Sintec Optronics

Optical Fiber Instruments

STAR-CMC-1550
Characterisation of Fiber Modal Content

The STAR-CMC-1550 Characterisation of Modal Content uses the spatially and spectrally resolved imaging (S^2) technique to identify the propagation modes of few-mode fibers. It consists of two different unit: a tunable laser and a receiver unit. The STAR-CMC-1550 allows to obtain the Differential Group Delay (DGD) for each propagation mode and the relative intensity, or Multipath Interference (MPI), compared to the most excited mode. Moreover, STAR-CMC-1550 allows to reconstruct the profiles and phases of the guided modes of the fiber under test.

Features & Benefits:

- Measure fibers up to 400 µm in diameter
- Measure hollow and solid core few-mode fibers
- Reconstruction of propagation mode profiles and phase
- Calculate the relative intensity of high order modes compared to the most excited mode
- Calculate the DGD of the propagation modes

Technical Specification

Measurement capability

- Fibre diameter: < 400 µm
- Fiber Length: 5 to 100 m
- Measurement time** : < 90 sec
- Fiber Type: Few-mode solid and hollow core fibres

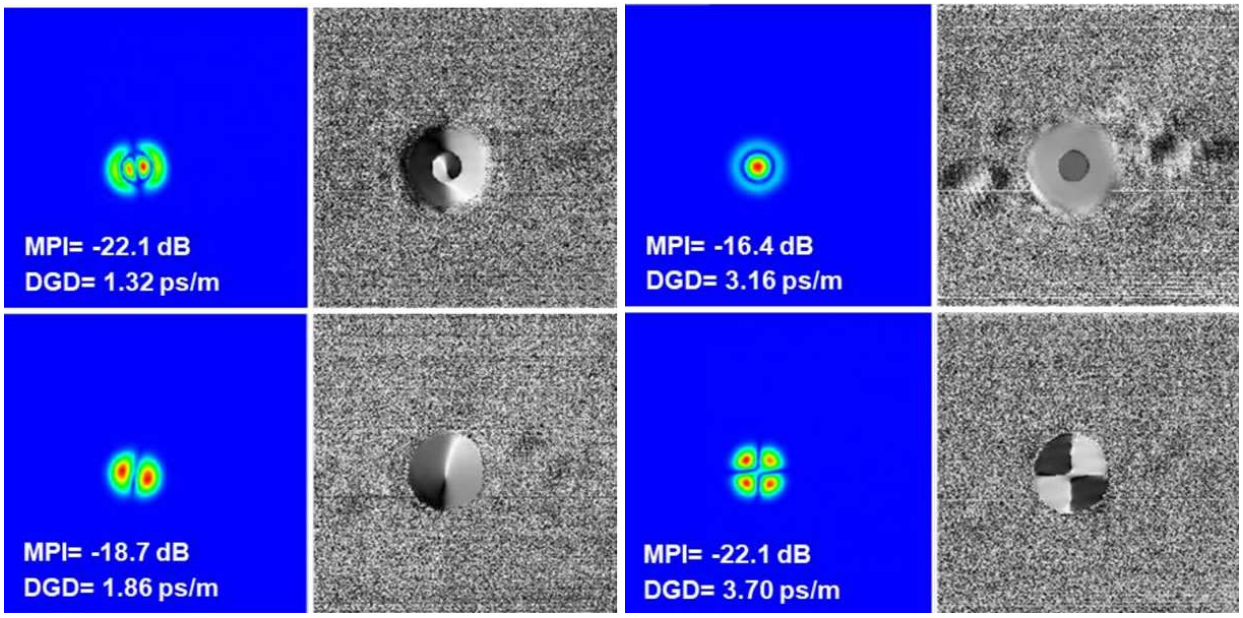
** analysing 2000 images

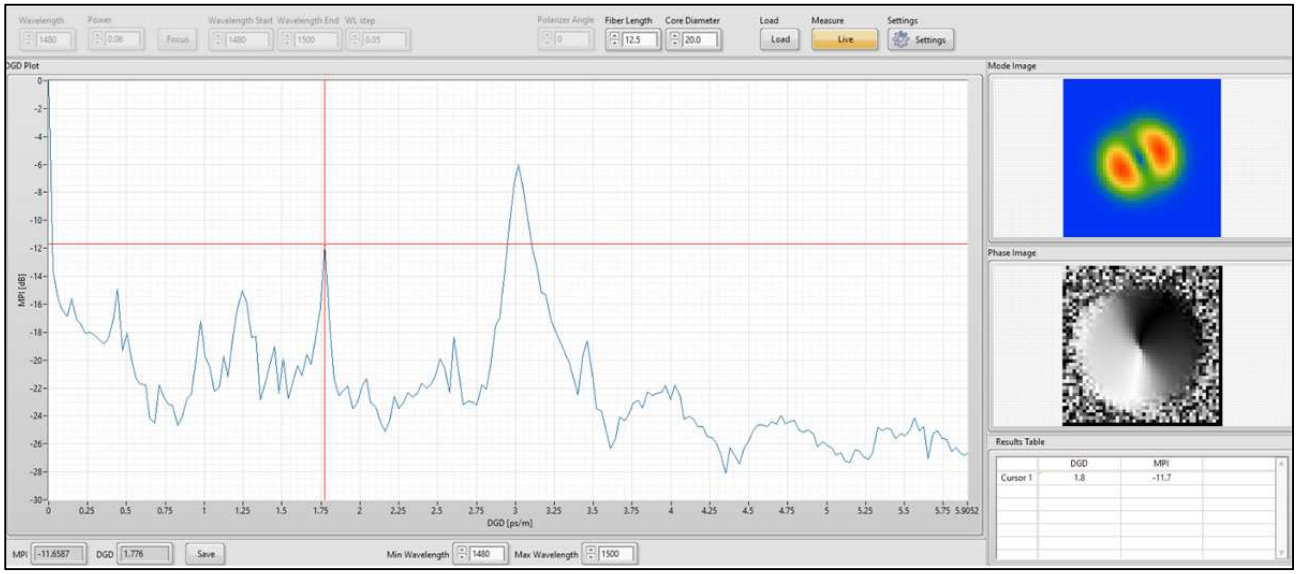
Optical

- Measurement wavelength: 1480 to 1630 nm
- Wavelength resolution: 10 pm
- Max DGD: 365 ps
- DGD resolution: 0.05 ps
- Image sensor: InGaAs 10.8x12.3 mm, 512x640 pixels, 20 µm pixel pitch
- Exposure range: 0.1ms to 20ms exposure time
- A/D conversion: 16 bit

Physical

- Weight: 7kg (Tunable laser); 8kg (Receiver unit)
- Size: 0.22m x 0.385m x 0.131m (Tunable laser); 0.306m x 0.606m x 0.145m (Receiver unit)
- Operating Temp: 15-30 0 C
- Humidity: 5%-95%. Relative, non-condensing
- Computer requirements: All systems are supplied with a computer running up-to-date Windows operating system
- Data interface: 1 X USB 3.0 (USB A to USB B: 1m cable supplied)


MPI= -22.1 dB
DGD= 1.32 ps/m
MPI= -16.4 dB
DGD= 3.16 ps/m
MPI= -18.7 dB
DGD= 1.86 ps/m
MPI= -22.1 dB
DGD= 3.70 ps/m


DGD Plot
Mode Image
Phase Image
Results Table
DGD
MPI
Cursor 1
1.8
-11.7
DGD [ps/m]
MPI [dB]
Save
Min Wavelength
Max Wavelength

STAR-nPA-400 Refractive Index Profiler

Measure refractive index in seconds!

The STAR-nPA-400 is the quick, easy and low-cost way to get the refractive index data you need to verify your standard and specialty fibers.

