

DIAMOND Fiber Optic Components

CABLE ASSEMBLIES, ADAPTERS, IMODs AND TOOLS

The AVIM™ connector is born in mid 1990's as a vibration resistant connector for avionics and space application. Since then, the evolution of these connectors has been driven by harsh environment applications, especially for Aerospace and Naval applications.

In a first step, AVIM™ has been adapted to Naval applications, then by 2009, a lighter and rugged version was commissioned for a Mars rover, the Mini AVIM™. This connector has been used in various application due to its exceptional environmental resistance characteristics, and to its high end optical performance benefitting from Diamond unique ferrule designs and technologies.

An intermediate version, the Midi AVIM™ is coming to complete this family of shock and vibration resistant small single channel fiber optic connectors.

In the next pages, you will discover the different applications where these products are deployed, a description of Diamond's Space Grade process for Flight models that must follow the European Space Agency standards and the various products themselves, as well as tools and services provided by Diamond.

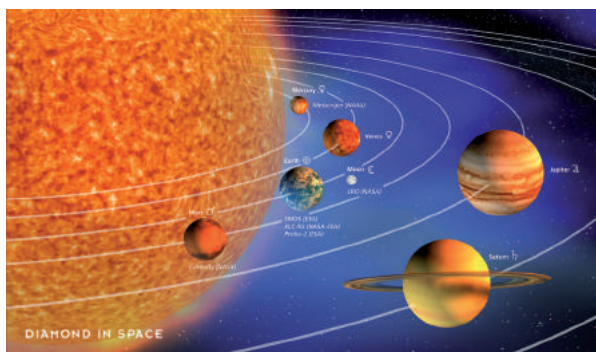
APPLICATIONS

SPACE

Active since mid-1990's in the space market, Diamond products have a long heritage in space, mainly used by NASA GSFC and more recently standardized by the ESCC, the European Space Components Coordination. The Mini AVIM™ is Diamond's only ESCC standardized component, but Diamond produce other flight models for custom configurations. The historically mostly used space connector, the AVIM™, due to commercial reasons, has not been standardized under ESCC but is still available, using the same Space Grade or Commercial Grade process as the Mini AVIM™. You can find connectors from Diamond from Mercury, on Mars, around the moon, mostly around the earth and soon toward Jupiter.

The Space applications have been divided in three groups:

1. Sensing
2. Inter-satellite communication
3. Intra-satellite communication



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AVIM™ Family

AVIM™
Midi AVIM™
Mini AVIM™ (ESCC 3420/001)
Micro AVIM™
CLEANING KIT



AVIM™



Midi AVIM™



Mini AVIM™



Micro AVIM™



Cleaning Kit

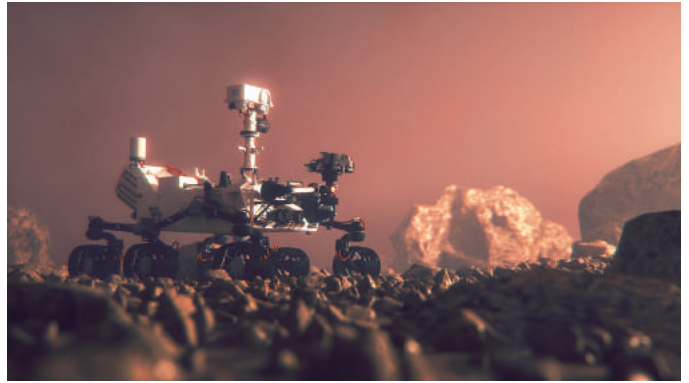
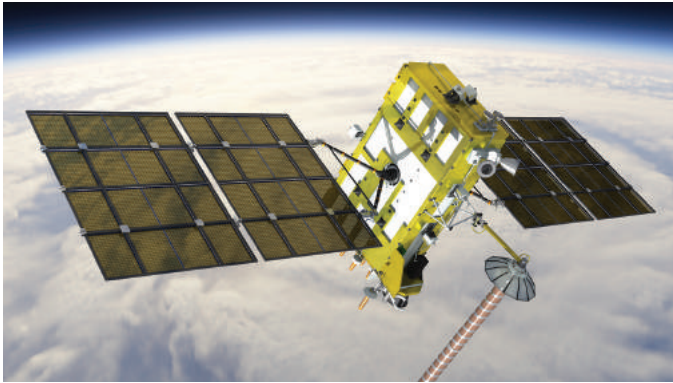
*Specifications subject to change
without notice*

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Sensing

The sensing application are numerous, probably driven by Lidar or Laser Altimeter, but numerous other application have been seen, using optical fiber from low wavelength, small core single mode polarization maintaining to large core multimode.

It is almost impossible to standardize those applications and these are the most demanding, as the pass/fail criteria can be quite different than the standard digital communication application because other properties from the light are used, such as wavelength, intensity, phase, polarization,...



Inter-satellite Communication

With optical signal, a line of sight is necessary to bring the data on the ground and it is not always possible from any satellite position. For this reason, communication between satellite, even planes, unmanned vehicle or balloons is required. Constellation of hundreds of satellites are discussed, each would require a communication terminals, which are already commercially available or in development.



Intra-Satellite communication

Telecom satellite are using up and down-link using radio waves and use electric cable internally (several tons). The challenge to change these payloads in fiber optic, improving dramatically weight, power dissipation and power consumption can change dramatically the face of communication via satellite. A typical telecom satellite would have a thousand connection to be replaced by optical fibers.

Product hierarchy

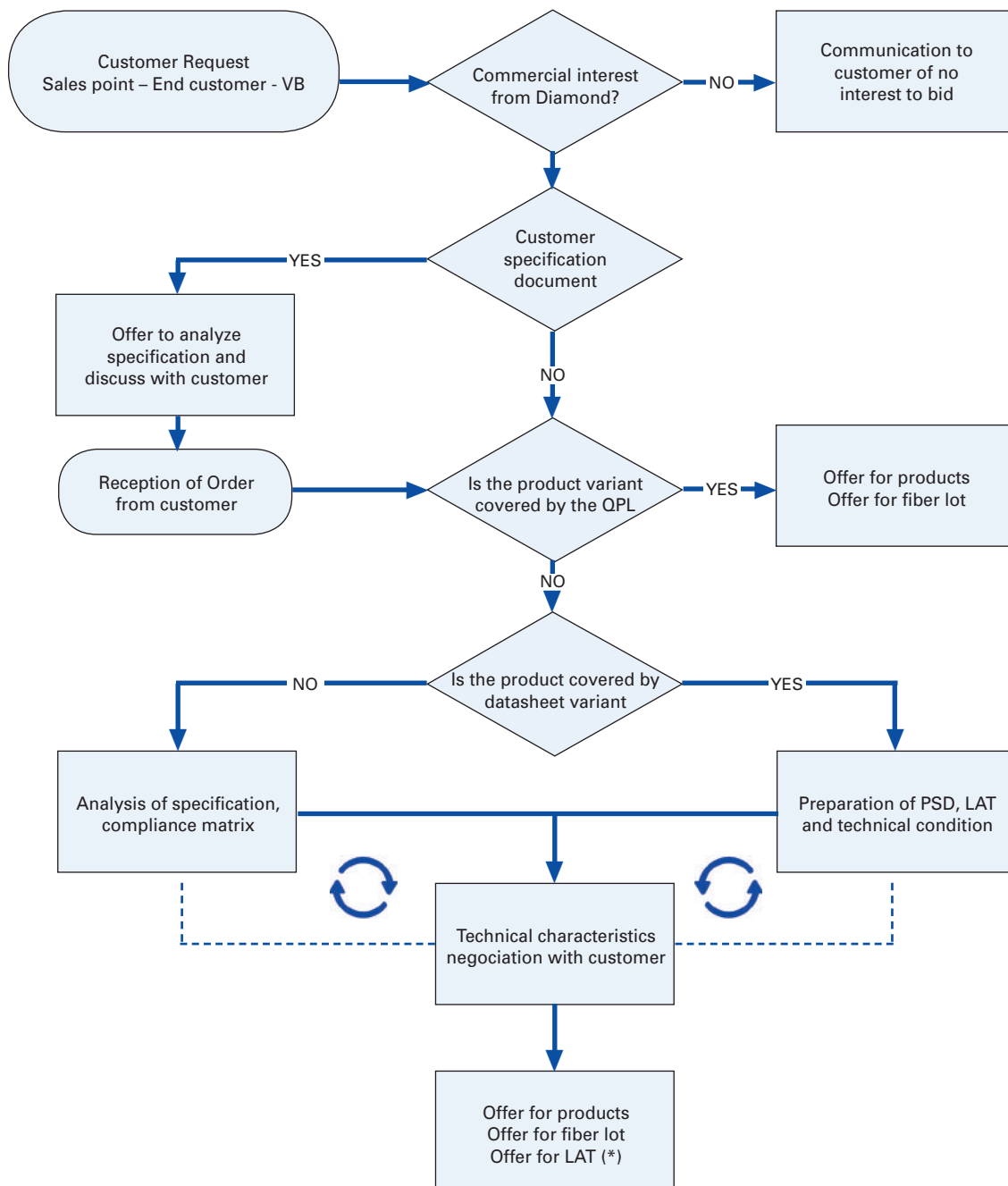
All the products can be assembled with different process and contractual information as follow:

- CG Commercial grade, according to our QTR, standard process
- SG Space Grade, according to our SG QTR, enhanced process to expand the operating range
- SG-ESCC SG products according to ESCC 3420 and/or 3420/001, requires a LAT/qualification and eventually an ETP
- SG-QPL SG products according to ESCC QPL, does not require a LAT/Qualification nor an ETP

The last three types of products correspond to the same assembly process, but with different contractual responsibilities and different traceabilities. They are all executed according to the same internal ISO product assurance process at Diamond.

