

# DIAMOND

## Fiber Optic Components

### CABLE ASSEMBLIES AND ADAPTERS

Thanks to its different technologies, mechanical and optical interfaces, the E-2000™ fiber optic connector family can cover the most standard and customized requirements in response to the increasingly customer demands. The family includes: simplex, compact and backplane connectors and adapters, as well as a series of network accessories such as: attenuators, hybrid adapters, transition adapters, terminators, reflectors and receptacles.

### FEATURES AND BENEFITS INCLUDE

- ▶ Color-coding and mechanical keying to ensure correct matings.
- ▶ Spring-loaded protective cap for high power applications providing increased safety protection
- ▶ Specially designed body to prevent endface damage during mating
- ▶ Modular designed mating adapters with metal protective shutters for high power applications
- ▶ EtO sterilizable components with optional O-ring seals IP65-rated (for E-2000™ Simplex and Compact) for safety, reliability, and quality in biomedical markets and applications subject to special environmental conditions.
- ▶ E-2000™ Simplex with non-magnetic components available
- ▶ Assemblies available with different plastic and metal flexible jacketing: Elastomer (Hytrel), PEEK (Vitrex 450), PA (Nylon), PTFE (Teflon), Stainless steel.
- ▶ Diamond composite ferrule (zirconia ceramic sleeve and titanium insert):
  - Allows plastic deformation for our Active Core Alignment (A.C.A)
  - Unique 0.1 dB Insertion Loss
  - Custom drill sizes from 80µm to 800µm
  - Superior Ultra polishing
  - Custom ferrules for multi-fiber technology
  - Ultra-low ferrule O.D. tolerances



### AVAILABLE TECHNOLOGIES AND OPTICAL INTERFACES

- ▶ PS optical interfaces: PS collimated, PSf free space, PM-PS, PSi Free Standing, PSm Multimode, PSc collimator.
- ▶ Polarization Maintaining (PM)
- ▶ VIS/NIR for low wavelengths and small core fibers
- ▶ Optical Line Identification OLID assemblies
- ▶ E-2000™ FUSION for easy field termination of MM and SM fibers
- ▶ E-2000™ Crimp & Cleave for field termination of 200/230 µm HCS-fiber

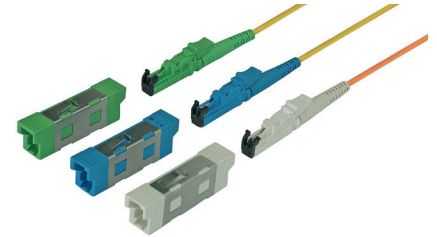


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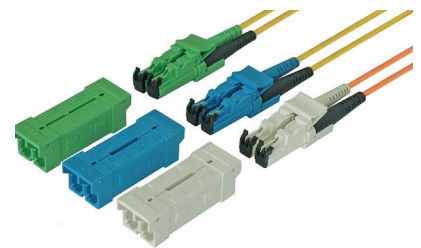
[www.diamond-fo.com](http://www.diamond-fo.com)

### E-2000™ Family

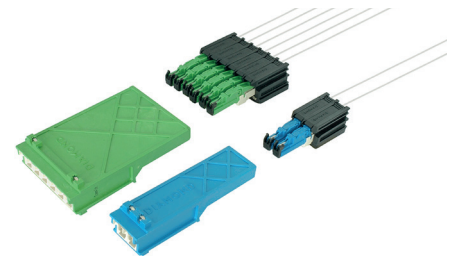
SINGLE MODE PC/APC  
MULTIMODE PC  
PS, PSf, PM-PS, PSi, PSm, PSc, PM,  
VIS/NIR



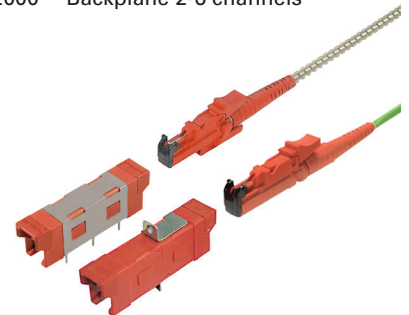
E-2000™ Simplex



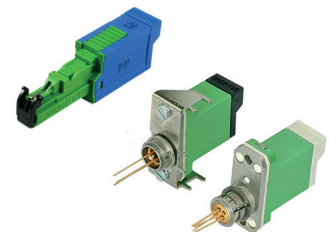
E-2000™ Compact



E-2000™ Backplane 2-6 channels



E-2000™ Interlock and Power Solution (PS)



E-2000™ Accessories and active modules

*Specifications subject to change  
without notice*

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## THE E-2000™ SIMPLEX

Constant innovation in the field of fiber optics has created demand for products with ever increasing performance requirements. Diamond has responded to this challenge and expanded the E-2000™ connector system to address these needs throughout all market segments.

The E-2000™ Simplex offers unparalleled 0.1 dB maximum insertion loss random mating, exceptional repeatability, while maintaining the already well established, superior features of the E-2000™ connector family.

### STANDARDS

- ▶ EN 86 275-801 „Connector sets of assessed quality for optical fibers and cables - Type LSH universal“
- ▶ EN 86 275-802 „Connector sets of assessed quality for optical fibers and cables - Type LSH-HRL universal“
- ▶ TIA/EIA 604-16 Fiber Optic Intermateability standard - Type
- ▶ IEC 61 754-15 “Fiber optic connector interfaces – Part 15: Type LSH connector family”

### AVAILABLE AS

- ▶ Standard terminated connector, also for applications up to 6W (E-2000™ PS)  
Connector set (to be terminated with Diamond special equipment)

### OPTICAL SPECIFICATIONS

	MULTIMODE 0° PC	SINGLE MODE 0° PC	SINGLE MODE 8° APC	SINGLE MODE 8° 0.1 dB	UNITS	TEST CONDITIONS
Insertion Loss (IL)	typ. 0.15 max 0.4	typ. 0.2 max 0.4	typ. 0.2 max 0.4	max 0.1	dB	IEC 61300-3-4; $\lambda = 1300/1550\text{nm}$
Return Loss (RL)	typ. 40	min 50	min 70*	min 85*	dB	IEC 61300-3-6; $\lambda = 1300/1550\text{nm}$
Repeatability of IL	max $\pm 0.1$			-	dB	IEC 61300-2-2; $\lambda = 1300/1550\text{nm}$
Service life	1000 mate/demate cycles				-	According to field experience
Storage temperature	-40/+90**				°C	

\* Measured with high precision reflectometer

\*\* May be further limited by cable specifications

### ENVIRONMENTAL CONDITIONS

MEASUREMENT / TEST	PARAMETERS	METHOD
Change of temperature (Reliability)	-40°C / +85°C / 1 h dwell / 500 cycles	IEC 61300-2-22
Low temperature	-51°C / 96 h	MIL-STD-810F
Dry heat (Reliability)	+85°C / 2'000 h	IEC 61300-2-18
Thermal shock	-51°C / +71°C / 1 h dwell / 3 cycles	MIL-STD-810F
Low pressure, procedure II	4'572 m / 1 h	MIL-STD-810F
Low pressure, procedure III	2'438 m to 12'192 m / 60 s	MIL-STD-810F
Damp heat, cyclic (Reliability)	+25°C / +55°C / 95% r.h. / 100 cycles	IEC 61300-2-46
Composite temperature-humidity cycling	-10°C / +25°C / +65°C / 93% r.h. / 15 cycles	IEC 61300-2-21
Extended humidity (Reliability)	+85°C / 85% rh / 2'000 h	Telcordia GR-326-CORE
Salt mist	+35°C / 50 g/l / 96 h	IEC 61300-2-26

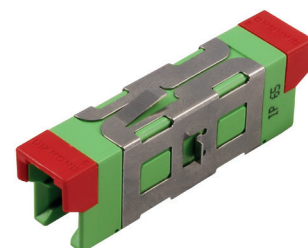
### MECHANICAL CONDITIONS

Tensile strength of coupling mechanism	40 N / 2 min	IEC 61300-2-6
Cable retention	100 N / 2 min	IEC 61300-2-4
Proof at 0°	4.5 Kg - 6.8 Kg / 5 s	Telcordia GR-326-CORE
Proof at 90°	2.3 Kg - 3.4 Kg / 5 s	Telcordia GR-326-CORE
Static side load	1 N / 1 h on cable version 0.2 N / 5 min on fibre version	IEC 61300-2-42
Cable torsion	15 N / $\pm 180^\circ$ / 25 cycles	IEC 61300-2-5
Twist	1.35 Kg / $\pm 1'800^\circ$ / 10 cycles	Telcordia GR-326-CORE
Vibration, sinusoidal	10 Hz - 55 Hz / 1.5 mm / 30 min	IEC 61300-2-1
Impact (freefall)	1.5 m / 5 drops	IEC 61300-2-12
Bending moment	10 N / 2 min	IEC 61300-2-7
Mating durability (Couplings)	500 cycles	IEC 61300-2-2
Flexing of strain relief	2 N / $\pm 90^\circ$ / 100 cycles	IEC 61300-2-44



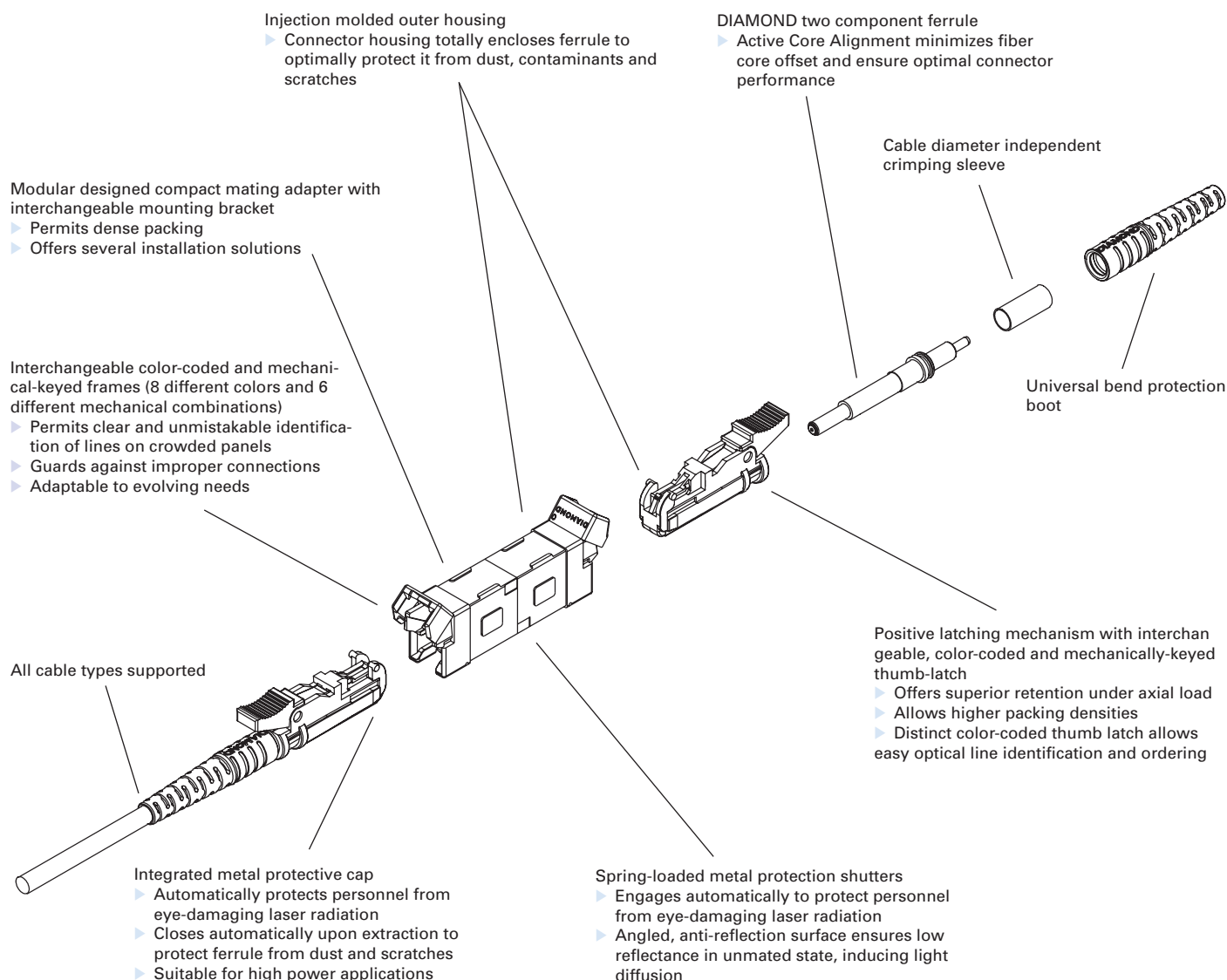
**Simplex adapter with fixed flange**

- ▶ For firmly fixation



**Versatile simplex adapter**

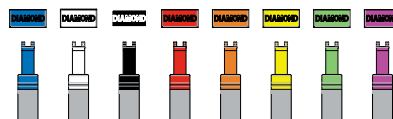
- ▶ Multiple swappable mounting flanges
- ▶ Suitable for IP65 version
- ▶ EtO-sterilizable