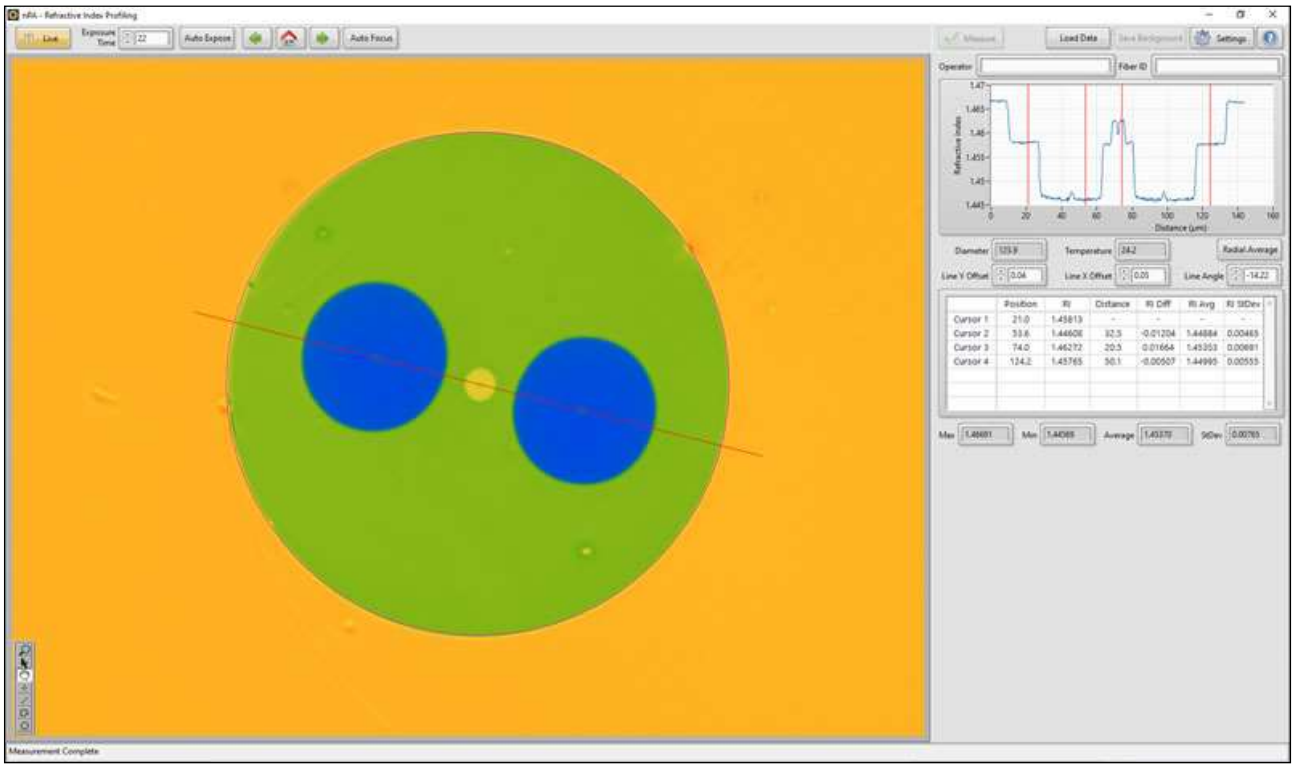
Minimum fiber preparation is required, and the clean, efficient graphical user interface allows the user to fully characterise their fibers, with minimal training or experience. The STAR-nPA-400 provides accurate and repeatable refractive index data, giving valuable information about fiber design and the manufacturing process.

The STAR-nPA-400 Refractive Index Profiler uses a modified refracted nearfield technique to analyse the end-view grey-scale intensity profile of a fiber to determine its full 2D refractive index distribution.

There is no need to rotate the fiber or scan the fiber end face, resulting in a very fast measurement, meaning that the nPA-400 is suitable for production lines, research and development labs, or QA environments.

Features and Benefits

- Measurement in seconds
- Very quick and easy fiber preparation – just cleave and insert the fiber
- Highly user-friendly software
- Measures fibers up to 400 µm in diameter
- Measures non-circularly symmetrical fibers – good for PM; octagonal, multicore
- Traceable calibration


nRA - Refractive Index Profiling
Live
Exposure Time
Auto Expose
Auto Focus
Load Data
Settings
Operator
Fiber ID
Refractive Index
Distance (µm)
Diameter
Temperature
Radial Average
Line Y Offset
Line X Offset
Line Angle
Position
RI
Distance
RI Diff
RI Avg
RI StDev
Cursor 1
Cursor 2
Cursor 3
Cursor 4
Max
Min
Average
StDev
Measurement Complete

Interferometric Inspection System

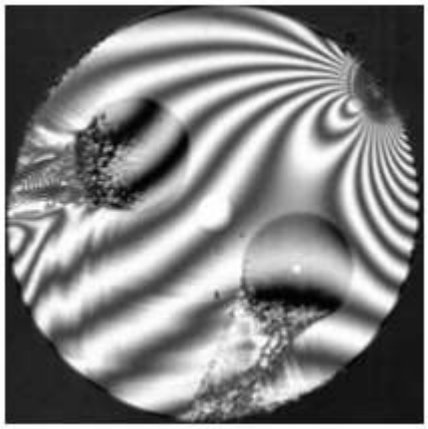
The interferometric inspection system (STAR-VFI-xxxx) specifically designed for checking the surface quality and flatness of your cleaved or polished fibers. The VFI interferometer has proved itself in Research, Production and QA over and over and the feedback we get from users indicates that they value these features:

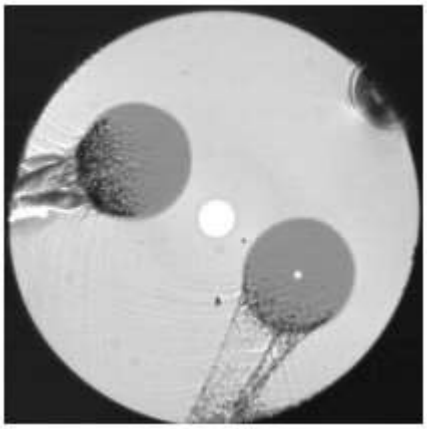
Features & Benefits

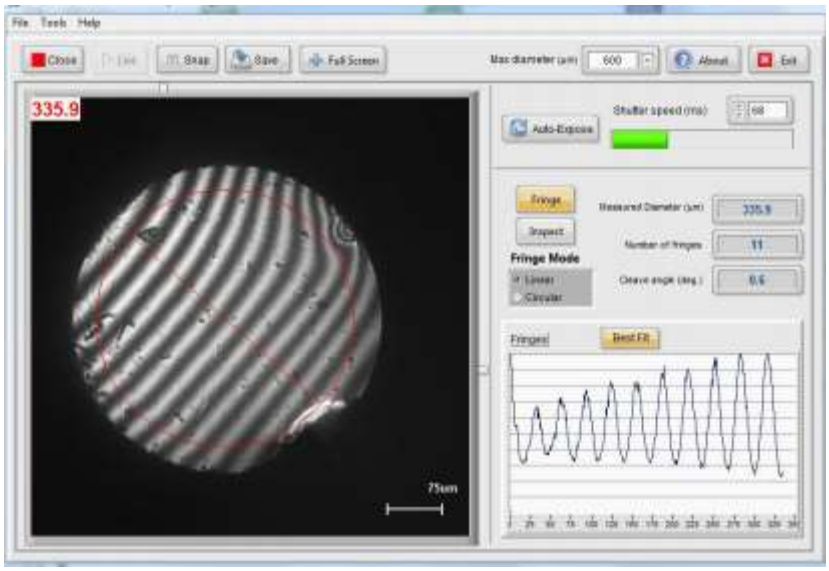
- Accepts 125 to 1200µm fiber diameters
- 5Mpixel camera gives x6 digital zoom
- Arden, Fujikura/AFL, Vytran and Furakawa/FITEL holders
- End angle/radius of curvature estimation
- Inspect and Fringe modes
- Flat and angled ends
- User calibration facility

Applications

- Precision cleaver manufacture
- Cleaver maintenance
- Laser manufacture
- Medical device manufacturing
- Fiber R&D n Development and testing of angled cleaves and cleavers
- Device pigtailing







Specifictions

	STAR-VFI-200	STAR-VFI-1200	STAR-VFI-2000
Field of View	200µm	1200µm maximum with x1.5, x2, x3, and x6 digital zoom	2000µm maximum with x1.5, x2, x3, and x6 digital zoom
Dimensions	240mm(W)x240mm(D) x90mm(H)		
Weight	2.0kg		
Image Sensor	1/1.8 inch CMOS array, 12bit, 6.4MP		
Effective Pixels	2076x2076, 2.4µm square pixels		
Fringe Resolving Power	2µm/fringe		
Max frame rate	> 20 fps		
LED wavelength	587nm		
Accuracy up to 2 deg	< 0.1 deg		
Accuracy up to 10 deg	< 0.2 deg		
Image Format	12-bit png		
Connection to computer	USB 3.0 (USB Type C to USB type A: 1m cable)		
Power Supply	12V in-line power supply		
Operating Temp.	0°C to + 50°C		
Humidity	5%- 95% relative, non-condensing 5%- 95% relative, non-condensing		
Operating systems	Windows7/8/10 64bit only		
Hardware	2GB RAM; USB 3.0 port; 64bit		

Ordering Information

Part number	Description
STAR-VFI-200	Interferometric inspection system for fibers with diameters of 125µm. Includes STAR-VFI-200 optical unit; STAR-VFI-H0 fiber holder for 125µm fibers; PC software; USB cable; power supply. Computer not included.
STAR-VFI-1200	Interferometric inspection system for fibers with diameters from 125 to 1200µm. Includes STAR-VFI-1200 optical unit; STAR-VFI-H0/0400 fiber holder for 400µm fibers; STAR-VFI-FTK400 fiber samples; PC software; USB cable; power supply. Computer not included.
STAR-VFI-2000	Interferometric inspection system for fibers with diameters from 400 to 2000µm. Includes STAR-VFI-2000 optical unit; STAR-VFI-H0/0400 fiber holder for 400µm fibers; STAR-VFI-FTK400 fiber samples; PC software; USB cable; power supply. Computer not included.

