KI23400 / KI27400 Series LTS

HANDHELD 2-WAY +LENGTH +ORL FIBER CERTIFIER

Test Applications

- SM, MM & both fiber types
- Tier 1 cable certification & reporting
- Bidirectional loss, length & ORL in one hook-up with integrated VFL (VisiTester)
- Optical power, continuity & polarity

Revision 27

This instrument series is a fast, accurate and easy bi-directional Tier 1 certifier for multimode and single mode fiber.

2-way loss, length & ORL pass/fail are displayed in real time on both instruments, at multiple λ, for one test hook-up per fiber*.

The compact instrument is also a stand-alone light source, optical power meter and VFL.

The VisiTester feature mixes a VFL laser with the test signal, making a connected test fiber obvious at the other end.

Excel-based reporting software provides tamper-proof and Standards-based certification and reporting, ensuring a combination of flexibility, productivity, and confidence. Datalogging, download and a real time mimic display are also included.

Features

- Ease to use, slim & versatile
- Loss, length & ORL tester for high fiber counts*
- Real time pass/fail
- Sunlight readable & backlit LCD
- SM, MM (EF Compliant) & quad test options
- Large memory & USB key file dump
- Interchangeable connectors
- Real-time, secure PC reporting software
- Continuity test tone with multi-Fiber ID
- VFL VisiTester option
- Long battery life, USB external power
- 25 calibration λ, 1% accuracy
- ISO 17025 traceable calibration
- 3-year warranty
- 3-year recommended calibration cycle
- Made in Australia

* Length, ORL and VisiTester on selected instrument models

KI23400 / KI27400 Series - Handheld 2-way +ORL +Length Fiber Certifier

A pair of fully featured KI23400/KI27400 Loss Testers (LTS) easily tests and reports fiber optic loss, length and ORL pass / fail against standards. Backed up by ILAC/ ISO17025 traceable calibration, it is ideal for test applications requiring accuracy with high throughput.

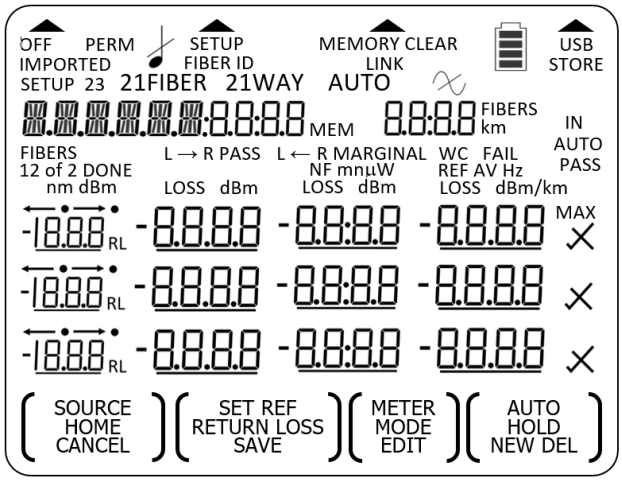
The real-time and comprehensive test display helps the user ensure there is a good optical connection before storing reading. This ensures superior practical accuracy and makes fault finding easier and quicker.

Two identical instruments are used, one of them automatically takes over as the master, and the same information is displayed at each end, which simplifies practical operation. The test procedure is the same for all fiber types.

The instruments provide flexible ways of working and can be used with or without an on-site computer. They are compact, lightweight and have >80 hours battery life.

Associated KITS™ software is tightly integrated and provides an easy workflow to set up, test and report against international standards or specific customer requirements, in a tamper-proof yet flexible reporting environment.

Test results can be stored in the 10,000 fibers memory, along with a text-input cable name and timestamp, and then dumped directly onto a USB memory key, providing limitless, secure, and future-proof data handling. These secure files or instrument memory can then be downloaded into KITS™. Alternatively, if a computer is available on-site, live readings can be clicked directly onto a customer report using our proven KITS™ customizable Excel-based reporting software. Pass/Fail standards can be selected as: international, in-house, or ad hoc, so the user can enter updated standards as appropriate.



TWO WAY AUTOTEST SPECIFICATIONS

Using a pair of instruments, bi-directional tests are achieved in real time over a single fiber with one hook-up, giving greatly superior speed, accuracy and ease of use compared to conventional two-step, two-fiber instruments. This saves training, skill, time, cleaning and materials, while also improving test confidence.

All 3 loss, length & ORL measurements are seamlessly integrated into the real time display. Loss references can be performed locally or remotely.