## COLOR KEYING

The E-2000™ system permits the user to specify the color of the thumb-latch and the mating adapter frame so that different line types, uses, destinations and points of origin, etc. can be readily identified. The thumb-latch and frame are available in eight distinct colors:

- |                  |           |
|------------------|-----------|
| 1. Blue          | 5. Orange |
| 2. Beige (White) | 6. Yellow |
| 3. Black         | 7. Green  |
| 4. Red           | 8. Violet |

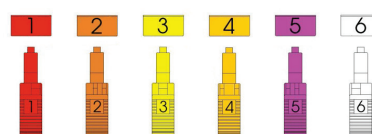


## MECHANICAL KEYING

Additionally, it will become increasingly necessary to guard against improper connection in multiple-service patch facilities. The E-2000™ system permits the inclusion of a mechanical keying mechanism to ensure channel differentiation.

The mechanical keying options are also color-coded as follows:

- |                  |                         |
|------------------|-------------------------|
| Key Nr. 1 Red    | Key Nr. 4 Orange        |
| Key Nr. 2 Brown  | Key Nr. 5 Violet        |
| Key Nr. 3 Yellow | Key Nr. 6 Beige (White) |



**NOTE** As standard, Diamond uses colored connector bodies, cable boots and mating adapter housings to identify the fiber type (SM or MM 50/62.5µm) and ferrule polish (PC or APC). Diamond's standard **connector/boot/adaptor** colors are as follows: Beige/Black/Beige for MM PC 50µm, Beige/Beige/Beige for MM PC 62.5µm, Blue/Blue/Blue for SM PC, and Green/Green/Green for SM APC. Other colors are available upon request.

## THE E-2000™ COMPACT

The E-2000™ COMPACT DUPLEX combines the familiarity of the RJ45 design **and the optical performances of the E-2000™ simplex connector**. It is based on components of the E-2000™ simplex version and is joined by a simple clip-bridge and a widened thumb-latch.

The E-2000™ COMPACT is the ideal solution for applications where an increasing number of cabling installations is required, typically to support multimedia environments including voice, data and image transmission.

The color and mechanical keying have the same identification as those of the E-2000™ Simplex connector.

### STANDARDS

- ▶ IEC 61 754-15 “Fiber optic connector interfaces – Part 15: Type LSH connector family”.

### AVAILABLE AS

- ▶ Standard terminated connector
- ▶ Connector set (to be terminated with Diamond special equipment)

## THE E-2000™ BACKPLANE

The E-2000™ Backplane combines the advantages of the E-2000™ SYSTEM and an optimal guiding mechanism for secure backplane connection. When mated, the PCB connector is retained in the mating adapter eliminating all stress on the PC Board.

It uses the common components of the E-2000™ Simplex version which are joined by a simple clip-bridge which includes a radial, angular and longitudinal compensation. Clip bridges are available for 2 and 6 connectors.

The E-2000™ Backplane offers the same optical performances as the E-2000™ simplex connector.

The adapters can be easily mounted into the distribution panel.

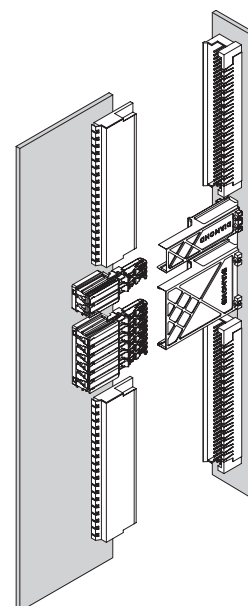
The E-2000™ Backplane covers all needs in this field of applications and offers:

- ▶ Same optical performances as the E-2000™ Simplex version
- ▶ Active push pull retention
- ▶ Sufficiently long pre-mating tracks for repeatable mating and high stability
- ▶ Backplane modules designed for integration into metric backplane system as per IEC 1070-4-100
- ▶ Injection moulded housing (UL 94 V0 flammability rating)
- ▶ Positive latching mechanism with step process to prevent the backplane and the PCB from stress
- ▶ Backplane adapter with spring loaded shutters and connectors with protective metal caps
- ▶ Existing components can be upgraded to the backplane version with the use of a clip bridge and an adapted latch
- ▶ Longitudinal mating compensation

### AVAILABLE AS

- ▶ Standard terminated connector
- ▶ Connector set (to be terminated with Diamond special equipment)

The E-2000™ BACKPLANE is fully integrable into the IEC 1070-4-100 metric system for backplane copper connectors: the 2 channel unit is 1 SU high, the 6 channel unit is 2 SU high. Furthermore, they are fully modular combinable; to upgrade the E-2000™ BACKPLANE to system of multiple channel design.



## THE E-2000™ INTERLOCK

DIAMOND presents a novel, reliable, and high-quality E-2000™ fiber optic connector and mating adapter with an integrated electrical circuit breaker.

This is very useful in many laser systems where it is preferred to block the emission by means of an external shutter rather than, for instance, to alter the internal laser's driving conditions.

The E-2000™ Interlock is particularly suitable for high-power applications or any other situation where light must be rapidly interrupted due to safety and protection reasons.

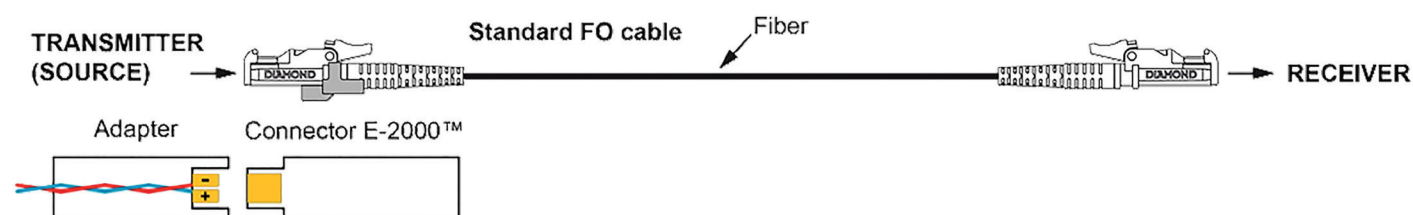
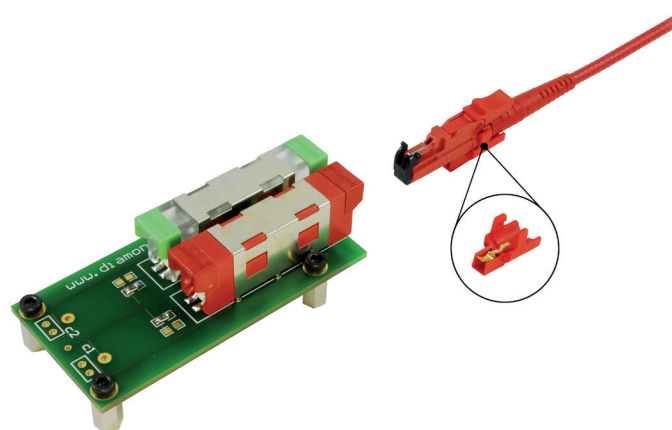
**The E-2000™ interlock is available in several Power Solution (PS) optical interfaces (i.e: PS collimated, PSf free space, PM-PS, PSm, etc.) and supports all other standard E-2000™ features:**

- ▶ Standard and small core fibers
- ▶ Standard, PM and other specialty fibers
- ▶ High precision core placements thanks to the active core alignment (A.C.A.)
- ▶ Color & mechanical coding
- ▶ Automated metal protection cap

The E-2000™ mating adapter also offers metal shutters and thanks to interchangeable mounting brackets supports a large variety of installation solutions, even on PCB.

### AVAILABLE AS

- ▶ Standard terminated connector

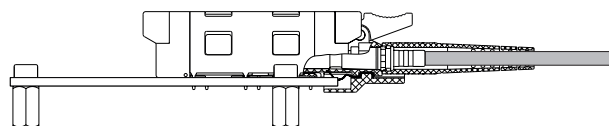
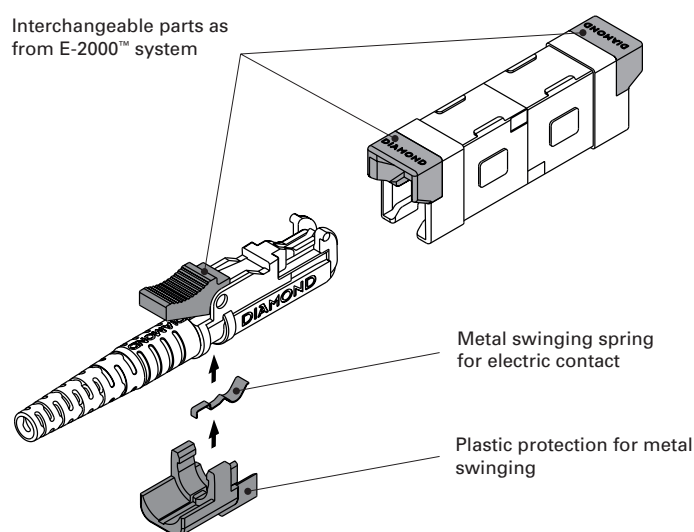


### OPTICAL SPECIFICATIONS FOR THE PS VERSION

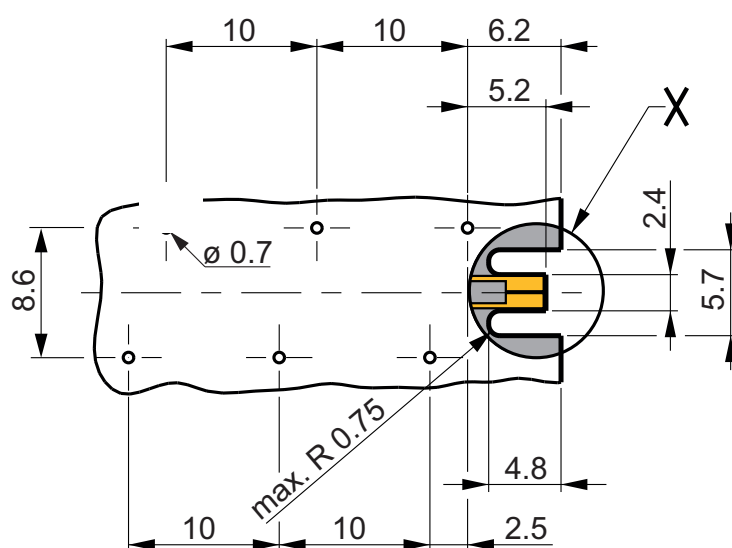
CONNECTOR TYPE	WAVELENGTH (nm)	IL (db) Against Reference		RL Against Reference		
		typ.	max.	connected		unmated
				PC 0°	APC 4°	APC 4°
E-2000™ PS	1625 - 1550 - 1310	0.2	0.4	45	75	50
	1060 - 980	0.3	0.6	35*	60*	
TEST CONDITIONS		IEC 61300-3-4		IEC 61300-3-6 OLCR method / *OCWR method		