Options

Options	Description
STAR-VFI-H0	fiber holder for 125µm fiber, perpendicular cleave
STAR-VFI-H0-200	fiber holder for 200µm fiber, perpendicular cleave
STAR-VFI-H0-400	fiber holder for 400µm fiber, perpendicular cleave
STAR-VFI -H0-600	fiber holder for 600µm fiber, perpendicular cleave
STAR-VFI -H0-800	fiber holder for 800µm fiber, perpendicular cleave
STAR-VFI -H0-1000	fiber holder for 1000µm fiber, perpendicular cleave
STAR-VFI -H0-1250	fiber holder for 1250µm fiber, perpendicular cleave
STAR-VFI -H0-1500	fiber holder for 1500µm fiber, perpendicular cleave
STAR-VFI -H0-2000	fiber holder for 2000µm fiber, perpendicular cleave
STAR-VFI -H0-1250F	fiber holder for 1.25mm ferrules
STAR-VFI -H0-1500F	fiber holder for 2.5mm ferrules
STAR-VFI -H0-2000F	fiber holder for 3.2mm ferrules
STAR-VFI -H-Angle	angle inducing anulus for measuring cleave angles from 4° – 12°
STAR-VFI -MPS	VFI mounting plate for standard Arden Photonics VFI holders
STAR-VFI -MPF	VFI mounting plate for 125µm Fujikura style fiber holders (also works with FGC holders)
STAR-VFI -MPFL	VFI mounting plate for 200µm+ Fujikura style fiber holders (also works with FGC holders)
STAR-VFI -CC-01	Rigid carrying case for STAR-VFI-200, STAR-VFI-1200, STAR-VFI-2000
STAR-VFI –UEW2	extended warranty covering parts and labour for 2 years from purchase, return to base. Cover excludes camera.
STAR-VFI -UEW3	extended warranty covering parts and labour for 3 years from purchase, return to base. Cover excludes camera.
STAR-VFI –UEW3	extended warranty covering parts and labour for 4 years from purchase, return to base. Cover excludes camera.
STAR-VFI -UEW5	extended warranty covering parts and labour for 5 years from purchase, return to base. Cover excludes camera.
STAR-VFI -FTK400	fiber samples, 400µm diameter, for checking STAR-VFI-1200 alignment and calibration

Encircled Flux Meter

Encircled Flux is now widely accepted as the preferred way to specify modal filling by IEEE, TIA and IEC. Measurement of Encircled Flux is defined in FOTP-203 – the “Modal Explorer” is the most standards-compliant measurement system available today and has been chosen by major standards labs in the USA and Europe as the basis for their critical measurements

Its compact size and solid design make it the tool of choice in cable makers, fiber optic instrument companies and VCSEL, laser and LED source makers. In use in factories every day, major players in the industry rely on the Modal Explorer.The Modal Explorer is available for measurements at 850 and 1300nm as well as other custom wavelengths. Modal Explorer makes measurement of Encircled Flux easy and accurate, and it complies with international standards.

But if you are measuring laser-based transmission light sources for multi-mode systems you may need to use a test jumper assembly and fiber shaker in order to avoid “speckle”. Industry standards, for example IEEE 802.3aq and FOTP–203, call for the use of a mechanical fiber shaker. The Fiber Shaker (MPX-SR3 option) reduces speckle by changing the differential path length of the modes in the fiber. The fiber is shaken continuously to allow the speckle to be averaged out. This will ensure sufficient repeatability for the measurement of the Encircled Flux

Features & Benefits

- End face inspection mode with focus indicator to give better repeatability from operator to operator
- Power monitor - optimize light throughput and modal conditions simultaneously
- Real-time measurement - adjust modal conditions easily as well as increase productivity
- Internal LED with fully filled launch condition
- USB2.0 connection gives portability - with the optional carrying case plus a laptop computer
- Optional geometrical calibration artefact to enable user calibration of MPX
- API software control feature designed for use in the production environment

Applications

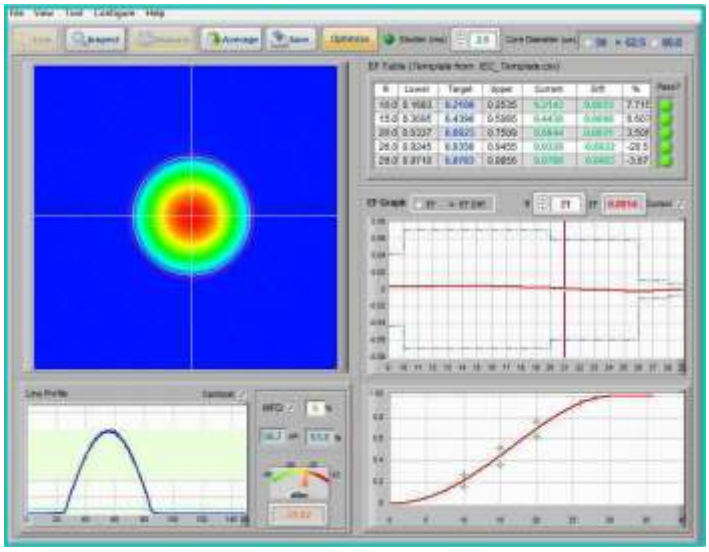
- Source and patchcord characterization for IEC11801 and TIA/EIA568 LAN testing
- VCSEL characterization for Gigabit Ethernet IEEE 802.3
- Mode-scrambler and mode-filter characterization
- Connector inspection n Measure sources to IEC 61280-4-1
- Alignment of pig-tailed light sources

MPX Geometrical Calibration Artefact (Optional)

MPX-CP01

MPX-2 in Carrying Case (Optional)

MPX-CC-02



Specifictions

	STAR-MPX-1	STAR-MPX-2
Wavelength	850nm (Encircled Flux measurement range is from 400nm to 1100nm but End Face Inspecton and Focussing is at 850nm)	1300nm (Encircled Flux measurement range is from 900nm to 1700nm but End Face Inspecton and Focussing is at 1300nm)
Size	260mm(W)x270mm(D)x90mm(H) 10”(W)x10.5”(D)x3.5”(H)	260mm(W)x390mm(D)x110mm(H) 10”(W)x15”(D)x4.5”(H)
Weight	2.5kg / 5.5lb	7.0kg / 15.5lb
Dynamic Range	60dB	>60dB
Image Sensor	CCD array, 12 bit, 4.65µm square pixels	InGaAs array, 12 bit, 30µm square pixels
Maximum Core Diameter	110µm	110µm
Maximum source power	Approx 10mW (depends on power density, fiber type etc.)	Approx 10mW (depends on power density, fiber type etc.)
Input connector adaptors available	Universal 2.5mm ferrule; LC (both supplied as standard), FC, ST,SC,MTP,Bare fiber (optional)	Universal 2.5mm ferrule; LC (both supplied as standard), FC, ST,SC,MTP,Bare fiber (optional)
End Face Inspection and Focussing	850nm LED	1300nm LED
Built0in reference source	850nm LED, FC connector, over-filled (110um core diameter,; 0.37NA)	1300nm LED, FC connector, over-filled (110um core diameter,; 0.37NA)
Power	External switched mode power supply (supplied)	External switched mode power supply (supplied)
Connection to Computer	USB 2.0 (USB B to USB A: 2m cable supplied)	USB 2.0 (USB B to USB A: 3m cable supplied)

Computer Requirements (minimum)	2GB RAM; USB 2.0 port – note system will not work with USB 3.0	2GB RAM; USB 2.0 port – note system will not work with USB 3.0
Operating System supported	Windows7/8/10 32bit or 64bit	Windows7/8/10 32bit or 64bit
Operating Temperature	0°C to + 50°C	0°C to + 50°C
Humidity	5%- 95% relative, non-condensing	5%- 95% relative, non-condensing