The SG-ESCC, if related to the Mini AVIM™ or AVIM™, already dispose of results from an ETP. For all other variations, an ETP according to ESCC 2263420 chart 1 or similar should be performed.

Procurement process



DIAMOND

Fiber Optic Components

AVIM™

SINGLE MODE PC/APC
MULTIMODE PC
PM PC/APC

CABLE ASSEMBLIES AND ADAPTERS

Developed in the 1990's for aerospace application and compatible with the DIN LSA connector, the AVIM™ is a multipurpose Commercial Off-The-Shelf fiber optic connector offering high optical performance and capable in dynamic environments of mobile platforms, including avionics and especially space flight.

These connectors are compatible with the widest range of optical fibers, including singlemode (SM), multimode (MM), polarization maintaining (PM) and other fibers of different core/cladding sizes, multi-fiber ferrule and multi-core fibers..

High performance in the form of lowest insertion loss provided by Diamond's unique Active Core Alignment termination process as well as high return loss for the most demanding, high bandwidth transmission systems.

By design the AVIM™ is the sum of several engineering achievements:

FEATURES

- ▶ Low IL thanks to Active Core Alignment (A.C.A.)
- ▶ High return loss thanks to Diamond polishing technique and A.C.A
- ▶ Miniaturized MIL-style ratchet system with high vibration/shock resistance
- ▶ Unique AVIM™ 2-piece cleanable adapter for easy cleaning and maintenance access

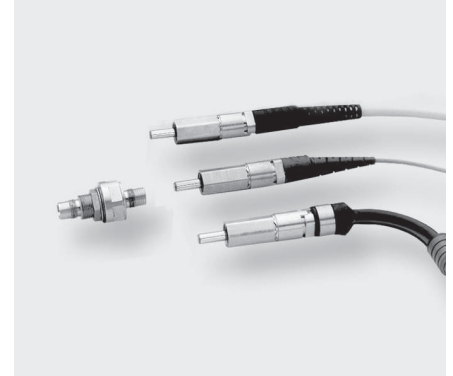
STANDARDS

- ▶ IEC 61754-3 100% compatible with LSA (DIN) standard

The AVIM™ has been successfully submitted to evaluation tests according to ESCC 2263420 and qualified. Diamond internal qualification standards as shown in QTR-064 will cover this product in the future.

PRODUCT VARIATION

- ▶ Terminated connector (commercial or space grade and space qualified) against ESCC 3420
- ▶ Multi-fiber custom connector set and assembled terminations
- ▶ Mating adapters (commercial, space qualified)

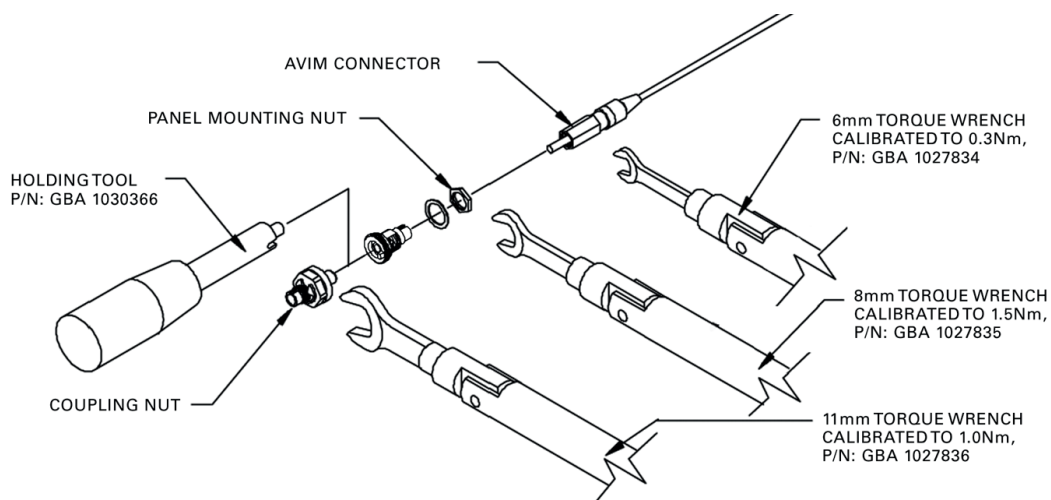


SPECIFICATIONS

AVIM™ - TECHNICAL CHARACTERISTICS						
	COMMERCIAL GRADE - TR005a			SPACE GRADE - QTR064		
Mechanical Performances		IL value using ITU G.652C	Standards		IL value using PM 1550nm	Standards
Mating durability	500	≤ 0.2dB	IEC 61300-2-2	100	≤ 0.4dB	IEC 61300-2-2
Shock, Impact	5 drops 1.5m	≤ 0.2dB	IEC 61300-2-12	500 g, 2ms	≤ 0.4dB	IEC 60068-2-27
Vibration	1oct/min, 20g@60Hz-2kHz 15cycles, sinus	≤ 0.2dB	IEC 61300-2-1	35gRMS, 20Hz-2kHz, 7.5min/axis random	≤ 0.4dB	IEC 60068-2-64
Environment Characteristics						
Operation Temperature	-40°C to +85°C, 1°C/min, 1h dwell, 20 cycles	≤ 0.3dB	IEC 61300-2-22	-55°C to +85°C, 1°C/min, 1h dwell, 100 cycles	≤ 0.4dB	IEC 61300-2-22
Temperature Storage/ Dry heat	168h, +85°C	≤ 0.2dB	IEC 61300-2-18	1000h, +85°C	≤ 0.4dB	IEC 61300-2-18
Cold	168h, -40°C	≤ 0.2dB	IEC 61300-2-17			
Damp Heat	+40°C, 95% r.h., 168h	≤ 0.2dB	IEC 61300-2-19	+25°C to +55°C, 95% r.h., 6 cycles, 144h	≤ 0.4dB	IEC 61300-2-46
Low pressure	n.a.			4*10 ⁻⁸ Torr, ambient, 8h	≤ 0.4dB	IEC 60068-2-13
Dust	n.a.			1h at +30°C, 1h at +65°, <30%r.h.	≤ 0.4dB	IEC 61300-2-27
Salt mist	n.a.			+35°C 85% r.h., 5% salt, 96h	≤ 0.4dB	IEC 60068-2-11
Rapid Depressurisation	n.a.			atm to 50mbar in 5s, 5 cycles	≤ 0.4dB	MIL-STD.810G, met. 500.5
Optical Characteristics**						
Insertion Loss, IL	0.15dB typical, 0.4max		IEC 61300-3-4 method B	0.25dB typical, 0.5dB max		IEC 61300-3-6 met B.
Return Loss, RL	PC >40dB; APC >75dB		IEC 61300-3-6 method OLCR	PC >40dB; APC >75dB		IEC 61300-3-4 met OLCR
Extinction Ratio, ER	ER >23dB, ER typical 28dB	not tested	Similar to IEC 61300-3-40	ER >23dB, ER typical 25dB		Similar to IEC 61300-3-40
Radiation				>1Mrad, ca. 8krad/h, ambient temp and humidity		ESCC229000
Cable related Characteristics	Homologated cables			Homologated cables		
Torsion	2N, 25 cycles 180°	≤ 0.2dB	IEC 61300-2-5	3N, 25 cycles 180°	≤ 0.4dB	IEC 61300-2-5
Static side load	0.2N, 90°, 5min	≤ 0.2dB	IEC 61300-2-42	0.2N, 90°, 60min	≤ 0.4dB	IEC 61300-2-42
Fiber Retention	5N, 1min	≤ 0.2dB	IEC 61300-2-4	5N, 2min	≤ 0.4dB	IEC 61300-2-4
Bending moment	10N, l=25mm	≤ 0.2dB	IEC 61300-2-7			