VisiTester illuminates the test fiber, making the other end easy to find, particularly when cable or fiber labelling is mis-matched or missing.

A handy two-way Autotest communications feature helps both users step quickly through a large fiber array.

Fiber Type	Wavelengths	Loss		Length		
		Range	Repeatability / Linearity	Range	Accuracy[1]	Resolution
MM	850, 1300 nm (62.5 µm) 850, 1300 nm (50 µm)	27 dB 24.5 dB	0.06 dB	6.0 dB / 20 Km 4.0 dB / 20 Km	0.01 % ± 4 m	1 m (0.000~9.999 Km) 10 m (10.00~99.99 Km) 100 m (100.0~999.9 Km)
MM	850, 1300 nm VisiTester (62.5 µm) 850, 1300 nm VisiTester (50 µm)	24 dB 21.5 dB	0.06 dB	4.5 dB / 20 Km 4.5 dB / 20 Km		
SM	1310, 1550 (VFL) nm	47 dB	0.04 dB	30 dB / 128 Km		
SM	1310, 1490, 1550, (VFL) nm 1310, 1550, 1625 (VFL) nm	44 dB	0.04 dB	27 dB / 128 Km		
SM	1310, 1550 nm, VisiTester	44 dB	0.04 dB	27 dB / 128 Km		
SM	1310, 1490, 1550, nm, VisiTester 1310, 1550, 1625 nm, VisiTester	41 dB	0.04 dB	24 dB / 128 Km		
SM	1310, 1490, 1550, 1625 (VFL) nm	41 dB	0.04 dB	24 dB / 128 Km		

For detailed source & ORL specifications, refer Light Source and ORL specifications

Note 1: Up to 3 dB above optical measuring loss limit. Cable ORL variation and fiber/cable length mismatch are typically dominant.

ONE WAY AUTOTEST SPECIFICATIONS

Using a single instrument, the light source and power meter ports can be looped around in one-way Autotest mode, to measure loss only.

The 2-way test port also operates as one-way Autotest light sources, compatible with other Kingfisher Autotest power meters, or as basic light sources.

The power meter port is also compatible with other Kingfisher Autotest sources with matching wavelengths.

One-way Autotest provides fast & easy loss testing at up to 3 λ, in one direction, along with the source nominal power level and λ, with either local or remote referencing.

Fiber Type	Wavelengths	Loss Range	Loss Repeatability / Linearity
MM	850, 1300 nm (62.5 µm) 850, 1300 nm (50 µm)	27 dB 24.5 dB	0.06 dB
MM	850, 1300 nm, VisiTester (62.5 µm) 850, 1300 nm, VisiTester (50 µm)	24 dB 21.5 dB	0.06 dB
SM	1310, 1550 nm	47 dB	0.04 dB
SM	1310, 1490, 1550, nm 1310, 1550, 1625 nm	44 dB	0.04 dB
SM	1310, 1550 nm, VisiTester	44 dB	0.04 dB
SM	1310, 1490, 1550, nm, VisiTester 1310, 1550, 1625 nm, VisiTester	41 dB	0.04 dB
SM	1310, 1490, 1550, 1625 (VFL) nm	41 dB	0.04 dB

OPTICAL POWER METER SPECIFICATIONS

The power meter port uses the same interchangeable connector adaptors as the other ports.

ISO17025 Traceable calibration at many wavelengths at 1% accuracy, and full linearity test, is the best in the industry.

The tight Total Uncertainty specification covers the full range of power levels, ambient temperatures, connectors, and fibers, without user dark current offset.

The multi-Fiber ID features tests common test tones and can also positively identify 1 of 12 test tones from multiple test sources. This can speed up continuity / polarity testing.

Please enquire for non-standard power meter configurations such as high-power detectors up to +33 dBm, POF / MPO. MTP / MXC applications, special connectors, wavelength selective detectors, special calibrations etc.

Response λ Nm	Damage level dBm	Calibration λ nm	Power range dBm	Tone[6] & Autotest Min dBm	Midrange linearity[2] dB	Calibration Accuracy[3] %	Polarization Sensitivity[5] dB	λ Sensitivity ± 30 nm[4] dB
InGaAs detector								
600 ~ 1700	+15	780, 820, 850, 980	+10 ~ -60	-40	0.04	1 % (0.06 dB)	< 0.05	0.2
		1270, 1290, **1300, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590,** 1610, 1625, 1650	+10 ~ -70	-50				
					Typical		Typical	typical

Note **2**: Mid-range linearity excludes top 5 dB and bottom 10 dB of range.