\* Values obtained with Diamond qualified fibers

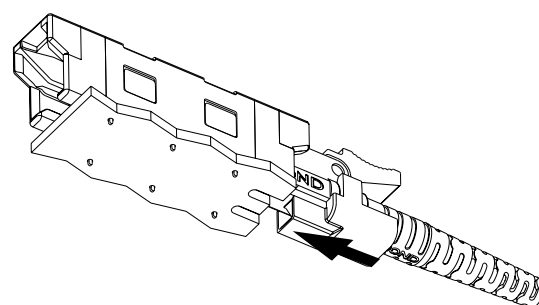
## CONSTRUCTION



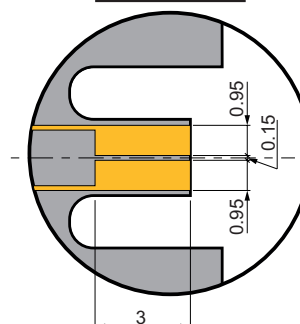
## MOUNTING INSTRUCTION



PCB thickness: 1,6mm  
(Other fixation types upon request)



DETAILS X



## SAFETY INFORMATION

The Interlock feature in the E-2000™ connector has to be considered as being part of a complete safety system, as it cannot be deemed as a stand-alone safety device.

In order to ensure safe operation it is mandatory to follow the operational information below:

- ▶ Although equipped with connectors having an Interlock system, lasers should be operated only when connectors are mated
- ▶ The light source must be switched off during mating and de-mating.

**WARNING:** The user is responsible for ensuring that all local, state, and national laws, rules, codes, and regulations relating to the use of the E-2000™ Interlock in any particular application are satisfied.



## THE E-2000™ POWER SOLUTION (PS COLLIMATED)

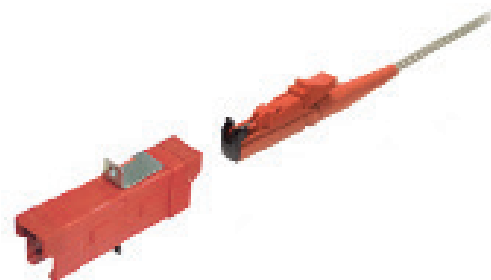
Diamond E-2000™ PS connector is designed for high power applications up to 6 Watts optical power for SM fibers. This has been developed to support the continuous rise of higher bitrates and longer transmission distances within DWDM technology.

Diamond PS connectors are based on contacted expanded beam technology; where a section of graded index fiber is spliced as a collimating lens, which enlarges the beam diameter and reduces power density at the connector interface. Using Diamond Active Core Alignment (ACA) technology, we can achieve unrivaled low IL performance for the PS technology by aligning the fiber exit angle instead of the core eccentricity as Diamond usually does on SM fiber. This technology is applicable to most connectors interfaces, but due to safety issues Diamond suggests to use it on E-2000™ and F-3000™ connectors with integrated metal protection caps and shutters.

E-2000™ PS connectors are available as simplex terminated connectors and backplane 2-6 channels.

### FEATURES AND BENEFITS

- ▶ 16x reduced power density
- ▶ Low Insertion loss
- ▶ Ultra high polish for High return loss
- ▶ Integrated metal protection caps and Shutters
- ▶ Interchangeable colour- and mechanical-coded frames and thumb latches



### STANDARDS

- ▶ Passed long term test at 6W, 2000h
- ▶ Passed Performance qualification according to *IEC 61753-2-1, cat. U*
- ▶ Passed Reliability qualification according to *IEC 62005-9-2, cat. U*
- ▶ Passed Long term Damp Heat according to *Telcordia GR-032685°C /85% r.h. 2000h*

## SAFETY INFORMATION FOR E-2000™ POWER SOLUTION

### CLEANING

Cleanliness still remains the key word using high power. The basic concept using PS connectors is therefore the following:

“before each mating procedure, the connectors must be absolutely clean and inspected with a microscope”.

The ferrule's surface inspection should be performed using an optical microscope with a magnification of at least 200x. The connector is normally affected by contamination during handling and mating procedures; the degree of cleanliness of the overall installation is also a critical parameter to be taken into consideration.

### HANDLING

The Power Solution connectors should be operated with high power only when connected. When unmated, the light source must absolutely be switched off.

### SAFETY

Optical connectors are passive components not subjected to Laser safety, but when integrated in an active system, as the output side of a light source, they will be submitted to it.

The following aspects are to be taken into account when evaluating the laser safety requirements:

- The exit beam of these connectors have a lower NA as standard connectors in air (NA=0.035) or ca. 2° divergence. This is used in the calculation of the amount of light that can enter the pupil at 1m.

The following safety precautions are to be considered as a starting point, each is responsible to edict proper safety protocols and we intend here just as to help doing this. The following precautions should not be considered as sufficient and should be reevaluated from case to case.

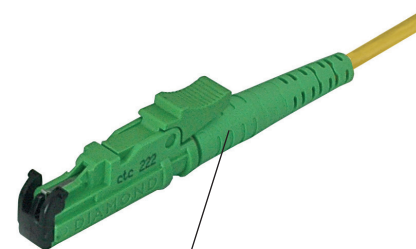
- usage in restricted area, access only for authorized and qualified personnel.
- use protective glasses, skin protective measures recommended.
- optical behavior under control: eliminate reflections (also diffuse), close unused optical channels, avoid light beams at eye level.
- switch on/off system with remote control or interlock and additional automatic switch off safety system.
- warning signal when sources are active.
- laser classification markings and danger indications.

## THE E-2000™ FUSION

The E-2000™ FUSION allows you to quickly and easily make field terminations with the performance you expect from Diamond-quality E-2000™ connectors. The key to this system is DIAMOND's advanced "crocodile alberino" fusion field ferrule assembly. The ferrule assembly consists of a factory-terminated fiber endface, fiber stub, and integrated splice protection. The fiber endface is core-centered via Diamond's well-known Active Core Alignment process and factory-polished to the company's precise specifications.

The E-2000™ FUSION is then field terminated via a low loss fusion splice using the new Diamond Zeus D50 Fusion Field Termination Kit.

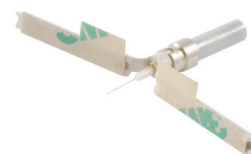
The E-2000™ FUSION is available for SM and MM fiber (250µm, 600µm and 900µm) and cable (1.6-to 3.1mm) in both 0° PC or 8° APC versions.



Crocodile Alberino 2.5mm

### FEATURES AND BENEFITS

- ▶ Simple, fast and reliable field termination  
*reduces operator error and cost per termination*
- ▶ No need of glue
- ▶ Outstanding optical performance  
*consistent and repeatable low IL / high RL*
- ▶ No polishing  
*eliminates the need for costly consumables*
- ▶ Fusion spliced pigtail performance and reliability without the cost and space associated with splice enclosures, trays and protectors



### AVAILABLE AS

- ▶ Connector set, (to be terminated with Diamond special equipment)

### COMPATIBLE SPLICERS WITH DIAMOND FUSION CROCODILE

- ▶ Fitel (Types: S132C, S153, S178)
- ▶ Sumitomo (Types: 71-C, T81C, Q101-CA)

### SPECIFICATIONS

	MULTIMODE 0° PC	SINGLE MODE 0° PC	SINGLE MODE 8° APC	UNITS	TEST CONDITIONS
Insertion Loss (IL)	typ. 0.2 max 0.5	typ. 0.25 max. 0.5	typ 0.25 max. 0.5	dB	IEC 61300-3-4; λ = 1300/1550nm
Return Loss (RL)	min. 40	min. 50	min. 70*	dB	IEC 61300-3-6; λ = 1300/1550nm
Repeatability of IL	max. ±0.1			dB	IEC 61300-2-2; λ = 1300/1550nm
Service life	1000 mate/demate cycles				According to field experiences
Operating temperature	-25/+70**			°C	
Storage temperature	-25/+70**			°C	

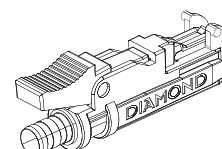
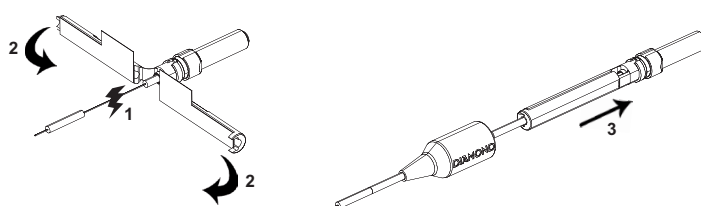
\* Measured with high precision reflectometer

\*\* May be further limited by cable specifications



ZEUS D50 Fusion Splicer

### E-2000™ FUSION INSTALLATION CONCEPT





## THE E-2000™ ACCESSORIES AND ACTIVE MODULES

The E-2000™ network accessories are available for many uses and can be deployed at several points in fiberoptic networks, as well as in LABs or special applications.

These include the following product families:

Attenuators (OAF), transition adapters (UGT), optical termination modules (OTM), hybrid-adapters, optical reflectors (OGR), multipurpose adapter system (MAS), ADT-UNI universal connector/adaptor solutions, Interfaces modules (IMOD), and active modules (MAT/MAR).

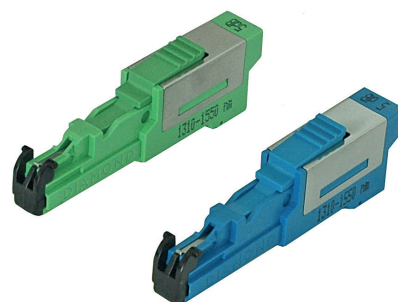
### OAF E-2000™ ATTENUATORS

Attenuators are used to adapt the transmitted light power to the characteristics of the implanted receiver. The OAF E-2000™ in-line fixed attenuator provide a precise and repeatable amount of light loss (attenuation) via a doped fiber. This results in wavelength independent and stable attenuation values for typical wavelength bands used in telecommunication applications (1260-1360 and 1460-1580 nm). OAF E-2000™ are available in single mode PC and APC version, for attenuations from 2 dB to 30 dB, for optical power up to +20 dBm. Other available OAF types are: F-3000™, FC, SC, LSA (DIN) and ST.

### SPECIFICATIONS

	SINGLEMODE 0° PC					SINGLE MODE 8° APC					UNITS
Fiber	9/125										μm
Wavelengths	1260-1360 and 1460-1580										nm
Nominal attenuation Tolerance*	2 ±0.5	4 ±0.5	5 ±0.5	6 ±0.5	10 ±1	15 ±1.5	20 ±2	25 ±2.5	30 ±2.5	dB dB	
Repeatability	<0.5 over service life										dB
Service life	1000 matings (According to field experience)										
Return loss	>45					>65					dB
Temperature range	-25/+70										°C

\* Values measured using 1310 or 1550 nm LED source. Additional IL induced by modal noise 0,05 dB/dB.  
The excess attenuation due to the 2 connections may be as high as 0.5 dB max.



### E-2000™ UGT-SI (Optical Transition Adapters)

Optical Sacrificial Interfaces are compact, in-line, male-to-female components, especially used in laboratory and field test equipment to protect front panel connector end-faces from the damage and contamination of repeated mating and de-mating.