* with Fujikura PM1500nm Panda
 ** vary with fiber type

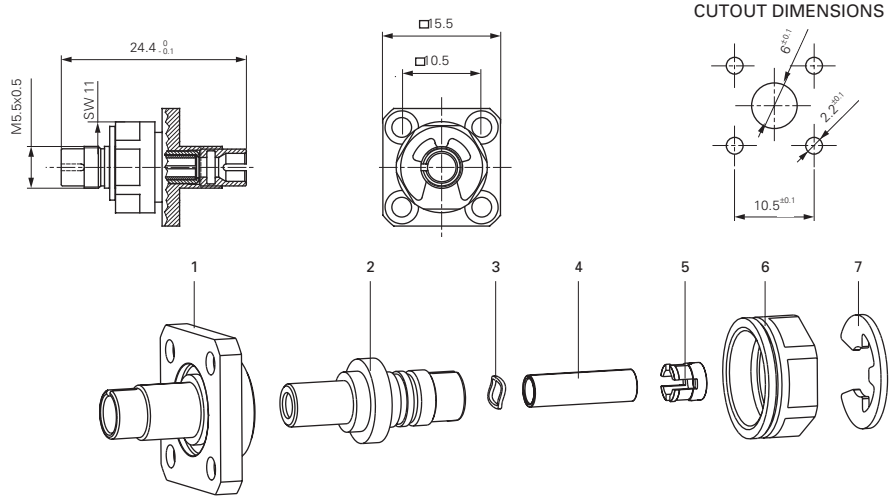
ESCC (ESA Space Component Coordination)



AVIM™ ADAPTER AND DIMENSIONS

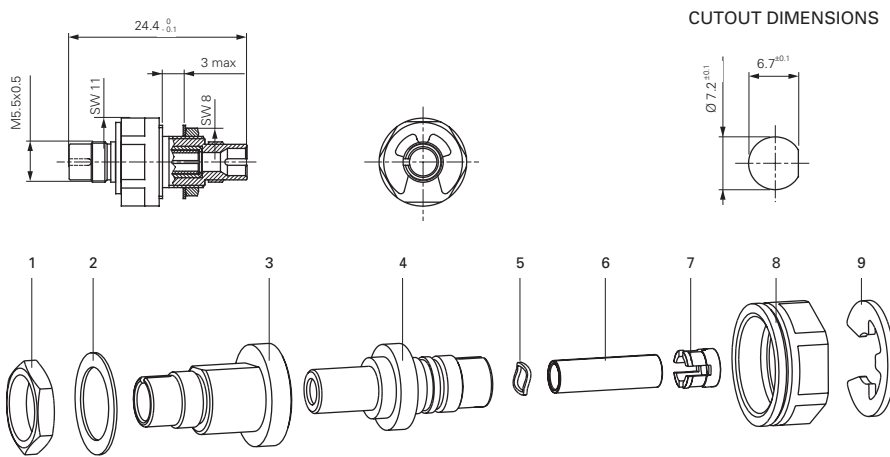
Available types: Hexagonal and square flange adapter for wall mount
 Material: According to part list

BILL OF MATERIAL - AVIM™ MATING ADAPTER - SQUARE FLANGE



POS.	DESCRIPTION	MATERIAL	UNIT MASS (g)
1	Square flange	CuNi12Zn30PB1	5.10
2	Body	CuNi12Zn30PB1	1.97
3	Elastic washer	X12CrNi177	0.01
4	Elastic sleeve	ZrO2	0.20
5	Elastic ring	CuNi12Zn30Pb1	0.09
6	Nut	CuNi12Zn30PB1	2.10
7	Serclip	X35CrMo17	0.24
Total			9.71

BILL OF MATERIAL - AVIM™ MATING ADAPTER - HEXAGONAL FLANGE



POS.	DESCRIPTION	MATERIAL	UNIT MASS (g)
1	Nut	CuNi12Zn30Pb Hard	0.27
2	Washer	CuSn6	0.09
3	D-shape body	CuNi12Zn30Pb Hard	2.49
4	Body	CuNi12Zn30Pb Hard	1.97
5	Elastic washer	X12CrNi177	0.01
6	Elastic sleeve	ZrO2	0.20
7	Elastic ring	CuNi12Zn30Pb1	0.09
8	Nut	CuNi12Zn30Pb1	2.10
9	Serclip	X35CrMo17	0.24
Total			7.46

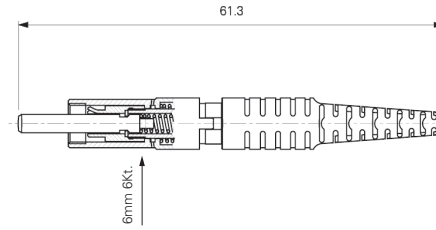
NOTE Other adapters are available, with square flange or not un-mountable. Please inquire for more information.

AVIM™ CONNECTOR AND DIMENSIONS

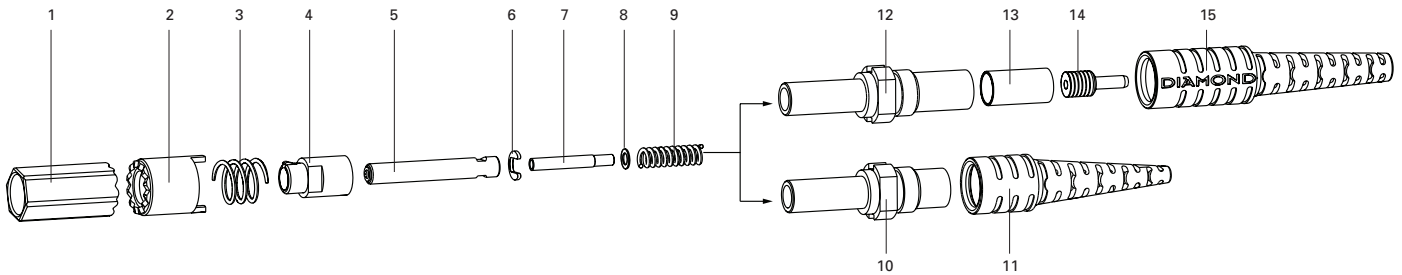
Connectors for 900µm - 3mm, straight boot style

Available types: **AVIM™ (PC, APC, PM, PS)**

Ferrule material: Zirconia/metal insert, custom upon request



BILL OF MATERIAL - BOM



POS.	DESCRIPTION	MATERIAL	UNIT MASS (g)
1	Hexagonal ring	CuNi12Zn30Pb hard	1.09
2	Antirotation ring	CuNi12Zn30Pb	0.77
3	Anti-rotation spring	1.4310	0.13
4	Body Keyed nose	X10CrNiS189	0.48
5	Ferrule	ZrO2, titanium	0.27
6	Ferrule anti-rotation std	1.4301	0.01
7	Ferrule back tube	CuZn37	0.06
8	Ferrule ring for PM	CuZn37	0.01
9	Ferrule spring	X12CrNi177	0.10
10	Short Main body	CuNi12Zn30Pb hard	2.17
11	Boot	Hytrel 8068 ¹	0.34
12	Long main body	CuNi12Zn30Pb hard	1.48
13	Crimp ring (only with long main body)	Cu-5um Ni	0.77
14	Reductiononly (with long main body)	CuZn39Pb3	0.16
15	Long boot	Hytrel 8068 1	0.55
16	Protection cap (not displayed)	DIN 1.4310 or PPO Noryl V150	
Total			8.39

¹ Vacuum bake is 24h at 10-2 Torr and between 110°C to 125°C to 125°C

ORDER INFORMATION

Please refer to the part numbers provided in the separate P/N list.

For assemblies or other configurations, please contact your nearest local Diamond representative or fill in the contact form available on the www.diamond-fo.com website.

DIAMOND

Fiber Optic Components

CABLE ASSEMBLIES AND ADAPTERS

The Midi AVIM™ connector has been developed following the AVIM™ and Mini AVIM™ market feedback. It is smaller and lighter than the AVIM™ connector and easier to manipulate than the Mini AVIM™ thanks to its compatibility with re-enforced cable.

The AVIM™ antirotation system and the base construction of Diamond Micro Interface (DMI) connector are the design base of the Midi AVIM™.