Note **3**: Calibration condition: non coherent light, -35±5 dBm, 23±1°C, ±0.5 nm, 20±3 nm FWHM, PC ceramic connector, 50 µm fiber.

Note **4** At calibration wavelengths in bold type.

Note **5**: For APC connector only.

Note **6**: For tone detection up to 1000 Hz.

LIGHT SOURCE SPECIFICATIONS

The emitters feature excellent repeatability and stability. Re-connection repeatability is <0.1 dB, which contributes to exceptional test confidence.

LED sources are Encircled Flux (EF) compliant, providing the most consistent and reliable testing results.

The Zero Warm Up (Ultra Stable) source option uses a unique optical design, to provide zero warm up, ultra-high temperature stability, and is unaffected by varying back reflection. It provides unmatched test stability in arduous conditions.

The multi-Fiber ID feature tests common test tones and can also positively identify 1 of 12 test tones from multiple test sources. This can speed up continuity / polarity testing.

Please enquire about non-standard source configurations such as other wavelengths, power levels, connectors etc.

Up to 2 test ports with 6 assorted LED or laser emitters can be custom specified per instrument, making this a versatile tester for mixed multimode / single mode fiber testing.

Laser options can be compliant with CWDM standards to cover typical cable qualification for O, E, S, C, & L bands, including the water absorption peak, 1625 and 1650 nm.

	1310 / 1550 nm F-P Laser	1490 / 1625 nm VFL/CWDM[7] Laser	850 / 1300 nm LED	Comments
Power accuracy	± 1 dB (for Laser @ SMF and, LED @ 62.5 µm)			Refer to ORDERING INFORMATION for specific model's nominal power level.
Short term stability (dB) KI27400[8] / KI23400[9]	0.04 / 0.03	0.06 / 0.04	0.01	
Stability over temp (dB) KI27400 / KI23400	0.6 / 0.2	0.6 / 0.2	0.35	Typical / Max
λ initial tolerance (nm)	20	6.5	NA	At 25 °C
λ width, nm	3	< 1	NA	FWHM, typical
λ nm/°C	0.4	0.1	0.4	Typical
Mode Controlled Source	NA	NA	Mode controlled	50/125 compliant: IEC 61280-4-1 {Ed.1.0}, TIA/EIA 526-14A & TIA TSB-178.
Reconnection repeatability (dB)	0.1	0.1	0.05	95 % confidence
Laser output power	Adjustable over 7 dB in 0.01 dB steps		NA	
Modulation	270Hz, 330Hz, 1kHz, 2kHz ± 2 %, 12 multi-Fiber ID tones, additional 2 Hz blink for VFL/VisiTester			

Note **7**: CWDM laser wavelengths: 1270, 1290, (1310), 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, (1550), 1570, 1590, 1610 nm

Note **8**: For 15 min, typ. ± Δ 2°C, after warmup, ORL < -25 dB

Note **9**: For 15 min, max, ± Δ 3°C

VisiTester or VFL SPECIFICATIONS

On "V" part numbers the unique VisiTester mixes a powerful red laser with Two-Way Autotest, so at the far end, the active test fiber winks, making the fiber to be tested obvious to the user. The red laser is mixed with a test tone for a clip-on fiber identifier. This mixed signal extends practical fault-finding options since a clip-on fiber identifier can be used simultaneously. The red laser can also be selected in stand-alone mode, for typical fault-finding applications.

On "F" part numbers, the VFL on a separate optical port offers a stand-alone fault and continuity finder.

Parameters	Values
Wavelength	650 nm nominal (refer to Kingfisher website for actual wavelength)
Power	0 dBm ± 1 dB (@ SM / MM fiber)
Laser Safety	Class 1, IEC60825-2
Visible blink rate	CW or 2 Hz (see Light Source Specifications for other modulation frequencies)

ORL SPECIFICATIONS

The full-featured ORL meter can operate in stand-alone mode or integrated with Autotest.

In two-way Autotest, the ORL is measured at each end of the link, and the results are displayed on both instruments.

A Zero-function compensates for residual reflections, and to provide extended measurement range with improved linearity. A User-Calibration Mode compensates for losses in a test set-up, which improves overall accuracy.

Multimode ORL ports all have APC connectors to ensure the full ORL measuring range.

