-15 ºC to +60 ºC			
Storage Temp.	-40 ºC to +70 ºC			

Ordering Code:

VA A - XXX - XXX - XXX - XXX - YYY

fiber type	
SM	SM fiber 9/125 µm

type	
PL	plug

connector type	
SC	SC connector
FC	FC connector

grade
N
A
S

applicable	
UU	UPC to UPC
UA	UPC to APC
AA	APC to APC

Herausgeber:
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VB A - Variable Attenuators Bending type

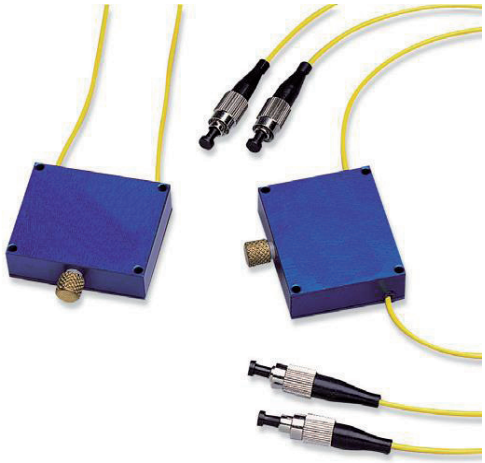
Description:

The fiber optical variable bending type attenuators are fully compliance with FC, ST and SC types optical connector requirements. Fiber attenuators can be applied to adjust power level of signal in the optical communication at the output of light sources, E/O converters and for the linear or dynamic range of power meter. Furthermore, they can be used in optical amplifier systems to balance the gain across the different operating wavelengths. The VBA series attenuator uses standard fibers currently deployed in optical systems. No special fibers, filters nor optical elements are used.

Attenuator box is terminated with standard fiber optic connectors allowing the user to quickly and easily introduce a variable insertion loss into the optical network. Attenuation variation is achieved by controlling bending radius. Ultra and angled polished ferrules provide excellent optical performance.

Features :

- Fully compatible with FC, ST and SC connectors, UPC / APC polishing
- Attenuation stability
- Perfect environmental stability and reliability
- Wavelength stability
- Wide attenuation range
- High resolution
- Excellent return loss
- Easy installation & well package
- Fiber bend style
- Continuous variation
- Patchcord or pigtail variants



VBA Attenuator Bending Type with FC connectors

Applications :

- Telecommunications networks, CATV
- Local area networks
- Optical fiber sensors
- Test equipment
- Fiber to the home
- Power Equalizers
- Optical Sensors
- Light Transmission Systems
- Laboratory Test
- Dynamic Gain Flattening

Herausgeber:
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Specifications:

Fiber type		SM 9/125 µm
Operation Wavelength:	Singlemode	1310 & 1550 nm
Variable Range:	UPC Singlemode	0.5 dB to 30 dB
Resolution		0.5 dB
Return Loss:	UPC / APC	55 / 65 dB
Max. Input Optical Power		+20 dBm
Temperature Coefficient		0.002 (dB/ºC)
Operation Temperature		-15 ºC to +60 ºC
Storage Temperature		-40 ºC to +70 ºC
Dimensions (box)		50 x 41.5 x 15 mm (excluded adjusting screw)

Dimensions :

Ordering Code:

VBA - XXX - XXX - XXX

cable length	
001	1 m
010	10 m
100	100 m

connector type	
USC	SC/UPC
NSC	SC/APC
UPC	FC/UPC
NPC	FC/APC
USL	ST/UPC
ULC	LC/UPC
NLC	LC/APC
NC	no connector

cable diameter	
20	2.0 mm
24	2.4 mm
30	3.0 mm

Herausgeber:
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VCA - Variable Attenuators Connector type

Description:

The fiber optical variable connector type attenuators are fully compliance with FC, ST and SC types optical connector requirements. Fiber attenuators can be applied to adjust power level of signal in the optical communication at the output of light sources, E/O converters and for the of linear or dynamic range of power meter. Furthermore, they can be used in optical amplifier systems to balance the gain across the different operating wavelengths. The VCA series attenuator uses standard fibers currently deployed in optical systems. No special fibers, filters nor optical elements are used.

Attenuators are compatible with standard fiber optic connectors and adapters allowing the user to quickly and easily introduce a variable insertion loss into the optical network. Attenuation variation is achieved by controlling longitudinal offset. Ultra polished ferrules provide excellent optical performance.

Features :

- Fully compatible with FC/PC, ST/PC and SC/PC connectors
- Attenuation stability
- Perfect environmental stability and reliability
- Wavelength stability
- Wide attenuation range
- High resolution
- Excellent return loss
- Easy installation & well package
- Air gap style
- Continuous variation
- Patchcord or pigtail variants

VCA Attenuator FC Connector Type

Applications :

- Telecommunications networks, CATV
- Local area networks
- Optical fiber sensors
- Test equipment
- Fiber to the home
- Power Equalizers
- Optical Sensors
- Light Transmission Systems
- Laboratory Test
- Dynamic Gain Flattening

VCA-USL/UPC-28SM-002

VCA-USC/USC-28SM-J-1

Herausgeber:
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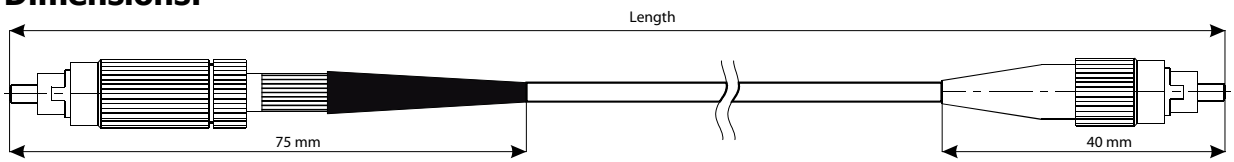
Specifications:

Fiber type		SM 9/125 µm, Flexcor 1060 nm MM 50/125 µm, MM 62.5/125 µm
Operation Wavelength:	Singlemode Multimode	1300 nm - 1620 nm 800 nm - 1300 nm
Variable Range:	UPC Singlemode PC Multimode	0.5 dB to 28 dB 0.5 dB to 20 dB
Resolution		0.1 dB
Return Loss:	UPC, PC	15 dB
Max. Input Optical Power		+20 dBm
Retention Force		200 to 600 grams
Temperature Coefficient		0.002 (dB/ºC)
Operation Temperature		-25 ºC to +70 ºC
Storage Temperature		-40 ºC to +85 ºC

Dimensions:



Ordering Code:

VCA - XXX / AAA* - XX XX - XXX

attenuator type:
Multimode
PC FC/PC
SL ST/PC
SC SC/PC
Singlemode
UPC FC/UPC
USL ST/UPC
USC SC/UPC

cable type:

XX		**XX**	
24	Ø 2.4 mm	**SM**	SM 9/125
28	Ø 2.8 mm	**FX**	Flexcor 1060
		M5	MM 50/125
		M6	MM 62.5/125

length:
(m)

connector type:
see patchcord ordering code:
CON_13-01_EN

*) Note:
P – for pigtail variant

Typical connectors:

Code	Description
PC	FC/PC
UPC	FC/UPC
USC	SC/UPC
SL	ST/PC
UE2	LSH (E2000)/UPC
LC	LC/PC
ULC	LC/UPC

Samples of Variable Attenuator :

VCA – UPC /...

VCA – USL /...

VCA – USC /...

Herausgeber:
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