STANDARDS

- ▶ IEC 61755-3, -4 Titanium – Ceramic PC and APC composite ferrule
- ▶ Diamond Mini AVIM™ mating adapter

BENEFITS

Compact, small and lightweight

- ▶ Low loss due to Diamond Active Core Alignment
- ▶ High return loss due to Diamond polishing technique
- ▶ Miniaturized MIL-style ratchet system with vibration/shock tolerance to 35 grms
- ▶ Titanium – ZrO₂ material for ultra low CTE mismatch
- ▶ 100% compatible with Mini AVIM™ mating adapters

AVAILABLE AS

Compact, small and lightweight

- ▶ Terminated connector
- ▶ Connector set (To be terminated with Diamond special equipment for AVIM™ connectors)
- ▶ PM technology terminated connector
- ▶ PS technology terminated connector
- ▶ Multi-fiber custom connector set and assembled terminations
- ▶ Mating adapters
- ▶ Commercial “First Class” or Enhanced grade
- ▶ Flight Model Lot Screening and Lot Acceptance Test upon requests

Midi AVIM™

SINGLE MODE PC/APC
MULTIMODE PC
PM PC/APC



SPECIFICATIONS

Midi AVIM™™ - TECHNICAL CHARACTERISTICS			
COMMERCIAL GRADE - QTR114			
Mechanical Performances		Δ IL value	Standards
Mating durability	500	$\leq 0.2\text{dB}$	IEC 61300-2-2
Shock	100g, 2ms duration, halfsine shock, 3 in each direction and each axis	$\leq 0.2\text{dB}$ $\leq 0.3\text{dB}$ transient	IEC 60068-2-27
Vibration Sinusoidal	10-2000Hz, 10g above 81.4Hz, 1oct/min, 3h50/axis, 15 cycles	$\leq 0.2\text{dB}$	IEC 60068-2-1
Vibration Random	20-2000Hz, 2.2g2/Hz, +6dB/oct below 100Hz, -5dB/oct higher 300Hz, 35grms total, 7.5min/axis	$\leq 0.2\text{dB}$ $\leq 0.3\text{dB}$ transient	IEC 60068-2-64
Environment Characteristics			
Operation Temperature	-40° to +85° C, 1° C/min, 1h dwell, 12 cycles	$\leq 0.2\text{dB}$	IEC 61300-2-2
Temperature Storage/Dry heat	96h, +85° c	$\leq 0.2\text{dB}$	IEC 61300-2-18
Cold	96h, -40° c	$\leq 0.2\text{dB}$	IEC 61300-2-17
Damp Heat cycling	+25°C to +55° C, 95% r.h., 6 cycles, 144h	$\leq 0.2\text{dB}$	IEC 61300-2-46
Optical Characteristics			
Insertion Loss, IL	0.25dB typical, 0.5dB max		IEC 61300-3-34 method B
Return Loss, RL	PC >40dB; APC >75dB		IEC 61300-3-6 method OLCR
Extinction Ratio, ER	ER>23dB, ER typical 28dB		Diamond method Similar to IEC 61300-3-4
Cable related Characteristics	Homologated cables		
Torsion	15N, 25 cycles $\pm 180^\circ$	$\leq 0.2\text{dB}$	IEC 61300-2-5
Static side load	1N, 90°, 60min	$\leq 0.2\text{dB}$	IEC 61300-2-42
Cable retention	70N, 2min	$\leq 0.2\text{dB}$	IEC 61300-2-4

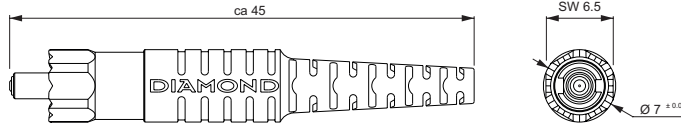
NOTE 1. Value based on Fujikura SM15-PS-U25D or Corning PM15-U25D and Corning 2mm cable.

Midi AVIM™ CONNECTOR TYPES AND DIMENSIONS

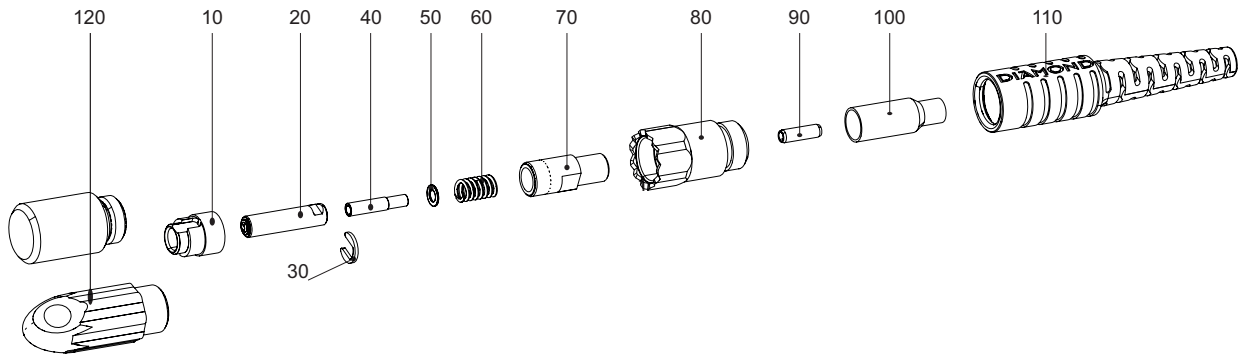
Connectors for 900um buffer coatings (or loose tube) with vacuum baked anti-flexion

Available types: **Midi AVIM™ (PC, APC, PM)**

Material: According to part list



BILL OF MATERIAL - BOM



POS.	DESCRIPTION	MATERIAL	UNIT MASS (g)
10	Orientation ring	Ti6Al4V or DIN 3.7165	0.17
20	Ferrule	ZrO2 . -Ti gr 1	0.23
30	Orientation washer	AISI304 - DIN 1.4301	0.02
40	Ferrule tube	CuZn37	0.09
50	Washer	CuZn37	0.01
60	Ferrule spring	AISI301 - DIN 1.4310	0.05
70	Body	Ti6Al4V or DIN 3.7165	0.25
80	Locking nut	Ti6Al4V or DIN 3.7165	0.70
90	Crimping tube	CuZn39Pb3	0.02
100	?	?	0.28
110	Antiflexion boot	Hytrel® 8068 vacuum baked	0.83
120	Protection cap	PPO black Noryl V0150B	n.a.
	Protection cap metal	X10CrNiS189	n.a.
		Total	2.65

¹Vacuum baked is 144h at 110°C to 125°C to 125°C and 10⁻³ Torr

NOTE Diamond’s standard boot colors are as follows: Black for MM and SM PC, and green for SM APC.

ORDER INFORMATION

When ordering pigtails or cable assemblies, please refer to the **connector type description** in the Available types section.

DIAMOND

Fiber Optic Components

CABLE ASSEMBLIES AND ADAPTERS

The Mini AVIM™ is a Diamond development for Exomars rover originally and has been standardized under ESCC 3420/001 Detail specification. Some variants of that specifications have been qualified under ESCC and can be found in the ESCC QPL site on escies.org.

The Mini AVIM™ connector has been developed after market request of a smaller and lighter version of our acclaimed AVIM™ connector for harsh environment, especially space applications.

The Mini AVIM™ combines two leading edge technologies: the AVIM™ MIL-style ratchet system and the base construction of Diamond Micro Interface (DMI) connector.

Commercial Off-The-Shelf (COTS) availability and economy backed by component availability from stock and quick turnaround of terminations and assemblies.

The Mini AVIM™ is aligned precisely in rotation and therefore it can be used for both standard SM and MM fibers, as well as for PM technologies and multi-fiber ferrules or multi-core fibers.

Our Power Solution (PS) technology can also be applied to this connector lower the power density with a GRIN lens to improve resistance to power failure.

Harsh environment applications will range from Space to underwater, applying to mobile, avionics, shipboard, oil downhole, etc.

FEATURES

- ▶ Compact, small and lightweight
- ▶ Low loss thanks to Diamond Active Core Alignment (A.C.A.)
- ▶ High return loss thanks to Diamond polishing technique and A.C.A.
- ▶ Miniaturized MIL-style ratchet system with high vibration/shock resistance
- ▶ All Titanium – ZrO2 material for ultra low CTE mismatch

STANDARDS

- ▶ ESCC 3420/001 Mini AVIM™ Detail specification

The Mini AVIM™ has been successfully submitted to evaluation tests according to ESCC 2263420 and qualified according to ESCC standards for the Space Grade and against IEC 61753-2-1 cat. U. for the Commercial Grade.