Optical Transition Adapters (UGT) are compact, in-line, male-to-female elements used to transition between similar or dissimilar endface geometries, eg. from 0° PC connectors to 8° angle-polished (APC) connectors. (Or the reverse.) They are also of value as "sacrificial" interfaces to protect connector endfaces from the damage and contamination of repeated matings. Other available UGT-SI types are: F-3000™, FC, SC and ST™.

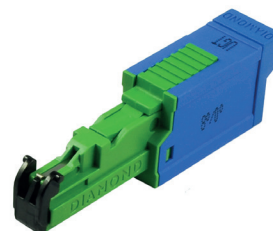
### SPECIFICATIONS

	SM G. 652D	MM	UNITS	TEST CONDITIONS
Insertion Loss (IL)*	max 0.7 dB	max 0.7 dB	dB	IEC 61300-3-4; λ = 1300/1550nm SM - 850/1300nm MM
Return Loss (RL)	PC min 45 / APC min 70**	min 35 dB	dB	IEC 61300-3-6; λ = 1300/1550nm SM - 850/1300nm MM
Repeatability of IL	max ±0.3		dB	IEC 61300-2-2; λ = 1300/1550nm SM - 850/1300nm MM
Service life	500 mate/demate cycles			
Operating temperature	-40/+85		°C	
Storage temperature	-40/+90		°C	

\* Total Insertion Loss. Additional IL due to modal noise max 0.5 dB

\*\* Measured with high resolution reflectometer HP

Other fibers available upon request



## E-2000™ OTM (Optical Termination Modules)

E-2000™ OTM Optical Termination Modules are used as fiber termination on open, unused channels in telecommunication distribution panels, measuring devices and CATV installations, in order to have a stable and lower back reflection in the system. Other available OTM types are: F-3000™, FC, and SC.

### SPECIFICATIONS

	SINGLE MODE 0° PC	SINGLE MODE 80° PC	UNITS	TEST CONDITIONS
Insertion Loss (IL)	NA		-	
Return Loss (RL)	min 45	min 70*	dB	IEC 61300-3-6; $\lambda = 1300/1550\text{nm}$
Service life	500 mate/demate cycles			
Operating temperature	-40/+85		°C	
Storage temperature	-40/+90		°C	

\* Measured with high precision reflectometer



## E-2000™ HYBRID ADAPTERS

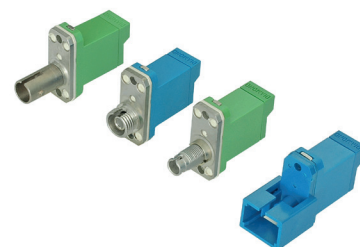
E-2000™ hybrid adapters ensure a connection between a E-2000™ and SC/FC/ST™/LSA (DIN) fiber optic connectors.

Their optical performance and compact size make is a logical and cost-effective alternative to hybrid patch assemblies.

### SPECIFICATIONS

	MULTIMODE 0° PC	SINGLE MODE 0° PC	SINGLE MODE 8° APC	UNITS	TEST CONDITIONS
Insertion Loss (IL)*	typ. 0.15	typ. 0.2	typ. 0.2	dB	IEC 61300-3-4; $\lambda = 1300/1550\text{nm}$
Repeatability of IL	max $\pm 0.1$			dB	IEC 61300-2-2; $\lambda = 1300/1550\text{nm}$
Service life	1000 mate/demate cycles				According to field experience
Operating temperature	-40/+85			°C	
Storage temperature	-40/+90			°C	

\* IL measured using two reference cables



**NOTE** Optical and mechanical specifications are based on the use of the connector of corresponding standard; the above table reflects typical values.

## E-2000™ OGR (Optical Reflectors)

E-2000™ OGR are normally used as fiber termination with the highest possible back reflection.

They are mainly deployed in device manufacturing or LABs for calibration purposes, or for measuring back reflection within fiber-optic components. They are also used to provide reference reflection levels by measuring the sensitivity of sources to back reflection from other devices.

Other available OGR types are: F-3000™, FC, SC and ST™.

### SPECIFICATIONS

	SINGLE MODE PC/APC	UNITS	TEST CONDITIONS
Return Loss (Including connector loss)	Typ. 0.5	dB	IEC 61300-3-6; $\lambda = 1310/1550\text{nm}$
Polarization dependence of return loss	Typ. 0.2 max. 0.3	dB	IEC 61300-3-2; $\lambda = 1550\text{nm}$
Wavelength dependence of return loss	Typ. 0.5 max. 0.8	dB	IEC 61300-3-7; $\lambda = \text{from } 1280 \text{ to } 1580\text{nm}$
Repeatability of RL	max +/- 0.1	dB	IEC 61300-3-6; $\lambda = 1310/1550\text{nm}$
Service life	500 mate/demate		IEC 61300-2-2
Operating temperature	-25 / +70	°C	IEC 61300-2-22
Storage temperature	-40 / +85	°C	



## E-2000™ MAS (Multipurpose Adapter System)

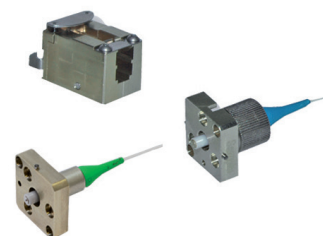
The E-2000™ MAS is a modular interchangeable adapters based on 2.5 mm diameter ferrule whose size, ease of cleaning and inspection, and optical performance make it an ideal choice for high performance applications such as test and measurement equipment.

This system is composed of a flange which provides an internal connection via a FC or Mini-AVIM style connector and a wide range of interchangeable adapters including the E-2000™, FC, SC, ST and LSA (DIN).

## SPECIFICATIONS

	MULTIMODE 0° PC	SINGLE MODE 0° PC	SINGLE MODE 8° APC	UNITS	TEST CONDITIONS
Insertion Loss (IL)*	max 0.25			dB	IEC 61300-3-4; $\lambda = 1300/1550\text{nm}$
Repeatability of IL*	max $\pm 0.15$			dB	IEC 61300-2-2; $\lambda = 1300/1550\text{nm}$
Service life (adapters)	500 mating cycles				
Service life (connectors)	1000 mating cycles				
Operating temperature	-25/+70			°C	

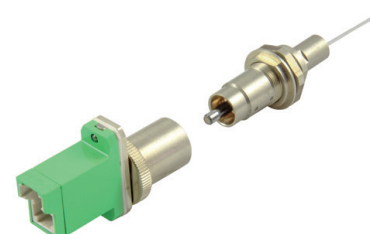
\* Measured using two reference connectors. Valid for ferrule type 2.5 mm diameter. For other types, please contact your local DIAMOND representative



## E-2000™ ADT-UNI UNIVERSAL CONNECTOR/ADAPTER

The ADT-UNI is a universal connector/adapter solution, which provides unparalleled optical performance and proven long-term reliability. The universal adapters which allows the acceptance of E-2000™, FC, SC, LSA (DIN) and ST™ connectors, are modular interchangeable adapters based on 2.5 mm diameter mating sleeve whose size, ease of cleaning and inspection make them an ideal choice for test and measurement equipment.

ADT/UNI are available in SM (typ. 0.2 dB) and MM (typ. 0.15dB).



## E-2000™ IMOD (Interfaces Modules)

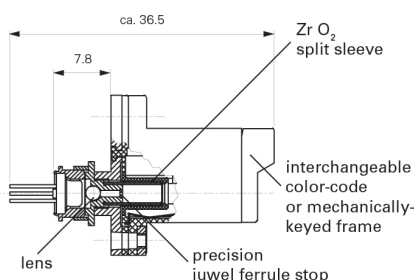
The E-2000™ Interface Module (IMOD) has been developed as a half adapter for free space application of optical connector. These modules are used more commonly for PC 0° connection, but version for using APC 8° ferrules can be offered as custom component. The two major reasons for using a high quality IMOD are the need of repeatable positioning in both axial and radial direction between each connector and each IMOD.

Other available IMOD types are: F-3000™, FC, SC, ST, LSA (DIN), Mini-AVIM, F-SMA.

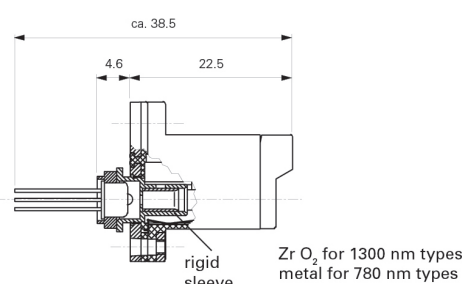


## E-2000™ MAT/MAR (Module Active Transmitter and Receivers)

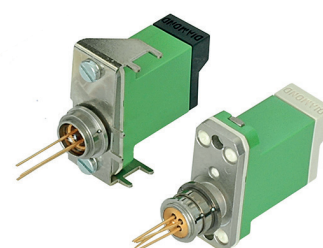
E-2000™ Transmitter (MAT) and Receiver (MAR) modules are designed as an IMOD with the appropriate fitting to adapt to an active component. The MAT requires an optical component to focus the light source (Laser, LED) to the ferrule position in the housing. Depending on the type of fiber (SM, PM or MM) the active alignment device secured by laser welds on the fixing flange is designed to guarantee optimal performance.



Construction for LED source transmitters and receivers (2 axis alignment)



Construction for LED source transmitters (3 axis alignment)



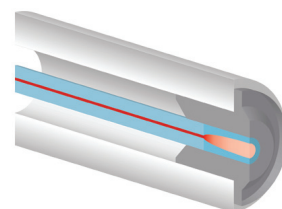
## DIAMOND TECHNOLOGIES

### POWER SOLUTION OPTICAL INTERFACES

Diamond uses different methods for expanded beam alignment, depending on the final use of the assembly. The main expanded beam types can be defined as the following: spliced GRIN lenses and spliced glass rod, or endcap which provides a Diverging, Collimated or Focused exit beam. These optical interfaces are also suitable for high power applications.

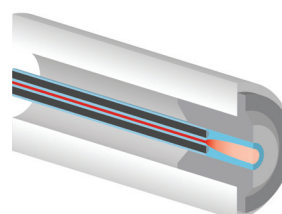
#### PS Collimated (Contact)

Diamond offers the Power Solution optical Interface which expands the MFD of a SM fiber by splicing a GRIN lens at the extremity. The MFD at the end of the connector is thus expanded by a factor 4, increasing the contact surface by a factor of about 16. As a result the heat issues decrease but cleanliness of the connectors and mating adapters is still important.



#### PM-PS Collimated Polarization Maintaining (Contact)

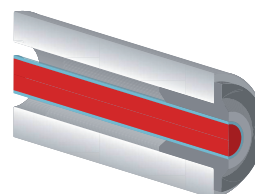
Polarization plays an important role in the industrial photonics market and when coupled with medium-high power application, creates a highly critical interface. Sensors and communication systems have been designed using Polarization Maintaining or Polarizing fibers. Special connectors are required for such applications, because the connection must be made with a certain orientation. Only connectors with an orientation key are capable of properly terminating these fibers.



#### PSm Power Solution Multimode (Contact)

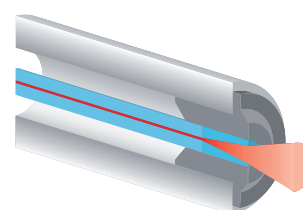
No standards for large MM connectors has been defined with high power application in mind. The quality of the contact is critical and the standard SM fiber optical interface is not sufficient. Diamond has established a new Optical Interface, the PSm, to fill this void and help end-users to source reliable connectors for these applications.

The optical interfaces use 100% concentricity measurement control and optical geometry measurements. A special visual inspection completes the Optical Interface definition.