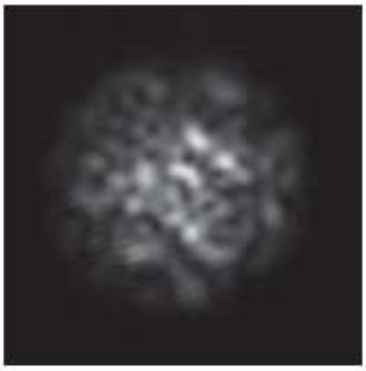
Ordering Information

Part number	Description
STAR-MPX1	MPX-1 system for modal analysis of multimode fibers at 850nm, including optical unit, cables, software package and user manual. System is supplied with a universal 2.5mm connector adaptor and an LC connector adaptor. Computer not included. See product specification for information about computer configuration.
STAR-MPX2	MPX-2 system for modal analysis of multimode fibers at 1300nm, including optical unit, cables, software package and user manual. System is supplied with a universal 2.5mm connector adaptor and an LC connector adaptor. Computer not included. See product specification for information about computer configuration

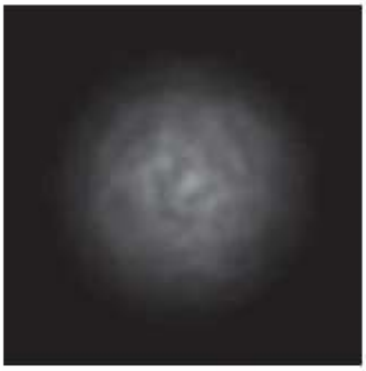
Options

Option	Description
STAR-MPX-API	MPX API software add on, designed for accessing and controlling the MPX for automated testing (additional license required)
STAR-MPX-CC-01	Rigid carrying case for MPX-1
STAR-MPX-CC-02	Rigid carrying case for MPX-2
STAR-MPX-CP01	Chrome-on-Glass calibration artefact and software package for MPX-1 and MPX-2 to enable user calibration traceable to NPL standards. Includes Chrome-on-Glass artefact, software CD and operation instructions
STAR-MPX-CAU250	Input connector adaptor for 2.5mm diamter ferrule connectors, universal (supplied as standard with MPX-1 and MPX-2)
STAR-MPX-CALC	Input connector adaptor for LC connectors (supplied as standard with MPX-1 and MPX-2)
STAR-MPX-CAFC	Input connector adaptor for FC connectors
STAR-MPX-CAFC/APC	Input connector adaptor for FC/APC connectors
STAR-MPX-CASC	Input connector adaptor for SC connectors
STAR-MPX-CASC/APC	Input connector adaptor for SC/APC connectors
STAR-MPX-CAST	Input connector adaptor for ST connectors
STAR-MPX-CAMTP	Input connector adaptor for MTP connectors
STAR-MPX-CAMTRJ	Input connector adaptor for MTRJ connectors
STAR-MPX-CAU250/APC	Input connector adaptor for 2.5mm diameter ferrule APC connectors, universal
STAR-MPX-SR3***	Fiber shaker with 2 fibers (1 x OM1 and 1 x OM2); FC/PC connectors on input and output. ***See the description on the next page
STAR-MPX-UEW3	MPX extended warranty covering parts and labour for 3 years from purchase, return to base. Cover excludes camera
STAR-APL-LC	Laptop computer, pre-installed with application software
STAR-APL-DC	Desktop computer, pre-installed with application software

Fiber Shaker (***see option STAR-MPX-SR3)



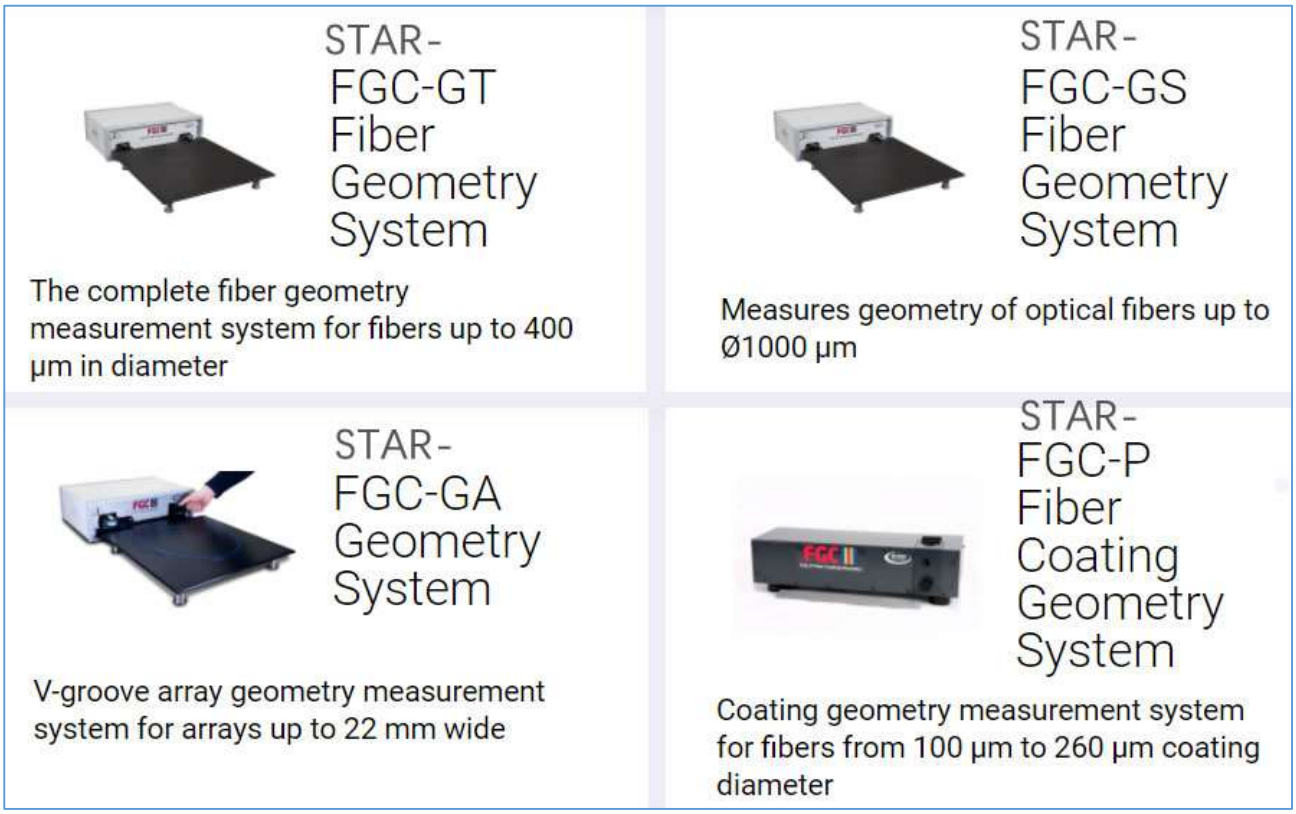
Light source output without shaker



Light source output with Shaker

Fiber types	OM1 (62.5/125 GI) and OM2 (50/125 GI)
Input & Output Connectors	FC/PC
Frequency of shaking	10Hz
Insertion loss	<1dB
Size	260mm(W)x270mm(D)x90mm(H)
Weight	1.9kg
Power	External switched mode power supply. Requirements: 90-240V, <500mA, <50W
Operating Temperature	+5ºC to +40ºC
Storage Temperature	-10ºC to +50ºC