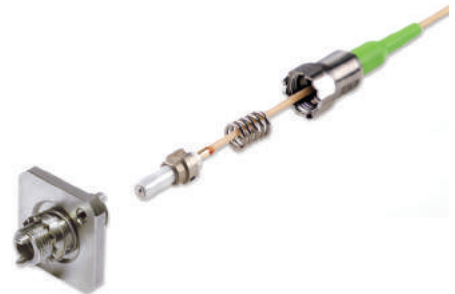
- ▶ ESCC standards can be found at <https://escies.org>

AVAILABLE AS

- ▶ Terminated connector (commercial, space grade and space qualified)
- ▶ Multi-fiber custom connector set and assembled terminations
- ▶ Mating adapters (commercial, space qualified)

Mini AVIM™

SINGLE MODE	PC/APC
MULTIMODE	PC
PM	PC/APC
PS	APC4°



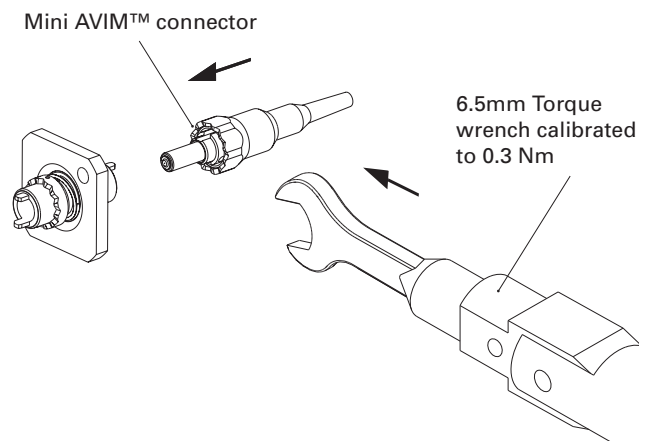
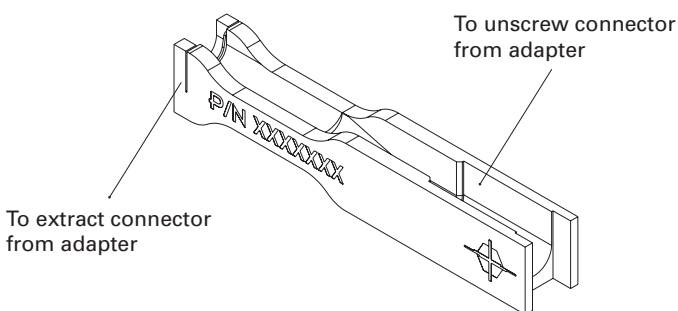
SPECIFICATIONS

Mini AVIM™ - TECHNICAL CHARACTERISTICS						
	COMMERCIAL GRADE - QTR040			SPACE GRADE - QTR065		
Mechanical Performances		IL value using ITU G.652C	Standards		IL value using PM 1550nm	Standards
Mating durability	500	≤ 0.2dB	IEC 61300-2-2	100	≤ 0.4dB	IEC 61300-2-2
Shock	n.a.			500 g, 2ms	≤ 0.4dB	IEC 60068-2-27
Vibration	1oct/min, 20g@60Hz-2kHz	≤ 0.2dB	IEC 61300-2-1 sinus	35gRMS, 20Hz-2kHz, 7.5min/axis	≤ 0.4dB	IEC 60068-2-64
Environment Characteristics						
Operation Temperature	-40°C to +85°C, 1°C/min, 1h dwell, 12 cycles	≤ 0.2dB	IEC 61300-2-22	-55°C to +85°C, 1°C/min, 1h dwell, 100 cycles	≤ 0.4dB	IEC 61300-2-22
Temperature Storage/ Dry heat	96h, +85°C	≤ 0.2dB	IEC 61300-2-18	1000h, +85°C	≤ 0.4dB	IEC 61300-2-18
Cold	96h, -40°C	≤ 0.2dB	IEC 61300-2-17			
Damp Heat cycling	+25°C to +55°C, 95% r.h., 6 cycles, 144h	≤ 0.2dB	IEC 61300-2-46	+25°C to +55°C, 95% r.h., 6 cycles, 144h	≤ 0.4dB	IEC 61300-2-46
Low pressure	n.a.			4*10-8 Torr, ambient, 8h	≤ 0.4dB	IEC 60068-2-13
Dust	n.a.			1h at +30°C, 1h at +65°, <30%r.h. Red China clay, 6g/m3, 8.9m/s	≤ 0.4dB	IEC 61300-2-27
Salt mist	n.a.			+35°C 85% r.h., 5% salt, 96h	≤ 0.4dB	IEC 60068-2-11
Rapid Depressurisation	n.a.			atm to 50mbar in 5s, 5 cycles	≤ 0.4dB	MIL-STD.810G, met. 500.5
Optical Characteristics**						
Insertion Loss, IL	0.15dB typical, 0.4max		IEC 61300-3-4 method B	0.25dB typical, 0.5dB max		IEC 61300-3-6 met B.
Return Loss, RL	PC >40dB; APC >75dB		IEC 61300-3-6 method OLCR	PC >40dB; APC >75dB		IEC 61300-3-4 met OLCR
Extinction Ratio, ER	ER >23dB, ER typical 28dB		Similar to IEC 61300-3-40	ER >23dB, ER typical 25dB		Similar to IEC 61300-3-40
Radiation	n.a.			>1Mrad, ca. 8krad/h, ambient temp and humidity		ESCC229000
Cable related Characteristics	Homologated cables			Homologated cables		
Torsion	2N, 25 cycles 180°	≤ 0.2dB	IEC 61300-2-5	3N, 25 cycles 180°	≤ 0.4dB	IEC 61300-2-5
Static side load	0.2N, 90°, 5min	≤ 0.2dB	IEC 61300-2-42	0.2N, 90°, 60min	≤ 0.4dB	IEC 61300-2-42
Fiber Retention	5N, 1min	≤ 0.2dB	IEC 61300-2-4	5N, 2min	≤ 0.4dB	IEC 61300-2-4
Bending moment	10N, l=25mm	≤ 0.2dB	IEC 61300-2-7			

* with Fujikura PM1500nm Panda

** vary with fiber type

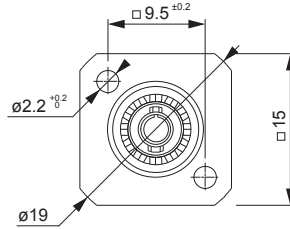
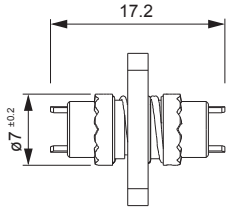
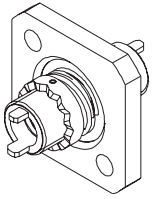
MINI AVIM™ UN-MOUNTING TOOL



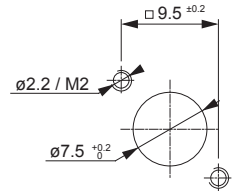
MINI AVIM™™ ADAPTER AND DIMENSIONS

Available types: Square flange adapter for wall mount

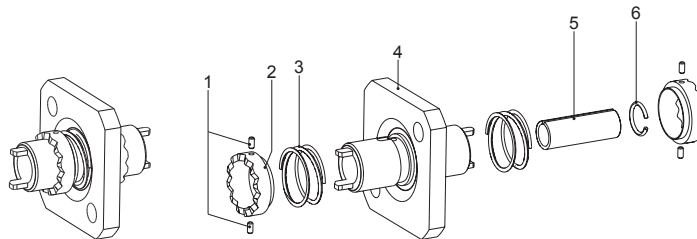
Material: According to part list



CUTOUT DIMENSIONS



BILL OF MATERIAL - BOM



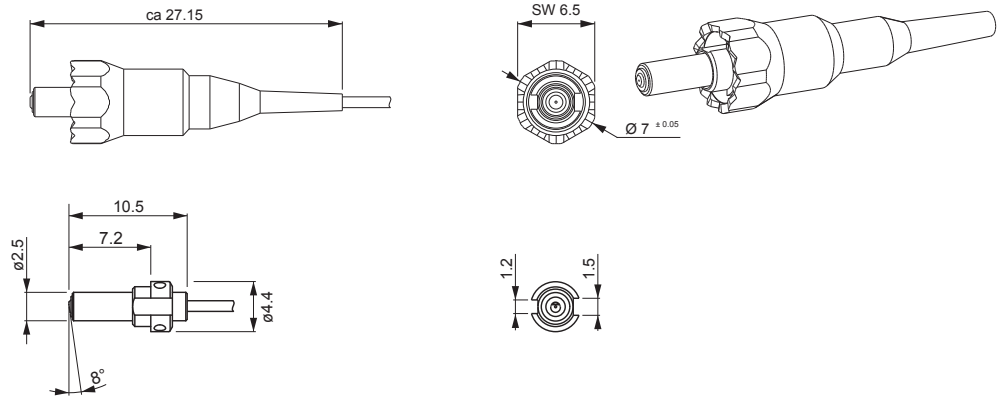
POS.	DESCRIPTION	MATERIAL	WEIGHT (gr.)
1	Pin for Anti-rotation ring (4x)	Ti6AL4V	0.01
2	Anti-rotation ring (2x)	Ti6Al4V	0.20
3	Anti-rotation spring (2x)	AISI 316 or DIN 1.4401	0.14
4	Main body	Ti6Al4V	2.12
5	Split sleeve	ZrO2	0.16
6	Clip for split sleeve	AISI 301 or DIN 1.4310	0.01
Total			2.64