Parameters	Laser		LED
	1 or 2 λ	3 or 4 λ	
Range[9]	0 ~ 60 dB	0 ~ 57 dB	0 ~ 30 dB (62.5 µm) 0 ~ 27.5 dB (50 µm)
Port isolation / residual[9]		>50 dB	> 20 dB
ORL linearity[9]	0.1 dB 55 ~ 60 dB: 1 dB after zero offset	0.1 dB 52 ~ 57 dB: 1 dB after zero offset	0.1 dB 22.5 ~ 30 dB: 1 dB after zero offset
ORL calibration accuracy[10]	0.2 dB	0.2 dB	0.2 dB
Resolution	0 ~ 50 dB: 0.01 dB 50 ~ 65 dB: 0.1 dB	0 ~ 45 dB: 0.01 dB 45 ~ 60 dB: 0.1 dB	0 ~ 30 dB: 0.01 dB 30 ~ 45 dB: 0.1 dB
λ available	*See source options in LIGHT SOURCE SPECIFICATIONS*		

Note 9: Instruments with PC connectors will have reduced ORL range due to ORL limitations of the PC connector, typically around 40dB. We suggest an APC instrument connector is always preferable unless low-range ORL measurements are acceptable

Note 10: Under calibration conditions: ORL of approximately 14.5 dB, 25 °C

GENERAL SPECIFICATIONS

The practical interchangeable optical connectors are dust & drop protected and are very simple to swap over or clean. SC adaptors are supplied, with others available including small form factor LC and universal styles. The metal-free adaptors avoid damaging contamination of connectors in high power systems.

The instrument has excellent battery life. Flexible instrument power options include alkaline or rechargeable batteries, with a jumper-selectable on-board battery charger. External power is via USB-C/micro-USB. The custom LCD is clearly sunlight-readable, operates over a wide range of temperatures, and has a reliable LED backlight.

Memory operation is simple, with 10,000 fiber capacity, and the memory can be easily dumped directly onto a USB key, providing effectively infinite capacity. Auto-incrementing identification text is stored with each test result and can meet standard-based labelling schemes. The user can go back and re-test a fiber.

Firmware & software updates (with standards and other updates) are free.

Parameters	Value	Parameters	Value
Battery life	Laser/LED source: 50 hours in Autotest, typical Power meter: 100 hours, typical	Operating/Storage	-15 to 55 °C / -25 to 70 °C
Size	190 x 105 x 35 mm (7.5 x 4.1 x 1.4")	Relative humidity	0 ~ 95 %
Weight	420 gm (0.9 lb.) / Shipping 1.5 Kg (3.3 lb.)	Tone detection	150 ~ 9900 Hz ±1 %
LCD size	74 x 55 mm / 2.9 x 2.2"	Recommended calibration cycle	3 years
Case	Polycarbonate / rubber edges & corners, moisture resistant, 1-meter drop tested	Power	2 Alkaline AA cells or 2 x NiMH AA cells, user selectable charging; Ext power input via USB-C; Selectable auto-off, low battery indicator, backlit display
Dust cap	Captive, functions as tilt bail when open		
Memory	Test results & timestamp for 8,000 fibers, unlimited on USB memory key		

Australian and international patents. Technical data is subject to change without notice as part of our program of continuous improvements. Class 1 Laser / LED infra-red device compliant with IEC60825-2.