#### PSf Free Space (Diverging, non contact)

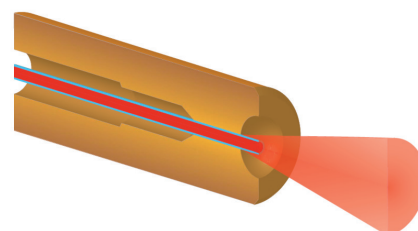
A glass rod is spliced at the end of a SM fiber. This allows the beam to be expanded before it exits the glass, diminishing the power density at the glass-air interface. This technique is used for high-power applications, at the injection or at the output to minimize the chance of burns at the interface. Diamond provides the SM Power Solution Freespace Optical Interface using this technology.



#### PSi Free Standing

The fiber-end free from epoxy glue allows proper thermal dissipation in the region of maximum power density.

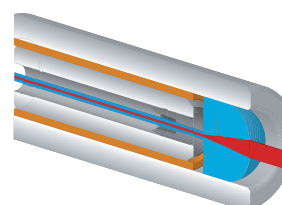
A proprietary design of mode-stripper can be integrated to obtain laser power confinement in the fiber core. The amount of power stripped out from the cladding is a function of the laser Beam Product Parameter (BPP) and of the receiving fiber core diameter and numerical aperture (NA).



#### PSc Collimator Systems

Collimators are for use in a wide variety of optical systems.

These modules are designed to collimate or focus light exiting an optical fiber to a desired beam diameter or spot size a specific distance away. Collimators are used with laser diodes, photodiodes, acoustic-optic modulators and other fiber optic devices where a specific output is needed.

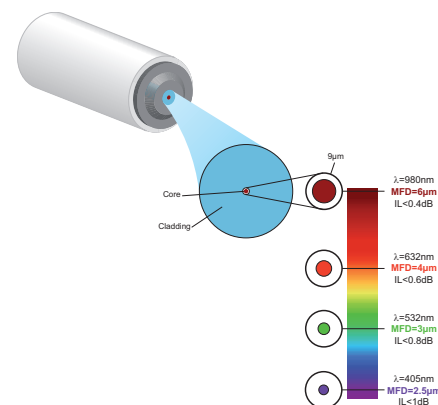


## VIS/NIR LOW WAVELENGTHS

Diamond offers the VIS/NIR optical interface for low wavelengths and small core fibers on E-2000™ connectors based on the Active Core Alignment (ACA) technology aiming to achieve unrivaled low IL performances. Other available types: F-3000™, SC, FC, LSA (DIN), DMI, AVIM, Mini-AVIM.

### Advantages

- ▶ Extremely low lateral offset for low insertion loss
- ▶ Ultra high polish for high return loss

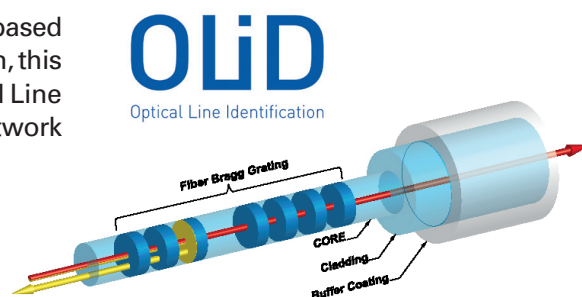


## OPTICAL LINE IDENTIFICATION (OLiD)

DIAMOND has developed a new network monitoring system which is based on Fiber Bragg Grating (FBG) technology. In a P2P network installation, this technology is used to identify each fiber line and manage the Optical Line Identification OLiD information through a data base owned by the network operator.

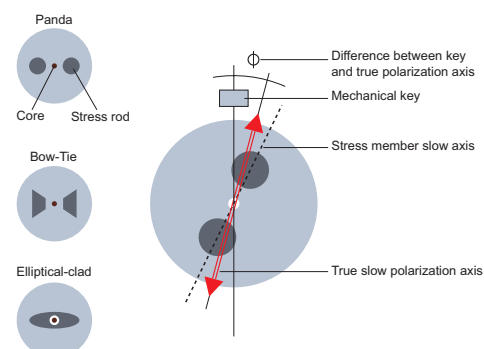
### Available products

- ▶ E-2000™ OLiD assemblies, UGT, Outlets



## POLARIZATION MAINTAINING (PM)

PM connectors cover applications such as: measurement instrumentation, sensors, communication systems and medical devices. Utilizing our Active Core Alignment process, we are able to independently optimize both insertion loss (IL) and extinction ratio (ER), eliminating the need to compromise one performance feature over another. Diamond provides high performance PM terminations directly to both passive and active optical devices, as well as for pigtails and patch cord assemblies.



## SPECIFICATIONS

WAVELENGTH (nm)	IL (dB)	ER (dB)	RL (dB)	
	97% (typ)	min (typ)	PC 0°	APC 8°
1625 - 1550 - 1310	0.3 (0.15)	23 (28)	50*	70*
1060 - 980	0.5 (0.25)	21 (26)	50	60*
830 - 780	0.6 (0.3)	20 (25)	40	60**
635	0.8 (0.4)	20 (25)	40	60**
532 - 460	1.2 (0.6)	20 (23)	35	60**
405	1.5 (0.75)	18 (21)	35	60**
TEST CONDITIONS	IEC 61300-3-34 Random mating	IEC 61300-3-40 Low coherence	IEC 61300-3-6 *OCWR method OLCR method	
Service life	500 mate/demate cycles			

- NOTE**
- Optical performance values based on use of Panda PM fiber, use of other types or wavelengths may impact performance values.
  - Diamond performs extinction ratio (ER) measurements using the crossed-polarizer method (similar to IEC 61300-3-40). This method requires the use of Glan-Thomson polarizers and of a low coherence light source (bandwidth > 10 nm). As a guideline, the following table shows the measurement accuracy that is achieved with our setup:  
ER nominal value and accuracy: 20 dB ±1.5 dB 25 dB ±2.5 dB 30 dB ±3.5 dB.
  - NA 0.12 ± 0.02
  - IL performance intended for E-2000™. Other connector mechanical interface display higher values. Please contact Diamond for values on your specific connector type.

\*\* Limited by test conditions

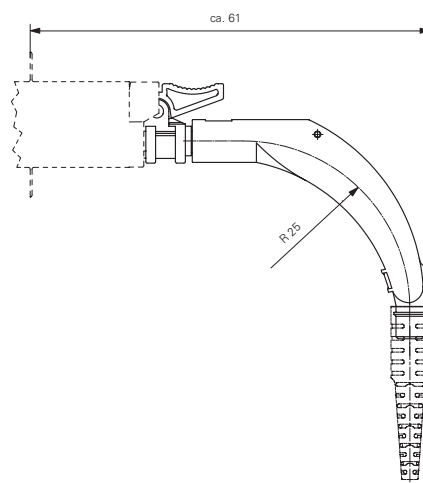
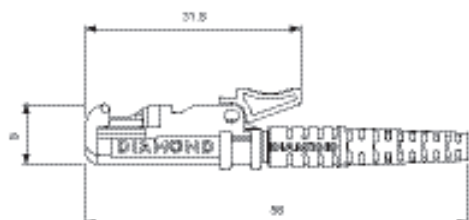
## DRAWINGS AND DIMENSIONS

### E-2000™ SIMPLEX AND COMPACT CONNECTORS

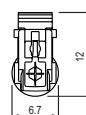
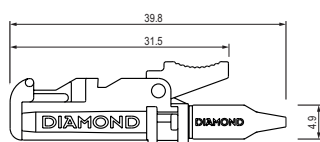
#### E-2000™ Simplex connectors 900µm - 3mm boot style

Ferrule material: Zirconia/metal insert

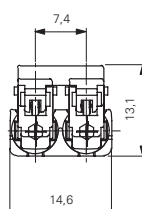
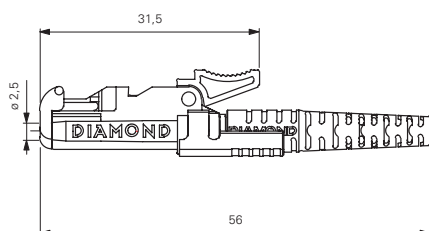
External parts: Plastic



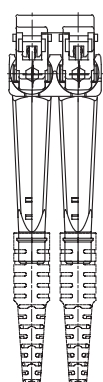
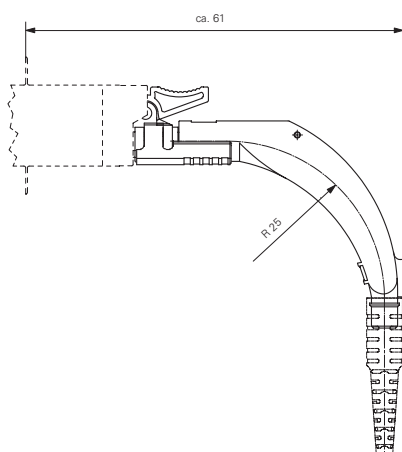
#### E-2000™ Simplex connectors 900µm short boot



#### E-2000™ Compact connectors 900µm - 3mm boot styles



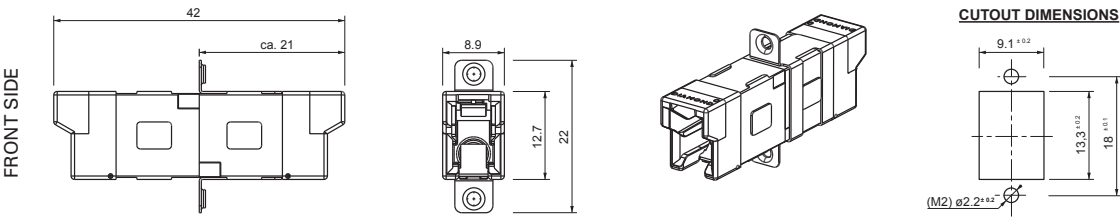
#### E-2000™ Compact connectors 900µm - 3mm 90° boot style



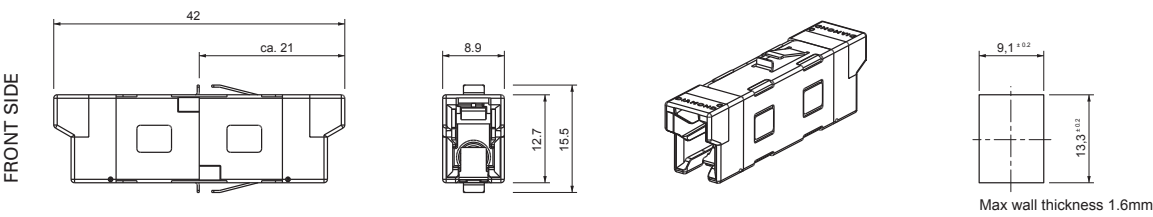


E-2000™ SIMPLEX ADAPTERS

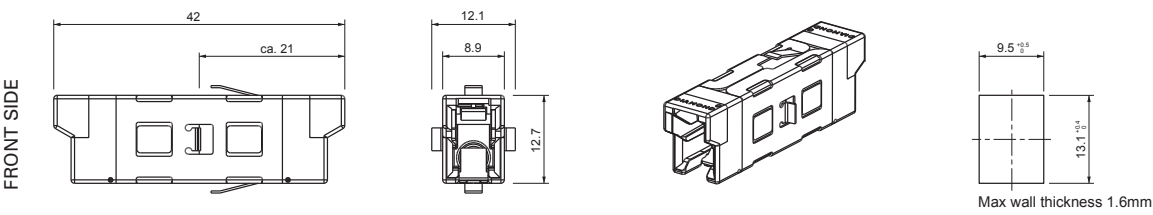
E-2000™ Simplex mating adapter with screw fixing clip