Mini AVIM™ CONNECTOR DIMENSIONS

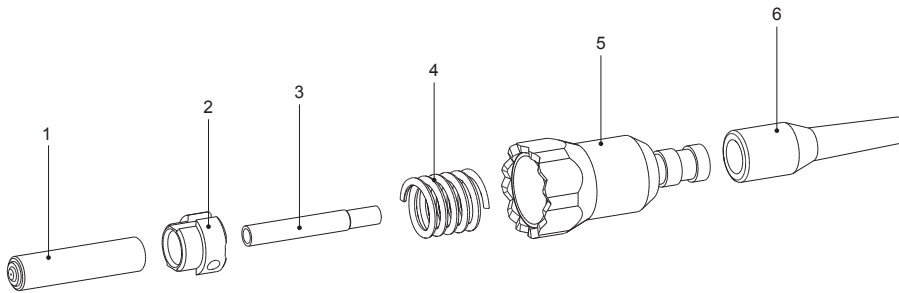
Connectors for 900um buffer coatings (or loose tube) up to 1.2mm cable

Available types: **Mini AVIM™ (PC, APC, PM, PS)**

Material: According to part list



BILL OF MATERIAL - BOM



POS.	DESCRIPTION	MATERIAL		UNIT MASS (g)
		NAME	NORMS	
1	Ferrule	Ceramic-Titanium	ZrO ₂ , Ti gr 1	0.21
2	DMI ring	Titanium	Ti6Al4V	0.09
3	Ferrule back tube	Brass	CuZn39Pb3	0.03
4	Spring	Stainless steel	AISI 304 or DIN 1.4301	0.11
5	Outside shell	Titanium	Ti6Al4V	0.52
6	Vacuum backed boot	Thermoplastic Elastomer TCP-ET	Hytrel 8068 ¹	0.08
Total				1.06

¹ Vacuum baked, 144h at 110°C to 125°C and 10⁻² Torr

NOTE Diamond's standard **boot** colors are as follows: Black for MM and SM PC, and green for SM APC.

ORDER INFORMATION

Please refer to the part numbers provided in the separate P/N list.

For assemblies or other configurations, please contact your nearest local Diamond representative or fill in the contact form available on the www.diamond-fo.com website.

DIAMOND

Fiber Optic Components

CABLE ASSEMBLIES AND ADAPTERS

In order to ensure the highest technical performance and to provide an optimum solution for high density packaging, DIAMOND has developed the Diamond Micro AVIM™ based on the DMI, but with titanium components. The Micro AVIM™ is identical to the Mini AVIM™ in terms of termini, but use different locking mechanism.

Thanks to its minimal space requirement, this system is an ideal solution for Printed Circuit Board (PCB) applications as well as a high quality interface between active and passive components of fiber optic installations. As such it has been used to replace splices, in some applications, improving the modularity at a low height budget impact.

Micro AVIM™ connectors are based on standard $\varnothing 2.5$ mm ferrules and are designed to operate with multimode and single mode fibers, 0° PC as well as 8° APC polished.

FEATURES AND BENEFITS

- ▶ Minimum space requirement (footprint of 4.5 x 21 mm)
- ▶ Consistent high performance solution
- ▶ Available in PC, APC and PM termination
- ▶ Available in PS on custom request due to laser safety issues
- ▶ Standard active fiber core aligned DIAMOND $\varnothing 2.5$ mm ferrule
- ▶ Easy installation by use of standard clip-on system.
- ▶ DMI assembly tool is available.

AVAILABLE AS

- ▶ Terminated connector

SPECIFICATIONS

STANDARD	MULTIMODE 0° PC	SINGLE MODE 0° PC	SINGLE MODE 8° APC	UNITS	TEST CONDITIONS
Insertion Loss (IL) Random	typ. 0.2 max. 0.4	typ. 0.15 max. 0.4	typ. 0.15 max. 0.4	dB	IEC 61300-3-4; $\lambda = 1300/1550\text{nm}$
Return Loss (RL)	min. 40	min. 50	min. 70*	dB	IEC 61300-3-6; $\lambda = 1300/1550\text{nm}$
Low IL Version					
Insertion Loss (IL) Random	-	typ. 0.1 max. 0.25	typ. 0.1 max. 0.25	dB	IEC 61300-3-4; $\lambda = 1300/1550\text{nm}$
Return Loss (RL)	-	min. 50	min. 75*	dB	IEC 61300-3-6; $\lambda = 1300/1550\text{nm}$
Repeatability of IL	max. ± 0.05			dB	IEC 61300-2-2; $\lambda = 1300/1550\text{nm}$
Service life	500 mate/demate cycles				
Operating temperature	-40/+85**			°C	

* Measured with high precision reflectometer
 ** May be further limited by fiber specifications

Micro AVIM™

SINGLE MODE PC/APC
 MULTIMODE PC
 PM PC/APC
 PS APC4°



Micro AVIM™ components



Micro AVIM™ assembled



CONNECTOR TYPES AND DIMENSIONS

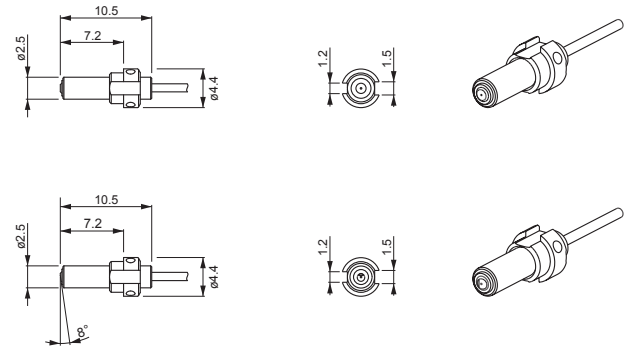
Micro AVIM™ connectors on 900 μm fiber, without boot

Available types: **Micro AVIM™ - PC**
Micro AVIM™ - APC

Ferrule material: Zirconia/Ti gr 1

External parts: Ti6Al4V

Mass: 0.33 gr



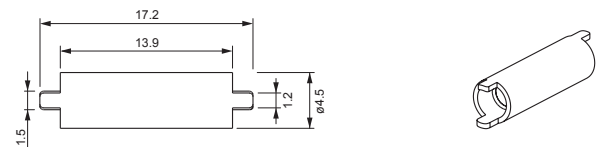
ADAPTER TYPES AND DIMENSIONS

Micro AVIM™ mating adapters

External parts: Ti6Al4V

Mating sleeve: Zirconia

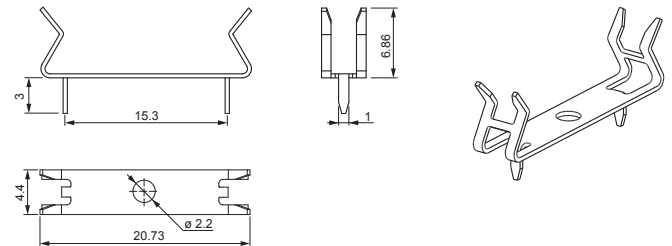
Mass: 0.6 gr



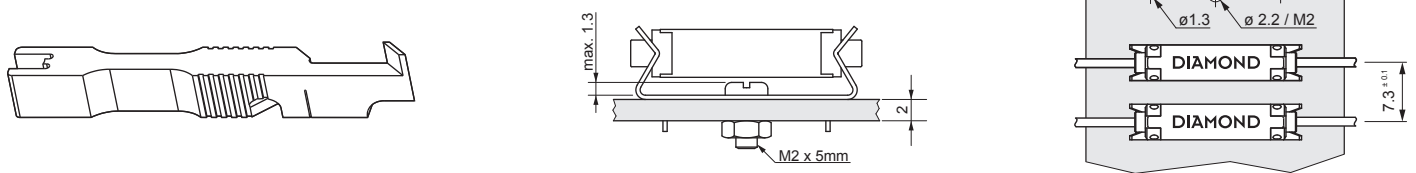
Micro AVIM™ mating adapters clip

External parts: Metal (Cu Be₂; tinned solderable)

Mass: 0.36 gr



Mounting tool and instructions:



For further information about mounting instructions, please refer to the Micro AVIM™ Part number list.