ORDERING INFORMATION

Description	Source Power (dBm) @ Fiber Type (µm)					No. of port	P/N
	Laser	LED			VisiTester / VFL		
	SMF	SMF	50	62.5	SMF		
	Refer to LIGHT SOURCE SPECIFICATIONS for Power Accuracy specifications						
KI27400 series: Loss Testing							
Instrument, LTS-2W 1310-1550-1625 nm Laser APC, InGaAs	-7	-	-	-	-	2	KI27410-InGaAs-APC
Instrument, LTS-2W 850-1300 nm LED, 1310-1550 nm Laser, InGaAs	-3	-35	-25.5	-23	-	3	KI27424-InGaAs
Instrument, LTS-2W 850-1300 nm LED, 1310-1550 nm Laser APC, InGaAs	-3	-35	-25.5	-23	-	3	KI27424-InGaAs-APC
KI27400 series: Loss Testing, Length, VisiTester (depends on model)							
Instrument, LTS-2W Length VisiTester, 850-1300 nm LED, InGaAs	-	-39	-29.5	-27	0	2	KI27403LV-InGaAs
Instrument, LTS-2W Length VisiTester, 1310-1550 nm Laser, InGaAs	-7	-	-	-	0	2	KI27422LV-InGaAs
Instrument, LTS-2W Length VisiTester, 1310-1550 nm Laser APC, InGaAs,	-7	-	-	-	0	2	KI27422LV-InGaAs-APC
Instrument, LTS-2W Length VisiTester, 1310-1550-1625 nm Laser APC, InGaAs	-10	-	-	-	0	2	KI27410LV-InGaAs-APC
Instrument, LTS-2W Length VisiTester, 1310-1490-1550-1625 nm Laser APC, InGaAs	-7	-	-	-	0	2	KI27416LV-InGaAs-APC
Instrument, LTS-2W Length VisiTester, 850-1300 nm LED, 1310-1550 nm Laser, InGaAs	-7	-39	-29.5	-27	0	3	KI27424LV-InGaAs
Instrument, LTS-2W Length VisiTester, 850-1300 nm LED, 1310-1550 nm Laser APC, InGaAs	-7	-39	-29.5	-27	0	3	KI27424LV-InGaAs-APC
Instrument, LTS-2W Length VisiTester, 850-1300 nm LED, 1310-1490-1550-1625 nm Laser APC, InGaAs	-7	-35	-25.5	-23	-	3	KI27425L-InGaAs-APC
KI23400 series: Loss, Length, ORL, VisiTester or VFL (depending on model), Ultra Stable (U/S, depending on model)							
Instrument, LTS-2W ORL Length VisiTester, 850-1300 nm LED APC, InGaAs	-	-39	-29.5	-27	0	2	KI23403OLV-InGaAs-APC
Instrument, LTS-2W ORL Length VisiTester, 850-1300 nm LED APC, 50 µm, Ge	-	-39	-29.5	-27	0	2	KI23403OLV-InGaAs-APC-50U
Instrument, LTS-2W ORL Length VisiTester, 1310-1550 nm U/S Laser, InGaAs	-7	-	-	-	0	2	KI23422OLV-InGaAs
Instrument, LTS-2W ORL Length VFL, 1310-1550 nm U/S Laser APC, InGaAs	-3	-	-	-	0	3	KI23422OLF-InGaAs-APC
Instrument, LTS-2W ORL Length VFL, 1310-1490-1550 nm U/S Laser APC, InGaAs	-7	-	-	-	0	3	KI23427OLF-InGaAs-APC
Instrument, LTS-2W ORL Length VFL, 1310-1550-1625 nm U/S Laser APC, InGaAs	-7	-	-	-	0	3	KI23410OLF-InGaAs-APC
Instrument, LTS-2W ORL Length VFL, 1310-1490-1550-1625 nm U/S Laser APC, InGaAs	-7	-	-	-	0	3	KI23416OLF-InGaAs-APC
Instrument, LTS-2W ORL Length, 850-1300 nm LED APC, 1310-1550 nm U/S Laser APC, InGaAs	-3	-38	-25.5	-23	-	3	KI23424OL-InGaAs-APC

Please enquire about instruments with other combinations of wavelength, power levels, PC/APC connectors and measurement capabilities.

STANDARD ACCESSORIES

Description	Quantity
SC/SC (OPT046) Hybrid adaptors	1 per port
SC/LC (OPT076) Hybrid adaptors	1 per port
SC/ST (OPT040) Hybrid adaptors *[only for KI23400 & KI27400 series with LED sources]*	1 per port
SC PC Terminator (OPT703) *[only for KI23400 series]*	1
SC APC Terminator (OPT704) *[only for KI23400 series]*	1
SC-SCAPC SMF Test Lead (OPT730-SCP-SCA) *[only for KI23400 series with Laser sources]*	1
SC-SCAPC MMF Test Lead (OPT706) *[only for KI23400 series with LED sources]*	1
SC-SC(APC) MMF Test Lead (OPT740-SCP-SCA) *[only for KI23400 series with LED sources @ 50 µm]*	1
50 & 62.5 µm fiber mandrel wrap set for Multimode sources (OPT701) *[only for KI23400 & KI27400 series with LED sources]*	1 set
USB cable (USBA to USB-C type)	1
Carry Pouch	1
Wrist Strap	1
Operation manual	1
QA certificates	1 set
ILAC/ NATA traceable calibration certificates including Power Meter, Light Source, Two-way detector	1 set

OPTIONAL INTERCHANGEABLE CONNECTOR ADAPTORS

This instrument is supplied with metal-free sleeve optical interchangeable connector adaptors. The source ferrule type is fixed and specified as either PC or APC. The power meter is for both PC & APC. Green is associated with APC. You can order any number of connector adaptors. Order quantity one per port. Universal adaptors are recommended to be used only on power meter ports.