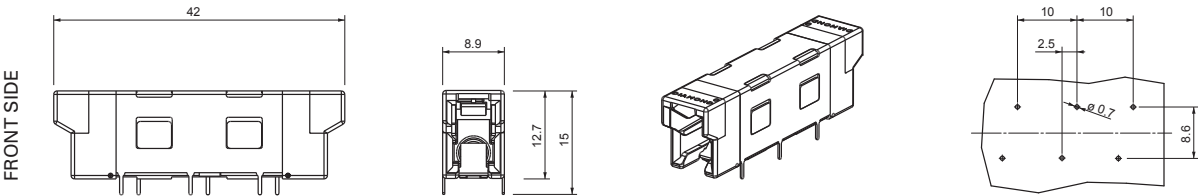
E-2000™ Simplex mating adapter with quick fixing clip  
(Typ A: for higher packaging density within E-2000™ cutout)



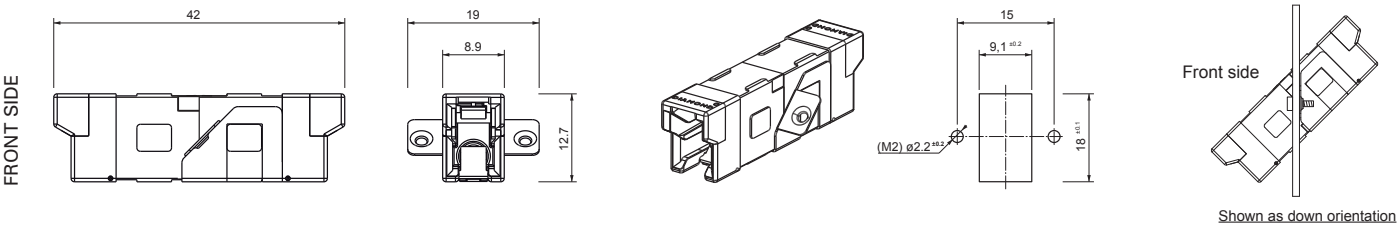
E-2000™ Simplex mating adapter with quick fixing clip  
(Typ B: for excellent stability within SC cutout)



E-2000™ Simplex mating adapter with print fixing clip

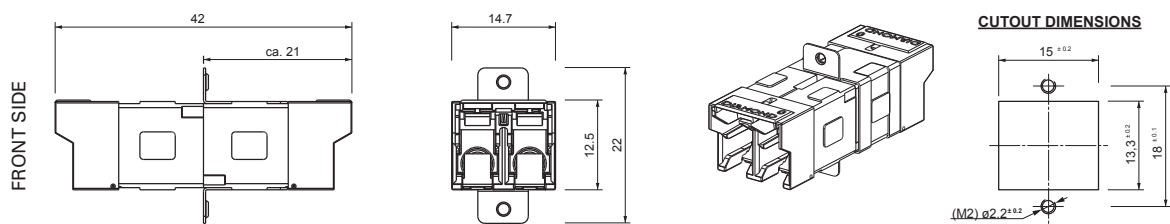


E-2000™ Simplex mating adapter with 45° screw fixing clip

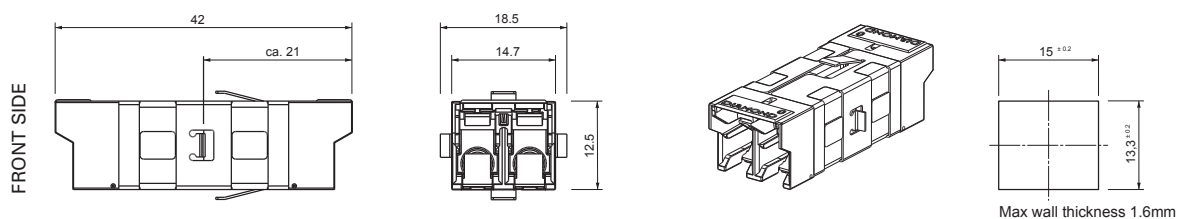


## E-2000™ COMPACT ADAPTERS

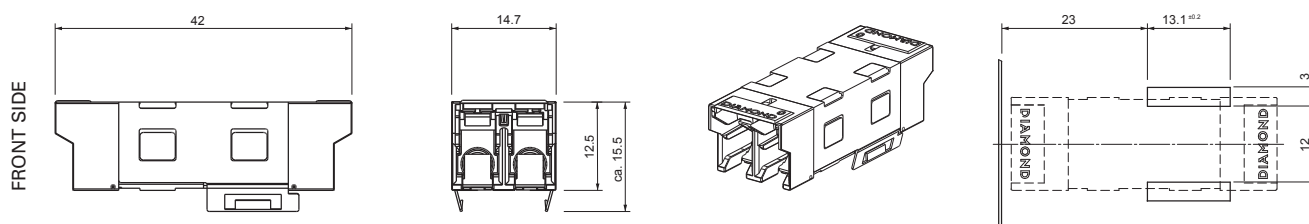
## E-2000™ Compact mating adapter with screw fixing clip



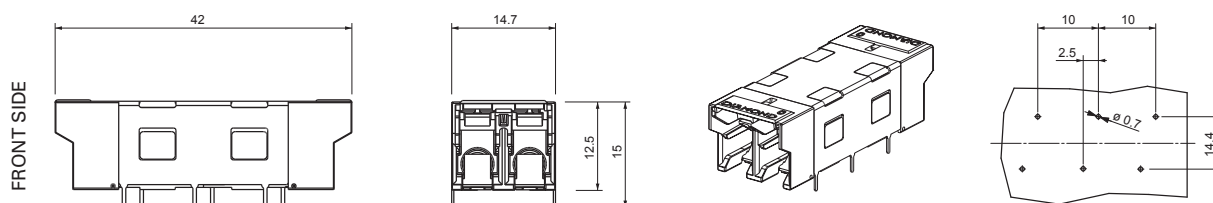
## E-2000™ Compact mating adapter with quick fixing clips



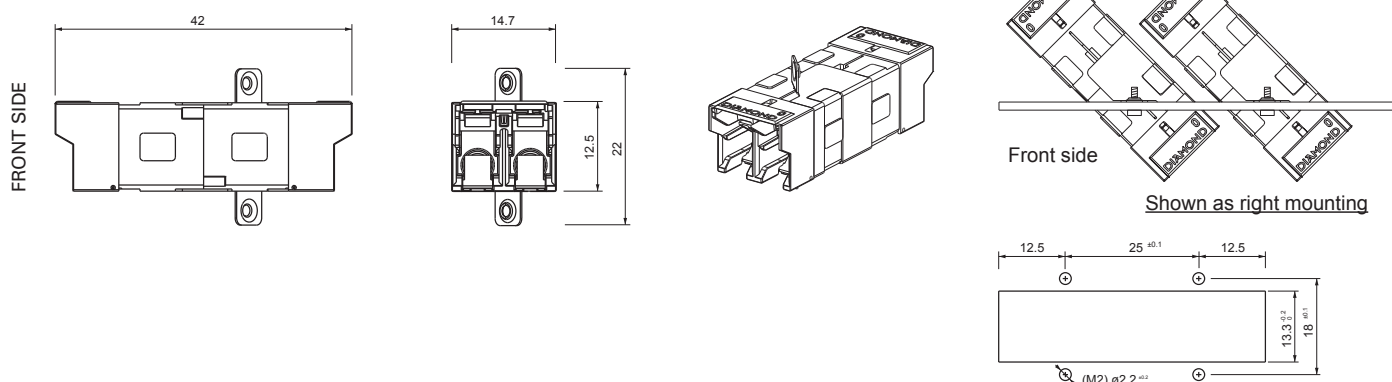
## E-2000™ Compact mating adapter with print fixing clip (snap closure)



## E-2000™ Compact mating adapter with print fixing clip (6 pins)



## E-2000™ Compact mating adapter with 45° screw fixing clip

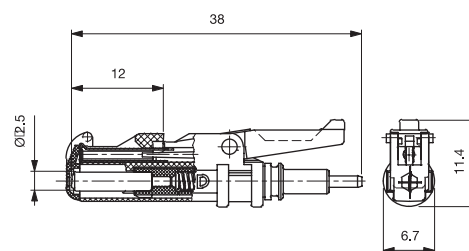


## E-2000™ BACKPLANE CONNECTOR AND ADAPTERS

E-2000™ Backplane connectors on 900 µm fiber, without boot

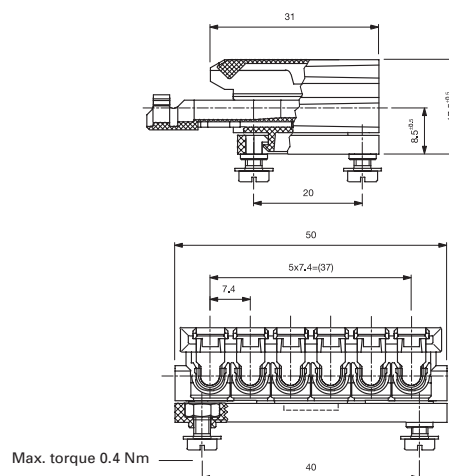
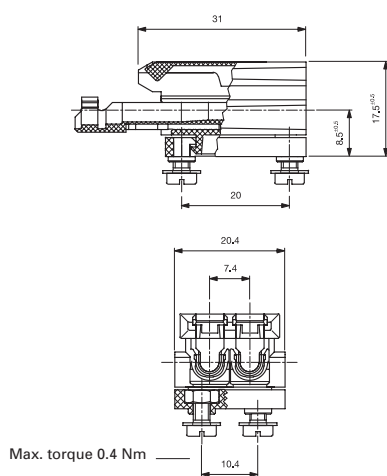
Ferrule material: Zirconia/metal insert

External parts: Plastic



E-2000™ PCB adapters, 2 and 6 channels

Material: PBT (black)

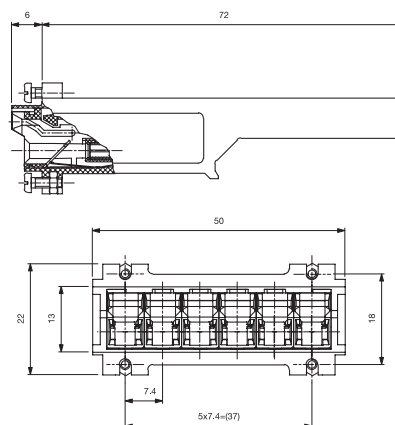
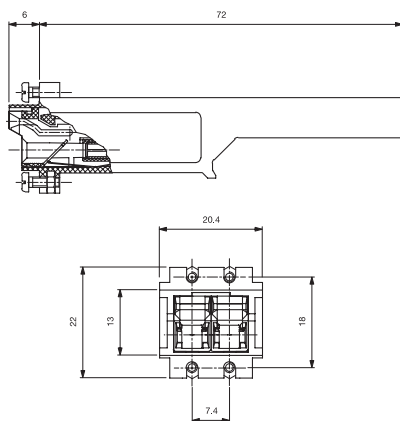