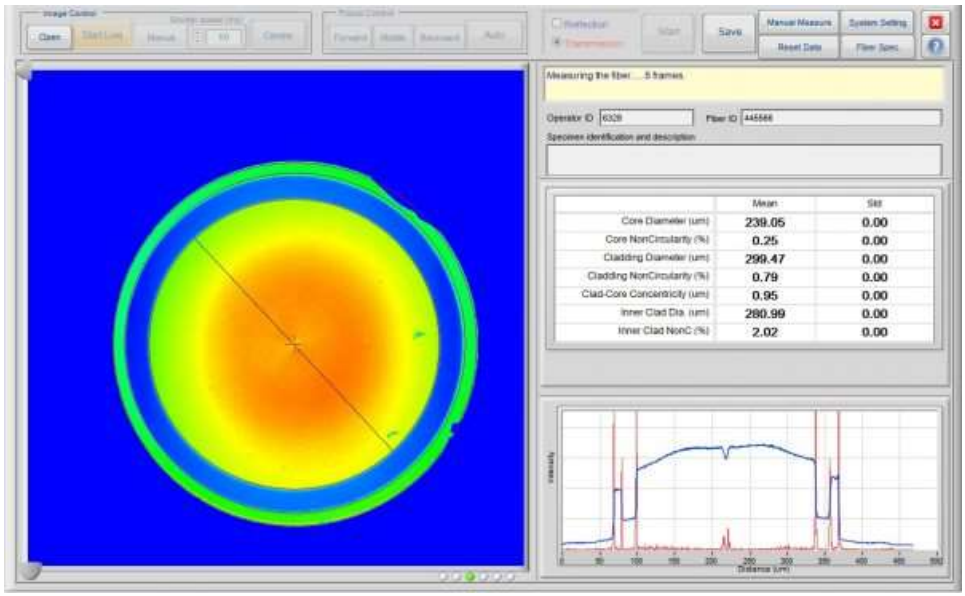
Fiber & Array Geometry Measurement Systems



1. STAR-FGC-GT & STAR-FGC-GS Fiber Glass Geometry Measurement System

The STAR-FGC range is the complete solution for measuring the dimensions of standard and specialty fiber in both production and R&D environments. STAR-FGC-GT – fiber glass geometry for fibers up to 400 µm diameter. STAR-FGC-GS – fiber glass geometry for fibers up to 1000 µm diameter.

The darkfield illumination system allows the software to show a clear live image of the end face of the fiber by illuminating the end face of the fiber and imaging the reflected light. This allows users to inspect the end face of the fiber whilst taking geometry measurements. The darkfield method of fiber geometry measurement is supported by both NPL in the UK and NIST in the USA.



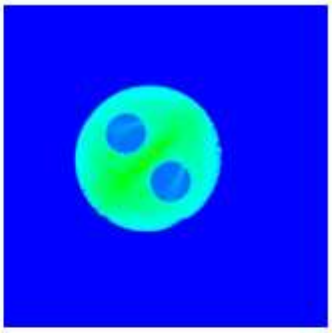
The STAR-FGC comes with an efficient software package containing controls to switch between reflection and transmission mode. This allows users to quickly and easily get both core and cladding geometry measurements including diameter, non-circularity and concentricity. The software contains measurement templates for all standard telecoms fibers, however users can also create their own. This allows the measurement of many special fiber types including dual clad fiber, bend insensitive fiber, multicore fibers and many more.

Features & Benefits

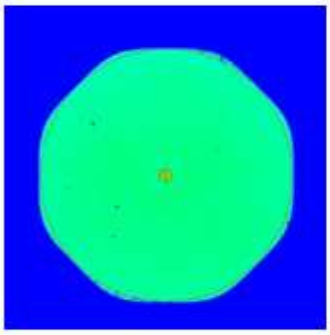
- Measures the widest range of fiber sizes and types – single unit solution means less bench space, reduced training
- Standards compliant – calibrated to international standards, ensuring confidence in its accuracy
- Production ready – reliable, repeatable, operator-independent results in seconds

Fiber Gallery

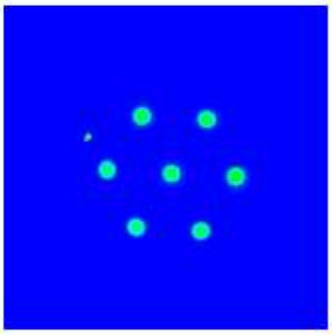
<< Standard



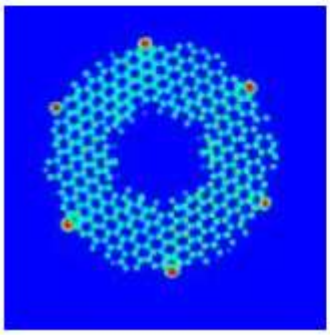
<< PM



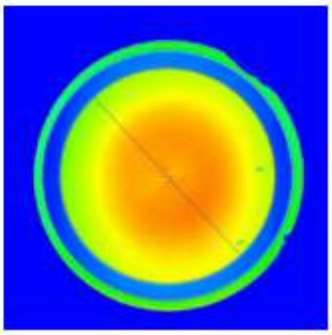
<< Octagonal



<< Multicore



<< Micro-Structured



<< Dual Clad

Specifictions

	STAR-FGS-GT*		STAR-FGC-GS**
Optical			
Max field of View	600 µm		1200 µm
Fiber Illumination – Reflection	Darkfield illumination, 850nm LED		
Fiber Illumination - Transmission	Mulitple LED array, 850nm		
Repeatability	Single mode	Multi mode	Multi mode
Core Diameter	< 0.05 µm	< 0.08 µm	< 0.1 µm
Cladding Diameter	< 0.05 µm	< 0.05 µm	< 0.25 µm
Core Non-circularity	< 1.0%	< 0.5%	< 0.05%
Cladding Non-circularity	< 0.1%	< 0.1%	< 0.1%
Core-to-Cladding Concentracity	< 0.06 µm	< 0.05 µm	< 0.05 µm
Measurement Capability			
Measurement Time	< 10 seconds (excluding fiber prep)		
Fiber Diameter	Up to 400 µm		Up to 1000 µm
Special Fibers	Dual clad, octagonal, PM, Multicore, PCF, etc.		
Physical			

Weight	11kg (with carry case 33kg)
Size	0.5 x 0.5 x 0.2
Operating Temp	0ºC to + 50ºC
Humidity	5%- 95% relative, non-condensing
Computer Requirements	All FGC systems are supplied with a desktop computer running up-to-date windows operating system
Data Interface	2 x USB3.0 (USB B to USB A: 2m cable supplied)

* Repeatability is measured on the STAR-FGC-GT using a single 125 µm fiber without removing it from the unit, the repeatability specifications are only applicable to OM1, OM2 and singlemode fibers.
** Repeatability is measured on the STAR-FGC-GS using a single 540/600 µm fiber without removing it from the unit

Ordering Information

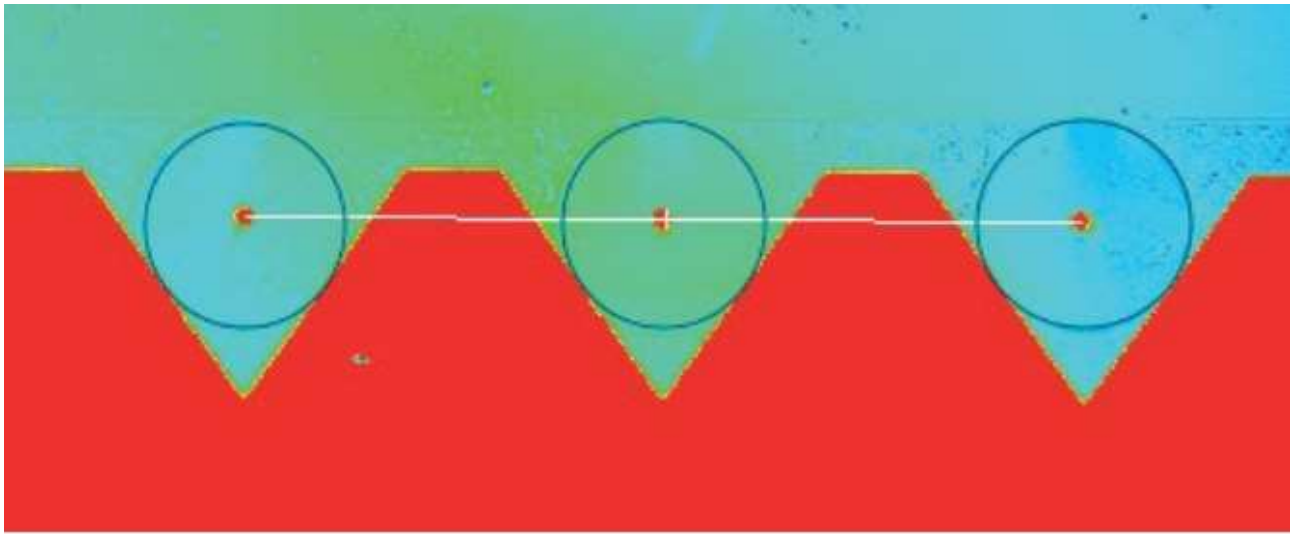
Part number	Description
STAR-FGC-GT	Fiber Glass Geometry System for measurement of optical fibers with diameters up to 400 µm. Including optical unit, fiber handling bench, cables, software package; desktop computer; pair of Arden holders suitable for 250 µm diameter coated fiber.
STAR-FGS-GS	Fiber Glass Geometry System for measurement of optical fibers with diameters up to 1000 µm. Including optical unit, fiber handling bench, cables, software package; desktop computer; pair of Arden holders suitable for 400 µm diameter coated fiber.
STAR-FG-H-250	Pair of Arden FGC fiber holders with 250 µm V-groove, suitable for 250 µm diameter coated fiber
STAR-FG-H-400	Pair of Arden FGC fiber holders with 400 µm V-groove, suitable for 400 µm diameter coated fiber
STAR-FG-H-600	Pair of Arden FGC fiber holders with 600 µm V-groove, suitable for 600 µm diameter coated fiber
STAR-FG-H-800	Pair of Arden FGC fiber holders with 800 µm V-groove, suitable for 800 µm diameter coated fiber
STAR-FG-H-1000	Pair of Arden FGC fiber holders with 1000 µm V-groove, suitable for 1000 µm diameter coated fiber
STAR-FG-H-CUST	Pair of Arden FGC fiber holders with customer defined V-groove diameter
STAR-FGC-GUEW3	FGC-Glass geometry system, extended warranty covering parts and labour for 3 years from purchase, return to base. Cover excludes camera.
STAR-FGC-GUEW5	FGC-Glass geometry system, extended warranty covering parts and labour for 5 years from purchase, return to base. Cover excludes camera.
STAR-FGC-PMI	PM illuminator designed for use with the FGC