ORDER INFORMATION

Please refer to the part numbers provided in the separate P/N list.

For assemblies or other configurations, please contact your nearest local Diamond representative or fill in the contact form available on the www.diamond-fo.com website.

DIAMOND Fiber Optic Equipment

INSPECTION EQUIPMENT

DESCRIPTION

Contamination is the first reason for troubleshooting optical networks. Proactive inspection and cleaning of fiber connectors can prevent poor signal performance, damage to equipment, and network downtime. DIAMOND's Video Microscope Kit contains all necessary tools for proper inspection and cleaning of the connector's front-faces to help ensure optimal connector performance. The Video Microscope meets today's requirements for safety, reliability and quality, and is the first handheld easy-to-use field inspection tool and optical power measurement (OPM) into one solution.

The microscope also saves test results and generate certification reports as document work quality, this will optimize the technicians efficiency so that they can complete a right job already at the first time.

The Microscope offers an high resolution 3.5 inch color LCD video display, integrated end-face illumination for inspection of 2.5 mm or 1.25 mm (PC and APC) ferrules, for both, unmated connector, and in-adapter connectors with the inspection probe.

The inspection probe can also be used as stand-alone device and be directly connected via USB to laptops or PCs, without the need for an external power supply.

FEATURES AND BENEFITS

- ▶ Integrates fiber inspection and optical power measurement (OPM) into one solution.
 - OPM with multiple calibrated wavelengths from 780 to 1625 nm.
 - Generates certification reports to prove that work quality meets industry standards and customers specifications
- ▶ User can easily manage specific pass/fail acceptance criteria with dedicated profiles for each requirement.
- ▶ Onboard storage results. (up to 10'000 measurements).
- ▶ Connectable to a PC via mini-USB, to export data and manage acceptance criteria using FiberChekPRO software.
- ▶ Automatic fiber-image centering.
- ▶ Two USB ports to connect additional devices such as the inspection probe.
- ▶ Intuitive Smartphone-style user interface with touch screen.
- ▶ Rugged, weather-proof design.
- ▶ Inspection probe with:
 - *FiberChekPRO™ software for analysis and reporting with laptops/PCs*
 - *Dual magnification (200X and 400X)*
 - *Adapters for checking unmated connectors as well as in-adapter connectors*
 - *Automatic image centering ensures the fiber always appears in the center of the screen*
 - *Magnification toggle button allows easy switching in both live and analysis views*

AVAILABLE KITS

- 1) Complete inspection set, cleaning kit, inspection probe, hard case including universal adapter 1.25mm and 2.5mm for free PC connectors, and SC, LC (PC) adapter tips for in-adapter inspection.
- 2) Inspection probe including SC, LC (PC) tips for in-adapter inspection, universal 1.25mm + 2.5mm (PC) for free connector and soft padded pouch.

Video Microscope Kit



Video Microscope with inspection probe



1) P/N 1081582






2) P/N 1801581




INSPECTION EQUIPMENT


DIAMOND Video Inspection Microscope Kit		
P.N	Description	
GY 1081582	Complete inspection and cleaning kit: - OLP-82P microscope with built-in Powermeter - P5000i digital inspection probe with SC, LC (PC) tips for in-adapter inspection - universal adapter 1.25mm and 2.5mm for free PC connectors, and .	
Delivery list - 1081582		
GY AUR	Hard case: 400 x 320 x 200 mm; (15.7 x 12.6 x 7.8 inches)	
GY AUR	OLP-82P microscope with built-in Powermeter - P5000i digital inspection probe, including SC, LC (PC) tips for in-adapter inspection. - Universal adapter 1.25mm and 2.5mm for inspecting free PC connectors. - Universal adapter 1.25mm and 2.5mm for powermeter - Power source AC - Battery pack (rechargeable Li ion) - Battery holder 8x for AA batteries (not rechargeable)	
GY 1038981	CLETOP esay clean cassette Type B	
GY 1065369	CleTOP cleaning sticks L=150mm ø2.5 5pcs	
GY 1020857	CleTOP cleaning sticks L=150mm ø1.25 5pcs	
GY 1070135	Alcohol dispenser 150ml without alcohol	
GY 1070137	Spender box with fibre optic lint-free wipes 10x10 cm 100 pcs.	
GY 1048757	Empty sectioned plastic box 17X12X3.5 cm	
AUR	World adapter	
GY 1019034	Service Adapter E-2000™	
GY 1019483	Service Adapter F-3000™	
GY 1031687	E-2000 body for cleaning the mating adapter	
GY 1066909	F-3000 body for cleaning the mating adapter	

INSPECTION EQUIPMENT

Optional tips for P5000i Digital inspection probe		
P.N	Description	
GY 1079313	Mini AVIM PC for in-adapter	
GY 1079317	Mini AVIM APC for in-adapter	
GY 1080864	Set for Avim in-adapter APC/PC inspection. (bulkhead) Barell & adapter	






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Consumables		
P.N	Description	
GY 1038970	Replacement reel for Cletop Cassette Cleaner Type B	
GY 1030609	Seikoh Giken Ferrule cleaner 2.5 mm	
BDA 1065369	Cletop cleaning sticks L=150mm ø2.5 5pcs	

P5000i Digital inspection probe (in-adapter inspection)		
P.N	Description	
GY 1074601	P5000i Digital inspection probe, including SC, LC (PC) tips for in-adapter inspection, universal 1.25mm + 2.5mm (PC) for free connector inspection and soft padded pouch. Laptop excluded.	

Optional tips for P5000i Digital inspection probe (Tips not listed upon request)













P.N	Description	
GY In progress	HE-2000™ PC Bulkhead adapter	
GY 1083457	HE-2000™ APC & PS Bulkhead adapter	
GY 1078533	E-2000™ for in-adapter HE-2000™ connector only MIL-38999 DM APC/PC/4° connector+bulk-head MIL83526 DM APC/PC/4° connector+bulk-head Including "Reduced cap fitting for DM insert adapter tip" (PN:000-004-108C000)	
GY 1074602	F-3000™ PC for in-adapter	
GY 1073321	E-2000™ APC/PC/4° for in-adapter	
GY 1074608	F-3000 APC for in-adapter	
GY 1074605	FC PC for in-adapter	
GY 1074603	FC APC for in-adapter	
GY 1074606	SC PC for in-adapter	
GY 1074607	SC APC for in-adapter	
GY 1074604	ST PC for in-adapter	
GY 1079313	Mini AVIM PC for in-adapter	
GY 1079317	Mini AVIM APC for in-adapter	
GY 1079315	Mini AVIM ferrule cleaner guide for in-adapter cleaning (bulkhead)	
GY 1080864	Set for Avim in-adapter APC/PC inspection. (bulkhead) Barell & adapter	



GY	1083076	Long reach DiaFlex/MPO 8° Includes both X + Y axis panning. (FYI standard version has only X-axis)	
GY	AUR	Long reach DiaFlex/MPO 0° Includes both X + Y axis panning. (FYI standard version has only X-axis)	
GY	1083078	Tip for Long reach DiaFlex/MPO 0°	
GY	1083152	Adapter for inspecting & cleaning DiaFlex	
GY	1074973	Adapter ELIO for ELIO socket inspection (female)	
GY	1074970	1.25mm PC for free connector	
GY	1074972	1.25mm APC for free connector	
GY	1074969	2.5mm PC for free connector	
GY	1074971	2.5mm APC for free connector	

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Optional adapters for video inspection/hand microscope to inspect connectors



P.N	Description		
GY	1074260	F-3000™ Adapter 0° for free simplex/duplex connectors	
GY	000-003-979C	F-3000™ Adapter 4° (PS) for free simplex/duplex connectors	
GY	000-003-974C	F-3000™ Adapter 8° for free simplex/duplex connectors	
GY	1075023	E-2000™ Adapter 0° for free simplex/duplex/Revos connectors	
GY	000-003-845C	E-2000™ Adapter 4° (PS) for free simplex/duplex/Revos connectors	
GY	000-003-837C	E-2000™ Adapter 8° for free simplex/duplex/Revos connectors	
GY	1070129	Ø1.25mm adapter PC for free simplex connectors	
GY	1070134	Ø2.5mm adapter PC for free simplex connectors	
GY	AUR	Ø2.5mm adapter APC for free simplex connectors	
GY	1072305	Ø3.175mm SMA Adapter PC for free simplex connectors	