E-2000™ Backplane adapters, 2 and 6 channels

Material: Plastic

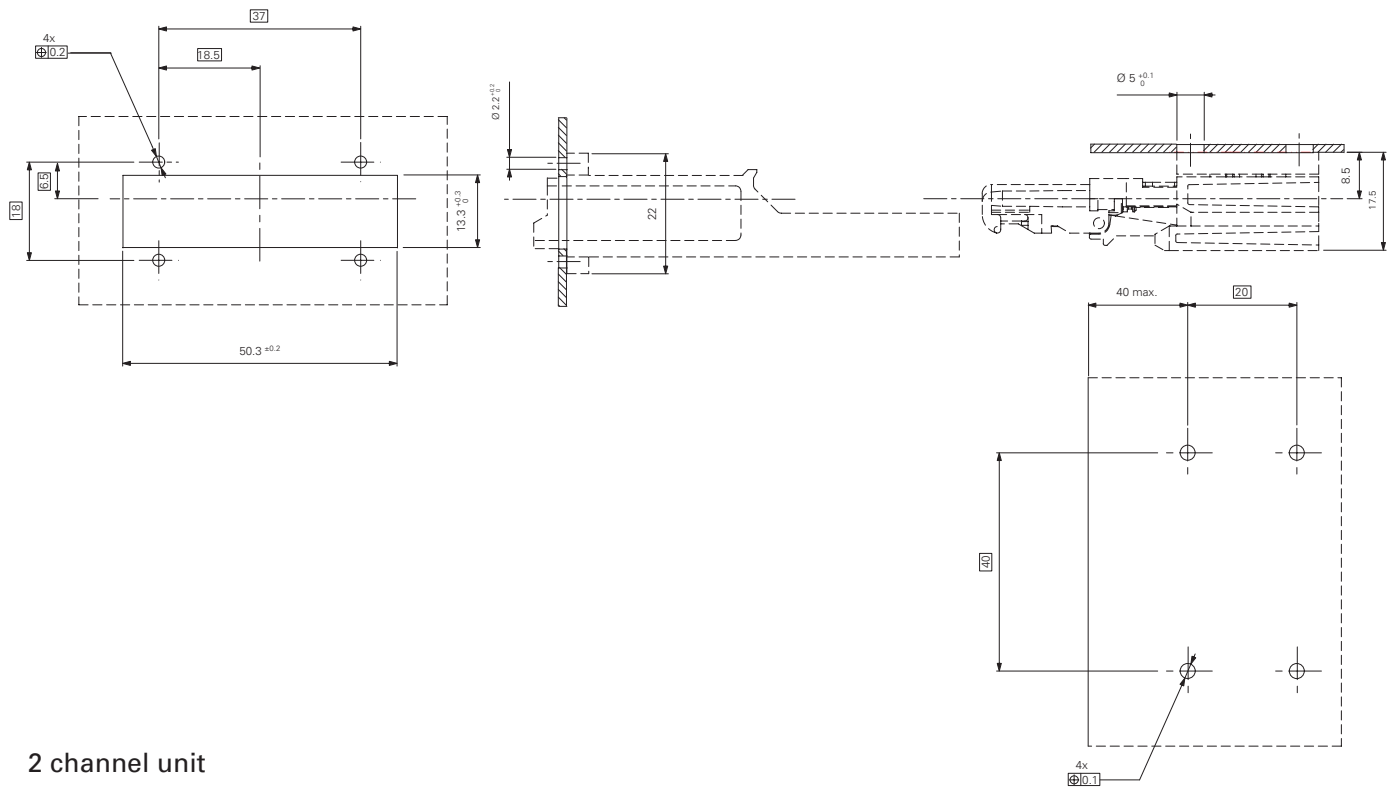
Mating sleeve: Zirconia

**NOTE** Standard colors: MM PC (beige); SM PC (blue); SM APC (green), PS (red)

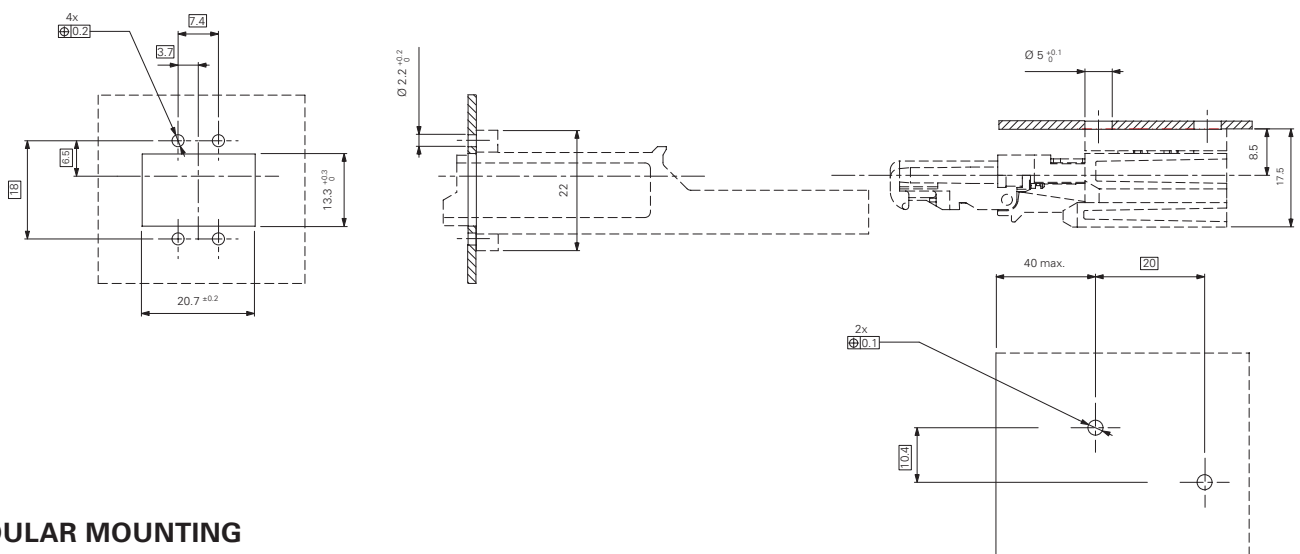


## MOUNTING HOLES

### 6 channel unit

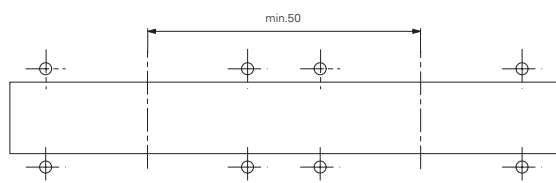


### 2 channel unit

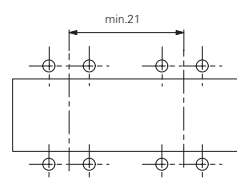


## MODULAR MOUNTING

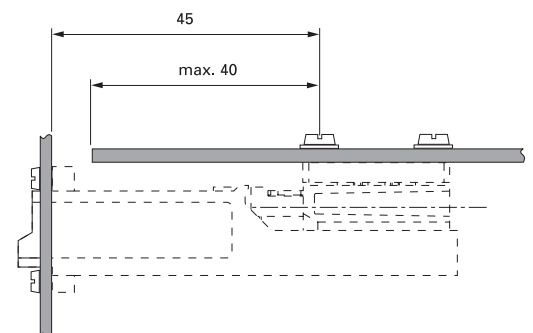
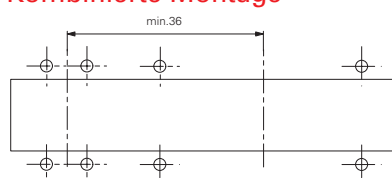
### 6 channel unit



### 2 channel unit



### 6 und 2 Kanal Kombinierte Montage



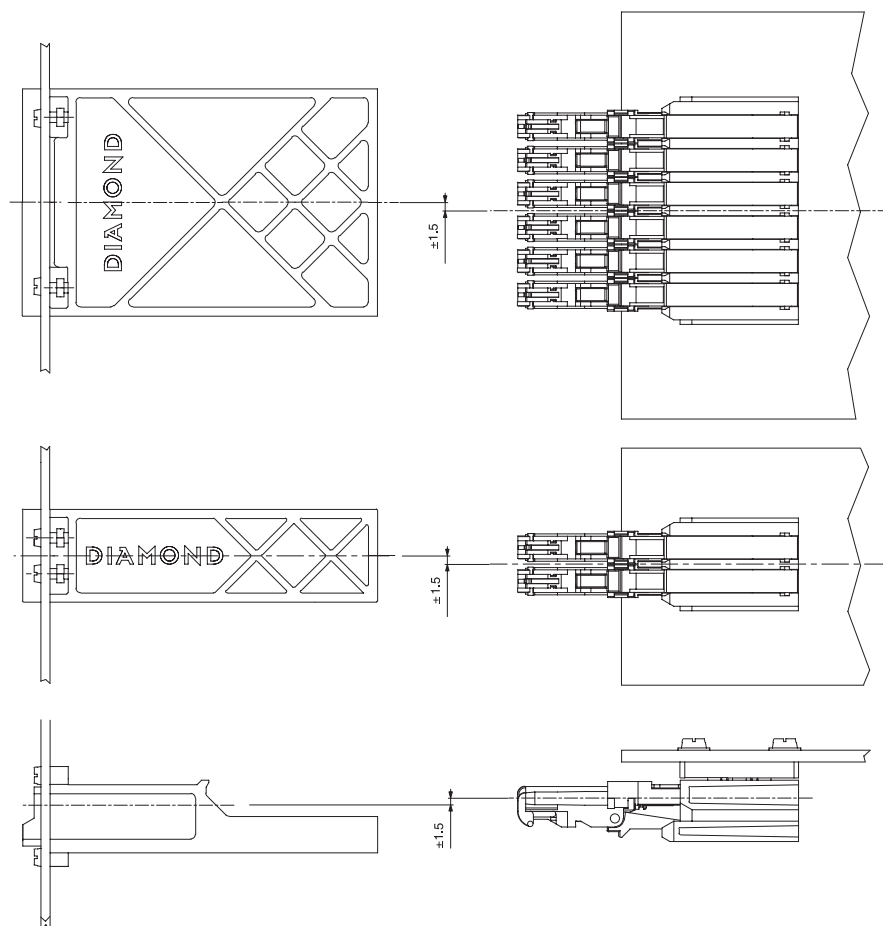
## APPLICATIONS NOTES

Fiber optic connectors for backplane also require the pre-mating of all involved components, to prevent lateral forces, while mated.

For repeatable and secure pre-mating and mating procedures, the E-2000™ BACKPLANE has a high adaptation degree of the connectors at the PC Board to the backplane mating adapter.

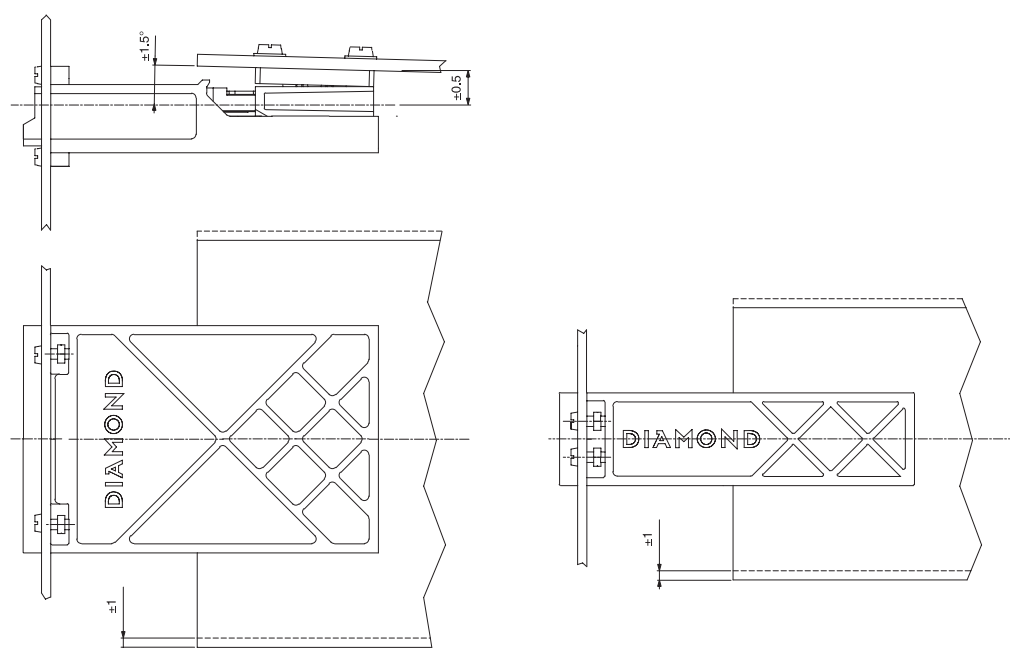
### PRE-MATING CONDITIONS

The system is designed to recover lateral misalignment up to  $\pm 1.5$  mm.