2. STAR-FGC-GA Array Geometry Measurement System

The STAR-FGC-GA is the ultimate solution for measurement and process control for V-groove array production. With one unit, users can measure V-groove block geometry, core-to-core pitch and core X & Y offset of multifiber arrays up to 15mm in width. With a 1200µm field of view as well as an automated lateral stage for scanning along the entire width of the array, the STAR-FGC-GA is the fastest and most flexible way to produce top quality V-groove arrays

Features and Benefits

- Measurement of core to core pitch, X-offset, Y-offset and V-groove block geometry.
- Lateral adjustment stage and image stitching for measurement over a 15mm array width.
- Flexible software can adjust for different fiber types (SM, PM, MM).
- 1200µm field of view allows simultaneous measurement of up to 4 cores, decreasing overall measurement time.
- Custom array holders available depending on customer requirements.



Specifications

Optical	Optical STAR-FGC-GA Repeatability Core X/Y-offsets* < 0.1 µm Core-core Distance* < 0.1 µm Measurement Capability Measurement Time < 1 minute (excluding fiber preparation) for a 3-fiber array Array Width Up to 15mm Fiber Types Singlemode, Multimode, PM Physical Weight 13kg (with carry case 44kg) Size 0.5m x 0.5m x 0.2m Operating Temperature 0 – 50° C Humidity 5% – 95%, relative, non-condensing Data Interface 3 X USB 3.1 (USB B to USB A: 0.5m cable supplied) Computer Requirements All FGC systems are supplied with a desktop computer running up-to-date Windows operating system
Max Field of View	1200µm
Fiber Illumination – Reflection	Multichannel 525nm
Fiber Illumination – Transmission	Darkfield illumination, 525nm LED

3. STAR-FGC-P Fiber Coating Geometry System

The STAR-FGC-P Fiber Coating Geometry System is the fast, reliable solution for measuring the geometry characteristics of optical fiber coatings.

The STAR-FGC-P provides a direct measurement of fiber coating geometry parameters including:

- coating diameter,
- coating non-circularity, and
- coating-cladding concentricity.

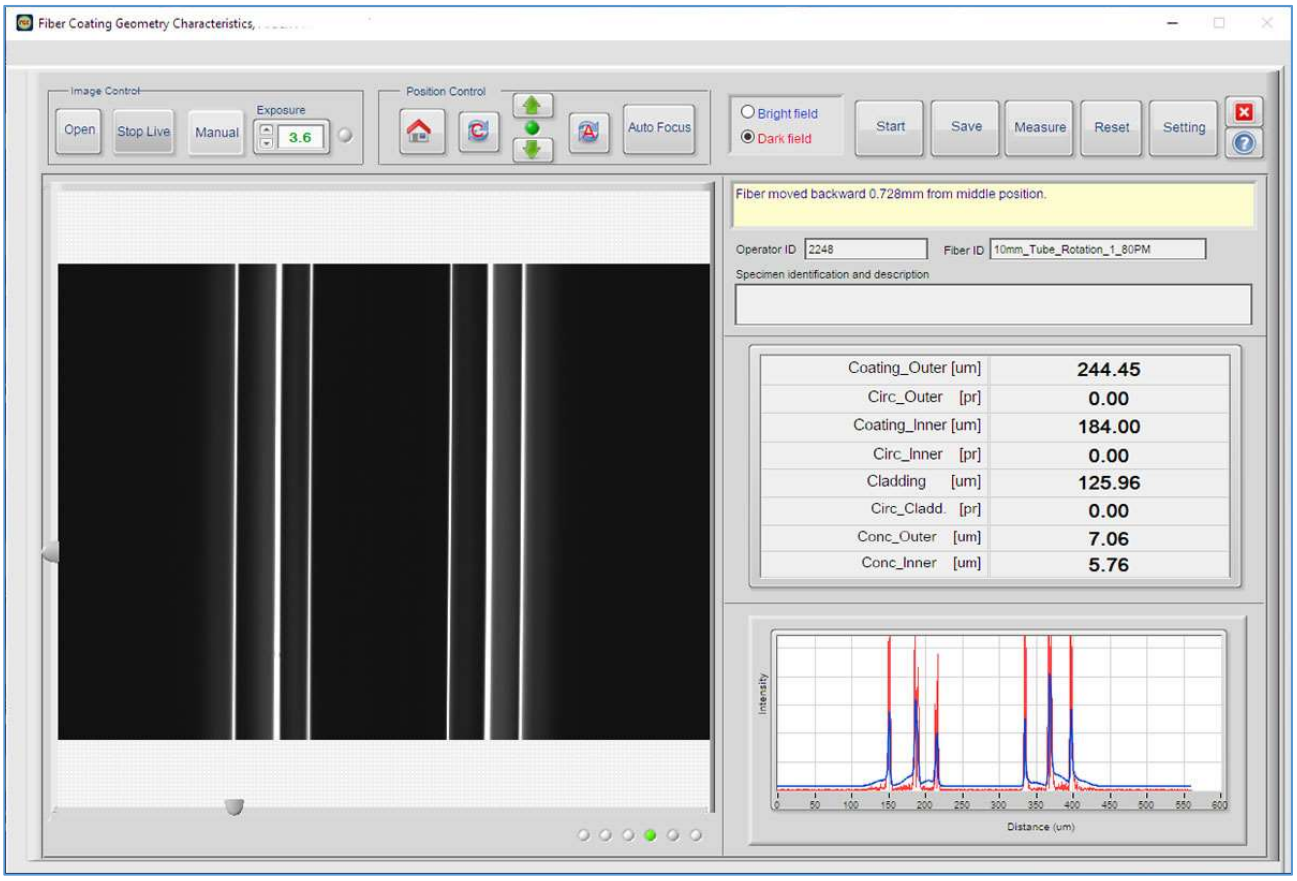
It can handle fibers with a coating diameter from 100 µm to 260 µm, being able to measure outer and inner coating layers.

The fast and user friendly nature of the STAR-FGC-P make it well suited to both production and R&D environments, maintaining excellent levels of repeatability and reliability.

The STAR-FGC-P uses a novel liquid cell design that allows it to repeatably measure even very thin fibers, including polarisation maintaining (PM) fibers.

The fiber under test is rotated through 360°, and measured at user-defined intervals, to minimise any measurement uncertainty caused by any asymmetry of the fiber. The ability to measure coatings in up to 36 different radial positions ensures the highest levels of accuracy and reliability for the measurement of diameter, circularity and concentricity.

The STAR-FGC-P Fiber Coating Geometry System is fully standards compliant, and uses the side-view reference test method described in IEC-60793-1-21. The STAR-FGC-P analyses the side-view grey-scale intensity profile to determine the positions of the coating and cladding boundaries using high-speed video and image processing techniques. The fiber under test is rotated through 360°, and measured at user-defined intervals, to minimise any measurement uncertainty caused by any asymmetry of the fiber.