Assesories		
P.N	Description	
GY 1071628	Visual Fault Locator (ML3) Pen style	
GY 1067799	Adapter 2.5mm --> 1.25mm for Visual Fault Locator	

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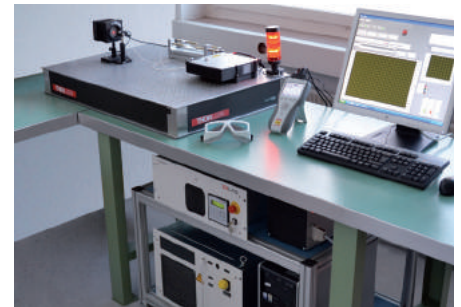
Consumables		
P.N	Description	
GY 1030609	Seikoh Giken Ferrule cleaner 2.5 mm	
GY 1038865	Seikoh Giken Ferrule cleaner 1.25 mm	
GY 1070125	Standard IBC-M250 for in adapter cleaning 2.5mm PC/APC	
GY 1080656	Special IBC-M250 for in adapter cleaning 2.5mm PC/APC + DM insert	
GY 1083813	DiaFlex/MPO Ferrule cleaner "IBC"	
GY 1070131	IBC-1.25 for in adapter cleaning (1.25mm PC/APC)	
GY 1083404	Stopper for 1.25 IBC cleaner (1070131) to clean in-adapter DiaLink male	
GY 1070130	Fibre optic lint-free wipes to refill spender box 100pcs.	
GY 1038970	Replacement reel for Cletop Cassette Cleaner Type B	
GY 1073654	Sticklers™ cleaner. The product fulfils flight regulations (non-flammable).	
GY 1074474	30ml sealed isopropyl alcohol. (The product fulfils flight regulations. It can be transported by plane)	

ACCREDITED LABORATORY

For opto-mechanical product tests, quality control and qualifications Diamond relies since 2002 upon an internal, fully independent, test laboratory qualified by the Swiss Accreditation Service SAS. The laboratory has a STS 333 accreditation for fiber-optic component testing as well as a SCS 101 accreditation for the calibration of fiber-optic measurement instruments according to ISO/IEC 17025 :2005.

The laboratory is equipped to perform a wide variety of tests both on the optical or mechanical product performance under different environmental conditions according to IEC, ISO, Telcordia, or MIL standard requirements. Additional characterization procedures that have not yet been standardized are also possible, particularly in relation to the use of high-power lasers.

These testing services are also available to customers.



ISO 7 CLEANROOM

For particularly demanding markets such as the medical, the space, life sciences industry sectors, Diamond offers a dedicated controlled environment where to perform part of the product processing. In an ISO 7 cleanroom (class 10'000 according to FED STD 1209E) products can be cleaned, dried, inspected, and packaged before delivery. Specific custom procedures may be implemented upon request.

Cleanroom main characteristics:

- ▶ **Class:** ISO 7 (norm DIN EN ISO 14644-1)
- ▶ **Filters:** 3 ULPA U15 filters
- ▶ **ESD-compliant:** Yes
- ▶ **Surface:** 40 m2



PRODUCTS ORDERING

Please use the following configurator for the assembled connectors. If you would like to connectorize a module, please use the configuration of a pigtail with sida A only and do this for each connector you need on your module. Please provide detailed module description with your request.

For ESCC 3420/001 products (Mini AVIM™), please use the ESCC product numbering for your request.

Examples:

AVIM™-02-PK-dA08PP-mA04PH-2000 Fiber Fujikura SM15-PS-U40A

Hybrid Patchcord PM L=2m, PEEK loose tube, 1x Midi AVIM™ PM APC 8°, 1x Mini AVIM™ PM-PS APC 4°.

FAMILY	FIBER	CABLE	SIDE A			SIDE B			LENGTH
			CONNECTOR	POLISHING	FUNCTION	CONNECTOR	POLISHING	FUNCTION	
AVIM™	FI	C	CO	PP	FU	CO	PP	FU	LLLL

FIBER	Code	Description
	01	Homologated SM fiber (separate list)
	02	Homologated PM fiber (separate list)
FI	03	Homologated MM fiber (separate list)
	XX	Various

CABLE	Code	Description
	BA	No cable, bare fiber
	PK	PEEK 1mm loose tube
C	EH	Elastomeric loose tube
	C1	Cable loose tube 3mm (AVIM™ only)
	C2	Cable loose tube 2.1mm (AVIM™ and Midi-
	A1	Armored 2.9mm stainless cable (AVIM™ only)
	SS	Short section of loose tube (pigtails only, specify length from ferrule and loose tube)
	XX	Various

CONNECTOR	Code	Description
	AA	AVIM™
	dA	Midi AVIM™
CO	mA	Mini AVIM™
	uA	Micro AVIM™
	FS	Ferrule 2.5x10.5mm ZrO2-Ti
	FL	Ferrule 2.5x17.5mm ZrO2-Ti
	CC	Commercial connector (E-2000™, FC narrow or wide key,...)
	XX	No connector

POLISHING	Code	Description
	00	PC, contact 0° according to IEC 61300-3-47
	08	APC, contact 8° according to IEC 61300-3-47
PP	04	APC, contact 4° according to Diamond Standard for PS
	0F	PC, flat polish 0° for non contact
	8F	APC, flat polish 8° for non contact
	XX	Various

FUNCTION	Code	Description
	PP	PM Active orientation on slow axis
	PH	PM-PS Active orientation on slow axis, beam expanded, collimated
FU	SS	SM
	PS	PS beam expanded, collimated
	XX	Various

LENGTH	Code	Description
	0200-0499	Tolerance ±50mm, length minimum is 200mm
	0500-0999	Tolerance ±100mm
LLLL	1000-6000	Tolerance ±150mm

NOTE - By homologation we intend that the assemblies can be produced with a known process without further development.
 - Please request an updated list of homologated fibers and cables

PRODUCTS PART NUMBER

Mating-Adapters

DESCRIPTION	ORDER NUMBER
Mini AVIM™ mating adapter square Flange CG	1058232
AVIM™ mating adapter hex flange NS CG	1028003
AVIM™ mating adapter square flange NS CG	1073322
Micro AVIM™ mating adapter	1023245
Micro AVIM™ mating adapter clip	1009209

Hybrid Mating-Adapters

DESCRIPTION	ORDER NUMBER
Mini AVIM™ - LSA/AVIM™	1064074
Mini AVIM™ - FC NS	1082140
Mini AVIM™ - Micro AVIM™/DMI	1065927
LSA/AVIM™ - FC wk (key 2.14 mm)	1018449
LSA/AVIM™ - FC nk (key 2.00 mm)	1024895
LSA/AVIM™ - ST™	1018448
LSA/AVIM™ - SC SM APC	1018490
LSA / E-2000™ SM APC	1018934
LSA/AVIM™ - F-3000™ (LC) SM APC	1018818

MAS Adapter System

DESCRIPTION	ORDER NUMBER
Mini-AVIM™ Universal Flange	1059841
MAS adapter E-2000™	1023701
MAS adapter SC	1023681
MAS adapter LSA/AVIM™	1023676
MAS adapter ST™	1018981
MAS adapter F-3000 (LC)	1023682
MAS adapter FC wk (wide key 2.14 mm)	1023677
MAS adapter FC nk (narrow key 2.00 mm)	1023678
FC wk Universal Flange	1022898

IMOD

DESCRIPTION	ORDER NUMBER
IMOD Mini AVIM™ PC, stopper on ceramic CG	1080135
IMOD Mini AVIM™ APC8, stopper on ceramic CG	1080823

Tools

DESCRIPTION	ORDER NUMBER
AVIM™ 6mm torque wrench 0.3Nm for connector	1027834
AVIM™ 8mm torque wrench 1.5Nm for mating adapter	1027835
AVIM™ 11mm torque wrench 1.0Nm for mating adapter coupling nut	1027836
AVIM™ mating adapter holding tool	1030366
Mini AVIM™ torque wrench 0.3Nm	1060037
Mini AVIM™ un-mounting tool	1060258
Micro AVIM™/DMI mounting tool	1032053
Video Inspection microscope kit	1081582