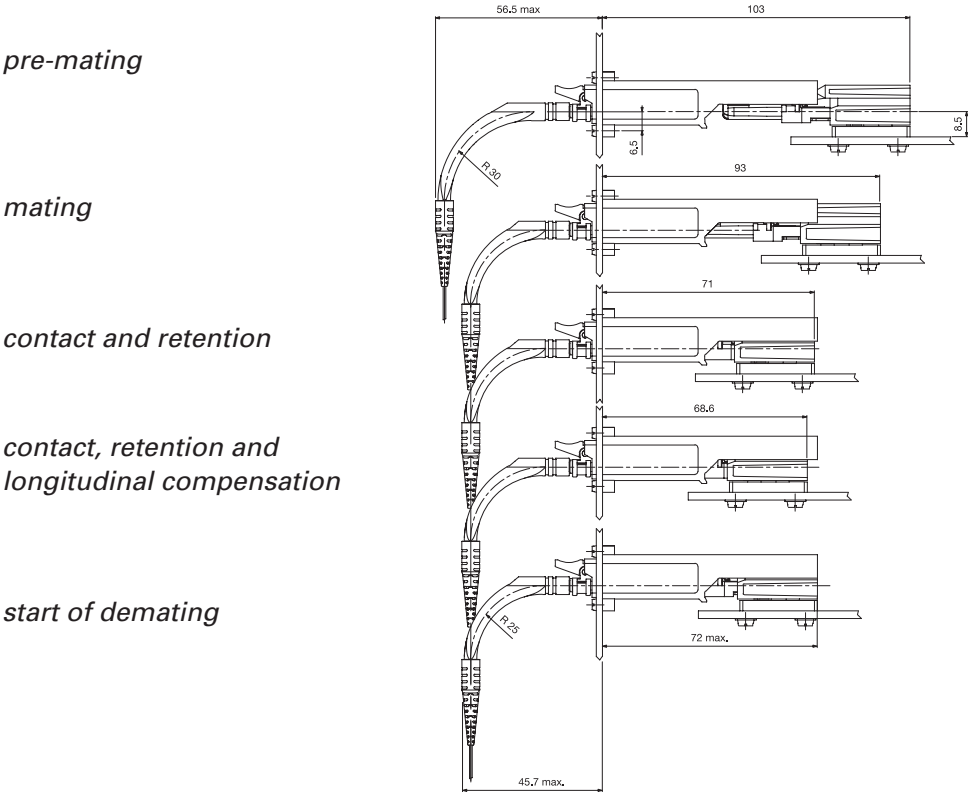
### MATED CONDITIONS

Angular misalignment of  $\pm 1.5^\circ$  degree and lateral misalignment of  $\pm 0.5$  mm resp.  $\pm 1$  mm are compensated.

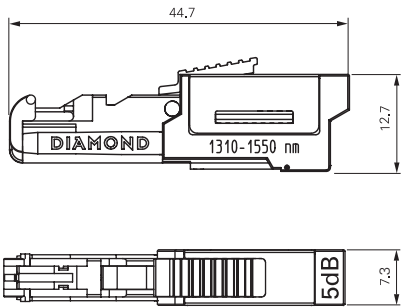


PROPOSED SPACE REQUIREMENT AND CONTROL ZONE

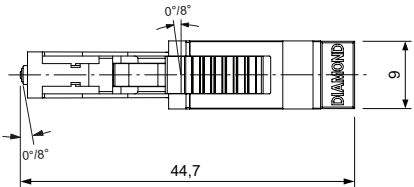
The E-2000™ BACKPLANE mechanism guarantees secure retention and eliminates stress at the PC Board when mated. After completion of the mating procedure the system has a 2.5 mm longitudinal way compensation.



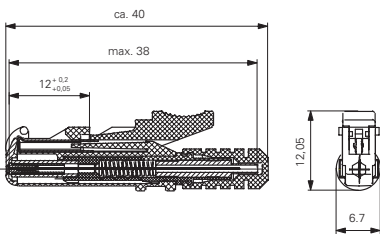
OAF E-2000™ ATTENUATORS



UGT E-2000™ TRANSITION ADAPTERS



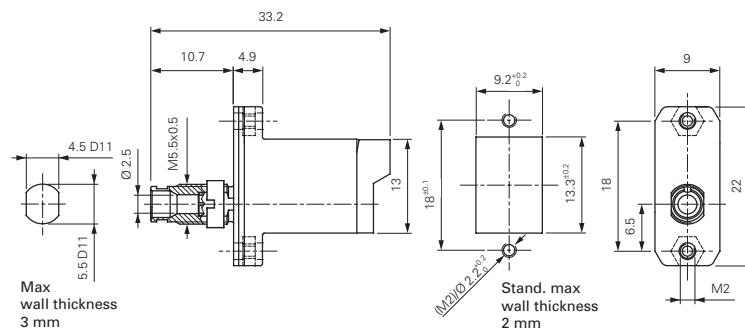
OTM E-2000™ OPTICAL TERMINATION MODULES



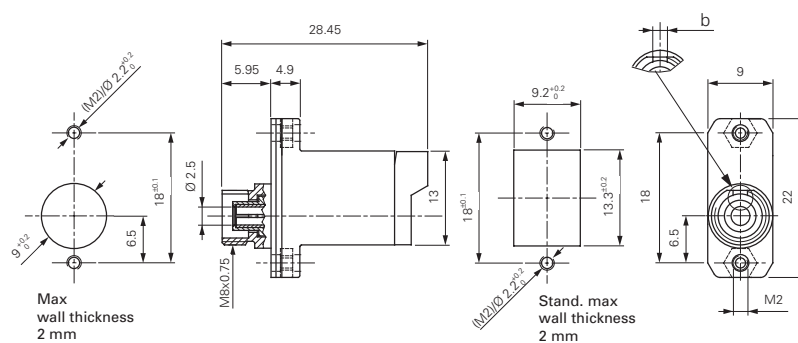


## E-2000™ HYBRID ADAPTERS

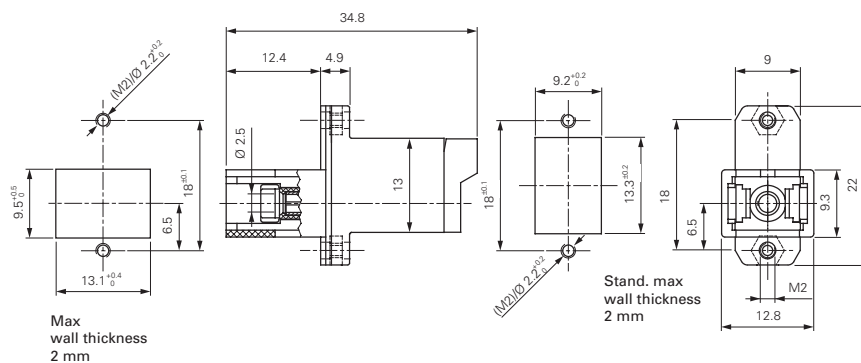
## Hybrid E-2000™ / LSA (DIN)



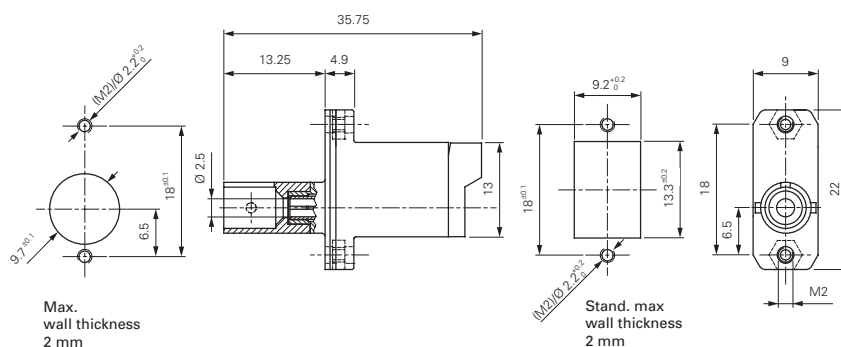
## Hybrid E-2000™ / FC



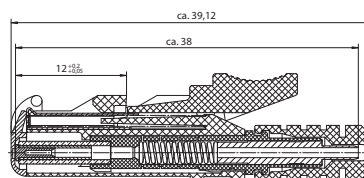
## Hybrid E-2000™ / SC



## Hybrid E-2000™ / ST™

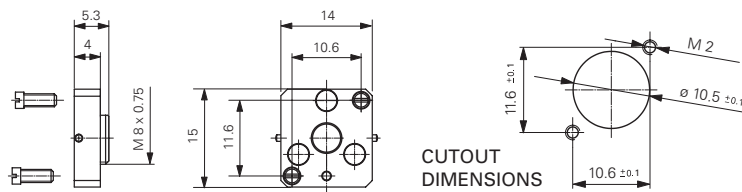


## OGR E-2000™ OPTICAL REFLECTORS

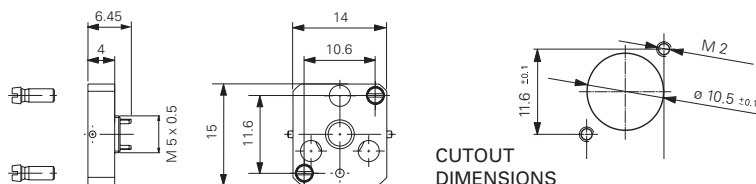


## E-2000™ MAS (MULTIPURPOSE ADAPTER SYSTEM)

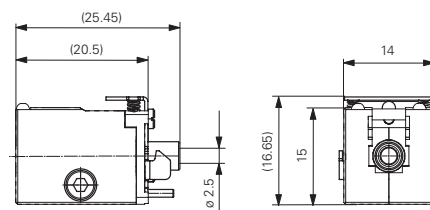
## MAS Universal flange (FC interface)



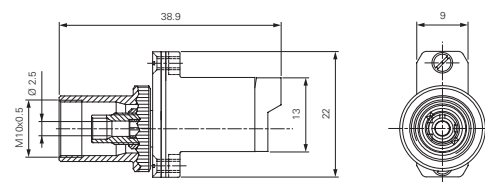
## MAS Universal flange (Mini-AVIM interface)



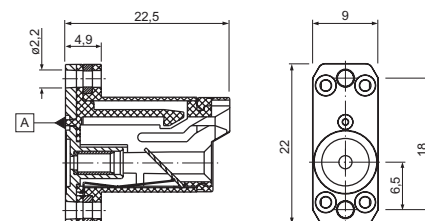
## MAS E-2000™



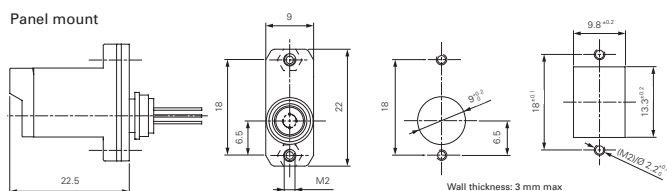
## E-2000™ ADT-UNI UNIVERSAL ADAPTER



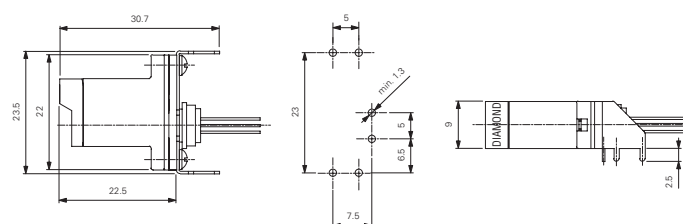
## E-2000™ IMOD (INTERFACE MODULE)



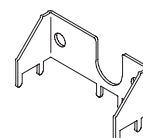
## E-2000™ MAT/MAR



PCB mount



PCB mounting clip



## ORDER INFORMATION

Please contact your nearest local Diamond representative or visit [www.diamond-fo.com](http://www.diamond-fo.com) website.