Measurement Capability

Fiber Type	SM, MM, PM
Coating Material	Dual acrylate
Coating Diameter	100 µm to 260 µm
Layer Thickness	> 10 µm
Measurement Time*	< 10 s per angular position
Angular Positions	Customisable, 8 to 36

Repeatability**

Outer Coating Diameter	< 0.5 µm
Outer Coating Non-Circularity	< 0.5%
Inner Coating Diameter	< 0.8 µm
Inner Coating Non-Circularity	< 0.8%
Outer Coating-to-Cladding Concentricity	< 0.5 µm
Inner Coating-to-Cladding Concentricity	< 0.8 µm

Optical

Illumination – Side View	Darkfield, 525 nm
Max Field of View	580 µm
Image Sensor	1.1-inch CMOS, 4112 x 3008 pixels resolution
Exposure Range	0.1 ms to 100 ms exposure time

Physical

Weig

ht	6 kg (with carry case 12 kg)
Size	0.5 x 0.2 x 0.2 m
Operating Temp***	10 – 30° C
Power Supply	15 V (external power supply supplied)
Power Consumption	60 W
Computer Requirements	All FGC systems are supplied with a computer running up-to-date Windows operating system

Data Interface	1 X USB 3.0 (USB B to U SB A: 1 m cable supplied)

*Analysing 100 scan lines and averaging 5 images
**Repeatability is measured using a 125/245 dual acrylate coated MM fiber sample over 12 angular positions without removing from the FGC-P
***Performance specification validated at 22° C

Part number	Description
STAR-FGC-P	STAR-FGC-P Fiber Coating Geometry System for measurement of optical fibers with diameters up to 260 µm. Including optical unit; 3 x STAR-FGC-P-FTA-245 tube assemblies; 3 x STAR-FGC-P-FTA-200 tube assemblies; 3 x STAR-FGC-P-FTA-100 tube assemblies; 3 x STAR-FGC-P-GLA tube packs; 1 x STAR-FGC-P-IL-1.5840 bottle of immersion liquid; 1 x STAR-FGC-P-TM tube storage block; 1 x STAR-FGC-P-CC carrying case; cables; computer pre-installed with system software
STAR-FGC-P-GLA	Glass tubes, pack of 10, replacement for use in STAR-FGC-P-FTA Fiber Tube Assembly
STAR-FGC-P-IL-1.5600	Bottle of Immersion liquid, 10 ml, (Refractive Index = 1.5600) for refilling STAR-FGC-P tube assembly
STAR-FGC-P-IL-1.5840	Bottle of Immersion liquid, 10 ml, (Refractive Index = 1.5600) for refilling STAR-FGC-P tube assembly
STAR-FGC-P-IL-1.6000	Bottle of Immersion liquid, 10 ml, (Refractive Index = 1.6000) for refilling STAR-FGC-P tube assembly
STAR-FGC-P-FTA-245	STAR-FGC-P Fiber Tube Assembly for 245 µm coatings, contains glass tube plus upper and lower fiber guides with 270 µm ferrule fitted
STAR-FGC-P-FTA-200	STAR-FGC-P Fiber Tube Assembly for 200 µm coatings, contains glass tube plus upper and lower fiber guides with 230 µm ferrule fitted
STAR-FGC-P-FTA-100	STAR-FGC-P Fiber Tube Assembly for 100 µm coatings, contains glass tube plus upper and lower fiber guides with 126 µm ferrule fitted
STAR-FGC-P-FTA-CUST	STAR-FGC-P Fiber Tube Assembly for custom fiber coatings, contains glass tube plus upper and lower fiber guides with custom ferrule fitted
STAR-FGC-P-TM	STAR-FGC-P glass tube storage block, for holding 6 tube assemblies
STAR-FGC-P-GUEW3	STAR-FGC-P extended warranty covering parts and labour for 3 years from purchase, return to base. Cover excludes camera
STAR-FGC-P-GUEW5	STAR-FGC-P extended warranty covering parts and labour for 5 years from purchase, return to base. Cover excludes camera
STAR-FGC-P-CC	STAR-FGC-P rigid carrying case

ODTR Launch Boxes

When measuring fiber optic cables using an OTDR, a launch box (also known as a Dead Zone Eliminator) helps to minimize the effects of the OTDR's launch pulse thus improving the accuracy of the measurement. Our high quality launch boxes come in three different housing formats:

1) Rugged "PELI" boxes versions are airtight, watertight and incredibly tough. These military approved cases are IP65 rated and are used in the harshest environments. Select this version if you want the best protection for your lead-in fiber.
2) Aluminium "EuroCard" enclosure is smaller, lighter than the PELI case offering an ideal solution for factory or lab environments where space is at a premium.
3) ABS "Midi"style enclosure is slightly larger than the "Euro" for longer fiber lengths.

We can supply a range of products in different fiber types including versions with "ModCon" mode control to enable your OTDR to meet the Encircled Flux launch condition requirement in IEC 61280-4-1.
All our boxes come with a full test certificate and 1 year warranty (except damaged connectors)
We offer a standard range of products but we also have the capability to make custom solutions to your precise requirements.

Features & Benefits

- Improve OTDR measurement accuracy
- Available with "ModCon" Launch conditioning to allow compliance with EF requirements of IEC 61280-4-1
- Rugged carrying case for long lifetime in field or factory
- Available in 09/125SM, 50/125MM, 62.5/125MM
- Custom configurations available
- User replaceable input and output leads (fusion splicer required) for long life time
- High quality components e.g. Draka PCVD GIMM fiber

Applications

- OTDR testing in field or factory
- Remove the "dead zone" from OTDR measurements
- Calibration comparison for OTDR measurements
- Long haul system loop back for field testing transmissions

Specification

	"PELI" style	**"Midi" style**	**"EuroCard" style**
Size	232 x 192 x 111 mm 9.25 x 7.75 x 4.5 in	155 x 240 x 35 mm 6.0 x 9.5 x 1.45 in	166 x 105 x 33 mm 6.5 x 4.1 x 1.3 in
Weight	1.3 kg (3.0 lb)	0.5kg (1.1 lb)	0.5kg (1.1 lb)
Operating temperature	-40 to +55 C	0 to +40 C	0 to +40 C
Typical loss	< 0.5dB @ 1310nm with 1km sm fiber	< 0.5dB @ 1310nm with 1km sm fiber	< 1.0dB @ 1310nm with 200m mm fiber
Input and output lead length	1m	1m	1m

Image			

Ordering information

We offer OTDR launch boxes in several standard configurations:

OTDR lead-in boxes in "PELI" case – singlemode

Part number	Description
STAR-ALB-09-0500-FC/FC-P	OTDR lead-in box, containing 500m of 09/125 fiber with FC connectors, in "Peli" case.
STAR-ALB-09-0500-FCAPC/FCAPC-P	OTDR lead-in box, containing 500m of 09/125 fiber with FCAPC connectors, in "Peli" case.
STAR-ALB-09-0500-SC/SC-P	OTDR lead-in box, containing 500m of 09/125 fiber with SC connectors, in "Peli" case.
STAR-ALB-09-0500-SCAPC/SCAPC-P	OTDR lead-in box, containing 500m of 09/125 fiber with SCAPC connectors, in "Peli" case.
STAR-ALB-09-1000-FC/FC-P	OTDR lead-in box, containing 1000m of 09/125 fiber with FC connectors, in "Peli" case.
STAR-ALB-09-1000-FCAPC/FCAPC-P	OTDR lead-in box, containing 1000m of 09/125 fiber with FCAPC connectors, in "Peli" case.
STAR-ALB-09-1000-SC/SC-P	OTDR lead-in box, containing 1000m of 09/125 fiber with SC connectors, in "Peli" case.
STAR-ALB-09-1000-SCAPC/SCAPC-P	OTDR lead-in box, containing 1000m of 09/125 fiber with SCAPC connectors, in "Peli" case.
STAR-ALB-09-2000-FC/FC-P	OTDR lead-in box, containing 2000m of 09/125 fiber with FC connectors, in "Peli" case.
STAR-ALB-09-2000-FCAPC/FCAPC-P	OTDR lead-in box, containing 2000m of 09/125 fiber with FCAPC connectors, in "Peli" case.
STAR-ALB-09-2000-SC/SC-P	OTDR lead-in box, containing 2000m of 09/125 fiber with SC connectors, in "Peli" case.

STAR-ALB-09-2000-SCAPC/SCAPC-P	OTDR lead-in box, containing 2000m of 09/125 fiber with SCAPC connectors, in “Peli” case.