Description	P/N	Description	P/N
FC	OPT051	E2000/LSH, Green	OPT060G
ST	OPT040	E2000/LSH	OPT060
LC	OPT076	1.25mm universal	OPT085
SC	OPT046	POF multi-connector	OPT077
MU	OPT080	2.5mm universal	OPT081
HFBR	OPT078	F3000	OPT072
LSA / DIN47256	OPT071	SMA	OPT082

OPTIONAL ACCESSORIES

Description	P/N
Option, Carry Case for 2 Instruments	OPT153
Option, Carry Case includes Cletop-style cleaner & Cleaning Sticks	OPT154B

AUTHORIZED DEALER

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KI 2000 Series LS / LTS / 2-way LTS / PM General Features

Full Feature Family

Full featured handheld optical Power Meter (purple), Light Source (yellow), Loss Tester (red).

Calibrations of all instruments are ISO 17025 traceable.

All Systems

Models for all fiber optic systems inclusive of Telco, PON, LAN, WAN, MPO/MTP Ribbon fiber, POF. A meter can test many fiber & connector types.

Ease of Use

Fewer keystrokes with custom LCD and 3λ loss test display, Autotest & guided button usage.

VisiTester Option

Mixes a laser VFL with Autotest Light Source, so the active test fiber winks, making it obvious.

Long Battery Life

Just 2x AA batteries work for 1000 hours for Power Meter, 90 hours for Light Source & Loss Tester. Choice of batteries is available with a jumper-selectable battery charger.

Total Uncertainty Specification

The Power Meter's unique Total Uncertainty Specification covers accuracy over all power levels, temperatures, connector and fiber types.

USB Key Data

Results in internal memory can be copied onto a USB memory key with one button-push providing unlimited test data storage capacity, backup or send from a cell phone.

Class 1 Laser

Kingfisher Laser Light Sources are Class 1 as per international laser eye safety standard, IEC 60825-2 (2011).

Autotest

Provides automatic real time multi λ loss testing up to 6 λ, with up to 3 λ displayed at once, with the respective source power levels. Use any Autotest source / meter / LTS with matching λ.
One keystroke to set all references or store all reading.

Encircled Flux Compliant Multimode Light Sources

All LED sources are Encircled Flux (EF) standards compliant, to provide the most consistent and reliable testing results.

Large LCD Display

The large custom LCD screen is sunlight-readable & backlit. It displays loss test data for 3 λ including reference or source power levels in Autotest.

Ribbon Fiber Test

The large detector area XL-version Power Meter is ideal for testing MPO/MT/MTP ribbon fiber connectors up to 72 fibers, 1 mm POF, fiber bundles, or any fiber with an active area up to 3 mm across.

USB Power & Charging

Instruments can be powered or charged (if re-chargeable batteries are fitted) via micro-USB.

Text Naming for Test Data

Loss test results can be stored in the large memory, along with a user-input cable name. Capacity is 1000 4-λ tests with text, timestamp, reference levels etc.

Test Tone with Multi-Fiber ID Function

Multi-Fiber ID Sources and meters provide a tone feature which can uniquely identify up to 12 fibers, in addition to common test tones, perfect for high density polarity and continuity testing.

Captive Dust Cap

The flip-over captive dust cap functions as tilt bail when open.

Other Features

- Useful standard accessories include pouch & wrist strap, connectors & documentation.
- Selectable auto-off & low battery indicator
- Versatile, rugged, reliable, moisture resistant constructions
- Power averaging mode for modulated signal
- Max / Min recording & display hold
- Displays mW, µW, nW, dB, dBm to 0.01 dB resolution
- Zero-warm up time Light Source option
- Up to 6 mixed LED, Laser & VFL Light Sources
- Up to 25 genuine Power Meters calibration wavelengths
- 3 ~ 7 Year warranty
- 2-way LTS capable of ORL & Length measurements
- 2-way LTS with large memory for 10,000 fibers
- ILAC/ ISO 17025 traceable calibration certificate

Interchangeable Connector

The practical interchangeable optical connectors are dust & drop protected and very simple to swap over or clean. Refer to Kingfisher's websites below for details.

For standard instrument

For XL Power Meter

Most Kingfisher adaptors are metal free to avoid contamination of connectors in high power systems.