OTDR lead-in boxes in “MIDI” case – single mode

Part number	Description
STAR-ALB-09-0500-FC/FC-M	OTDR lead-in box, containing 500m of 09/125 fiber with FC connectors, in “MIDI” case.
STAR-ALB-09-0500-FCAPC/FCAPC-M	OTDR lead-in box, containing 500m of 09/125 fiber with FCAPC connectors, in “MIDI” case.
STAR-ALB-09-0500-SC/SC-M	OTDR lead-in box, containing 500m of 09/125 fiber with SC connectors, in “MIDI” case.
STAR-ALB-09-0500-SCAPC/SCAPC-M	OTDR lead-in box, containing 500m of 09/125 fiber with SCAPC connectors, in “MIDI” case.
STAR-ALB-09-1000-FC/FC-M	OTDR lead-in box, containing 1000m of 09/125 fiber with FC connectors, in “MIDI” case.
STAR-ALB-09-1000-FCAPC/FCAPC-M	OTDR lead-in box, containing 1000m of 09/125 fiber with FCAPC connectors,in “MIDI” case.
STAR-ALB-09-1000-SC/SC-M	OTDR lead-in box, containing 1000m of 09/125 fiber with SC connectors, in “MIDI” case.
STAR-ALB-09-1000-SCAPC/SCAPC-M	OTDR lead-in box, containing 1000m of 09/125 fiber with SCAPC connectors,in “MIDI” case.
STAR-ALB-09-2000-FC/FC-M	OTDR lead-in box, containing 2000m of 09/125 fiber with FC connectors, in “MIDI” case.
STAR-ALB-09-2000-FCAPC/FCAPC-M	OTDR lead-in box, containing 2000m of 09/125 fiber with FCAPC connectors,in “MIDI” case.
STAR-ALB-09-2000-SC/SC-M	OTDR lead-in box, containing 2000m of 09/125 fiber with SC connectors,in “MIDI” case.
STAR-ALB-09-2000-SCAPC/SCAPC-M	OTDR lead-in box, containing 2000m of 09/125 fiber with SCAPC connectors, in “MIDI” case.

OTDR lead-in boxes in “PELI” case – multimode

Part number	Description
STAR-ALB-50-100-SC/SC-P	OTDR lead-in box, containing 100m of 50/125 multimode fiber with SC connectors, in “Peli” case.

STAR-ALB-50-100-SC/SC-P-MC	OTDR lead-in box, containing 100m of 50/125 multimode fiber with SC connectors, in “Peli” case. With “ModCon” mode controller.
STAR-ALB-50-250-SC/SC-P	OTDR lead-in box, containing 250m of 50/125 multimode fiber with SC connectors, in “Peli” case.
STAR-ALB-50-250-SC/SC-P-MC	OTDR lead-in box, containing 250m of 50/125 multimode fiber with SC connectors, in “Peli” case. With “ModCon” mode controller.
STAR-ALB-50-500-SC/SC-P	OTDR lead-in box, containing 500m of 50/125 multimode fiber with SC connectors, in “Peli” case.
STAR-ALB-50-500-SC/SC-P-MC	OTDR lead-in box, containing 500m of 50/125 multimode fiber with SC connectors, in “Peli” case. With “ModCon” mode controller.
STAR-ALB-62-100-SC/SC-P	OTDR lead-in box, containing 100m of 62.5/125 multimode fiber with SC connectors, in “Peli” case.
STAR-ALB-62-100-SC/SC-P-MC	OTDR lead-in box, containing 100m of 62.5/125 multimode fiber with SC connectors, in “Peli” case. With “ModCon” mode controller.
STAR-ALB-62-250-SC/SC-P	OTDR lead-in box, containing 250m of 62.5/125 multimode fiber with SC connectors, in “Peli” case.
STAR-ALB-62-250-SC/SC-P-MC	OTDR lead-in box, containing 250m of 62.5/125 multimode fiber with SC connectors, in “Peli” case. With “ModCon” mode controller.
STAR-ALB-62-500-SC/SC-P	OTDR lead-in box, containing 500m of 62.5/125 multimode fiber with SC connectors, in “Peli” case.
STAR-ALB-62-500-SC/SC-P-MC	OTDR lead-in box, containing 500m of 62.5/125 multimode fiber with SC connectors, in “Peli” case. With “ModCon” mode controller.

OTDR lead-in boxes in “EuroCard” enclosure – multimode

Part number	Description
STAR-ALB-50-100-SC/SC-E	OTDR lead-in box, containing 100m of 50/125 multimode fiber with SC connectors, in “EuroCard” case.
STAR-ALB-50-100-SC/SC-E-MC	OTDR lead-in box, containing 100m of 50/125 multimode fiber with SC connectors, in “EuroCard” case. With “ModCon” mode controller.
STAR-ALB-50-250-	OTDR lead-in box, containing 250m of 50/125 multimode fiber with SC

SC/SC-E	connectors, in “EuroCard” case.
STAR-ALB-50-250-SC/SC-E-MC	OTDR lead-in box, containing 250m of 50/125 multimode fiber with SC connectors, in “EuroCard” case. With “ModCon” mode controller.
STAR-ALB-50-500-SC/SC-E	OTDR lead-in box, containing 500m of 50/125 multimode fiber with SC connectors, in “EuroCard” case.
STAR-ALB-50-500-SC/SC-E-MC	OTDR lead-in box, containing 500m of 50/125 multimode fiber with SC connectors, in “EuroCard” case. With “ModCon” mode controller.
STAR-ALB-62-100-SC/SC-E	OTDR lead-in box, containing 100m of 62.50/125 multimode fiber with SC connectors, in “EuroCard” case.
STAR-ALB-62-100-SC/SC-E-MC	OTDR lead-in box, containing 100m of 62.5/125 multimode fiber with SC connectors, in “EuroCard” case. With “ModCon” mode controller.
STAR-ALB-62-250-SC/SC-E	OTDR lead-in box, containing 250m of 62.5/125 multimode fiber with SC connectors, in “EuroCard” case.
STAR-ALB-62-250-SC/SC-E-MC	OTDR lead-in box, containing 250m of 62.5/125 multimode fiber with SC connectors, in “EuroCard” case. With “ModCon” mode controller.
STAR-ALB-62-500-SC/SC-E	OTDR lead-in box, containing 500m of 62.5/125 multimode fiber with SC connectors, in “EuroCard” case.
STAR-ALB-62-500-SC/SC-E-MC	OTDR lead-in box, containing 500m of 62.5/125 multimode fiber with SC connectors, in “EuroCard” case. With “ModCon” mode controller.

Other configurations available on application

Sintec Optronics

Reference Fiber Optic Cables

We can supply a wide range of reference patchcords for use as the launch point for optical system testing. These patchcords are made to the highest tolerances to give you consistent measurement data.

Features & Benefits

- Innovative – unusual combinations of connectors, fibers and cables
- Reliable – 100% testing of insertion loss, return loss, end face feometry and surface finish
- High Performance – low insertion loss/high return loss/ custom wavelengths

Connectors

Connectors	E-2000	FC	LC	SC	SMA	ST	Military termini
Polish	UPC APC	UPC APC	UPC APC	UPC APC	IPC	UPC	UPC
Type	Push pull	Screw on	Push pull	Push pull	Screw on	Bayonet	Insert

Fibers

Fibre	SMF-28E	PM 850	PM 1300	PM 1550	SX + laser optimised	Infinicor 600	Infinicor 300
Mode field (Core) diameter (µm)	8.2	6.6	9.5	10.5	50	50	62.5
Wavelength (nm)	1310 1550	980 1060	1300	1550	850 1300	850 1300	850 1300
Attenuation (dB/km)	0.35 0.22	3.0	1.0	0.5	2.4 0.8	2.5 0.8	3.0 0.7
Numerical Aperture	0.14	0.14	0.14	0.14	0.20	0.20	0.275

Cables

OD	900um tight	900um loose	1.6mm PVC	1.6mm steel	3mm PVC tight	3mm PVC loose
Jacket material	PVC	Hytrel (nylon) or PTFE (Teflon)	PVC	Stainless steel	PVC	PVDF + PVC
Strength member	–	–	Kevlar	Stainless steel	Kevlar	Kevlar

Performance

Fibre	Singlemode	PM	Multimode
Insertion loss (dB)	<0.1	<0.1	<0.05
Return loss (dB)	APC >70 ; PC >55	UPC >55	PC >50
Fibre core eccentricity	<0.5	<0.5	<0.5
Extinction ratio	–	30	–
Radius of curvature (mm)	APC 8 < ROC < 12	APC 8 < ROC < 12	APC 8 < ROC < 12
Apex offset (μm)	<30	<30	<30
Fibre height (protrusion) (nm)	-50 FH < +50	-50 FH < +50	-50 FH < +50