OPTICAL TROUBLESHOOTING INSTRUMENTS

FLASHPISTOL® Leak Detection Probe
PX-Q500

PRODUCT OVERVIEW

The Flashpistol® leak detection probe is state of the art in precision fiber optic fault location, a light “sniffer” designed to find infrared radiation from splices, connectors, bends, damage, or open ports.* While traditional fiber test equipment can identify bad fibers or approximate distance to a fault, pinpointing problems in the real world is often about luck, intuition, or trial and error.

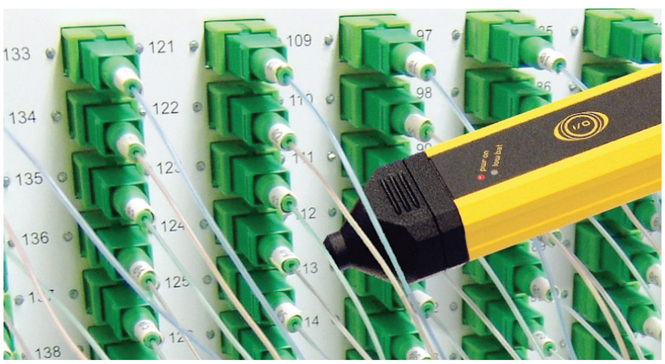
The patented Flashpistol® probe locates faults without contacting the test fiber thereby reducing the risk to adjacent live fibers. To use the Flashpistol® probe, simply squeeze and hold the trigger and sweep over a suspect area.

* 2kHz applications require a PX-Q4xx Series tracer source.

MADE IN U. S. A.

US PATENT 7,826,043B1 AND PATENTS PENDING

Note: Photos may vary from actual product



FEATURES

- Full two year warranty
- Integral weaver mount for aerial accessories
- Sunlight and fluorescent light immunity
- Interchangeable head accessories
- Standard 9V battery operation
- All metal construction

APPLICATIONS

- Fault location in splice enclosures and hubs
- Fault location in dead zones
- Fiber tracing end to end (300km+)
- Fiber tracing by mid-span leakage
- Fiber tracing by local bend
- Fiber bend and break pinpointing
- Connector damage detection
- Bulkhead adapter troubleshooting
- Live port detection
- Wavelength detection
- Splitter and WDM troubleshooting
- Aerial damage verification
- Saw cut and riser guard examination
- Raw fiber location and continuity testing
- Ribbon fiber orientation testing
- New installation scanning

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SPECIFICATIONS

Parameter	Value
Emitter	Laser, FP, Class 1
Wavelength	1550nm
Bandwidth	5nm
Power	<-1dBm
Modulation	500Hz
Detector	InGaAs
Sensitivity (mode sensitive)	-85dBm, -75dBm, -40dBm
Operating Temperature	-5C to 50C
Storage Temperature	-10C to 60C
Battery	9V Alkaline
Battery Life	24hr standby, 10hr typical usage

ORDERING INFORMATION

PX-Q5XX Flashpistol®

Model	Description
PX-Q500	Flashpistol® Leak Detection Probe
PX-Q504	Flashpistol® LD Set: Probe (Q500) & MedPwr +1Tracer Source(Q403)
PX-Q505	Flashpistol® LD Set: Probe (Q500) & HiPwr +5 Tracer Source (Q404)
PX-Q507	Flashpistol® LD Set: Probe (Q500) & VHiPwr +15 Tracer Source (Q410)

PX-Q4XX Flashpistol® Tracer Sources

Model	Description
PX-Q403	Single +1dBm 1550nm Tracer Source for Flashpistol* Probes
PX-Q404	Single +5dBm 1550nm Tracer Source for Flashpistol* Probes
PX-Q410	Single +15dBm 1550nm Tracer Source for Flashpistol* Probes
PX-Q424	Dual +5dBm 1550nm Tracer Source for Flashpistol* Probes
PX-Q434	Dual +5dBm, 1550nm / 0dBm, 650nm Tracer

PX-Q7XX Flashpistol® Accessories

Model	Description
PX-Q701	Head, (Standard Wideband Filter) 1280nm – 1650nm
PX-Q702	Head, 1310nm Filter
PX-Q703	Head, 1490nm Filter
PX-Q704	Head, 1550nm Filter
PX-Q721	Head, Fine point, 1550nm
PX-Q726	Head, Rigid, 3”, 1550nm
PX-Q731	Head, Flexible 24”, 1550nm
PX-Q750	Holster
PX-Q751	Flashpistol® Carry Case

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ENHANCED PRODUCT OVERVIEW

When troubleshooting fiber optic systems, it is often necessary to identify fibers or places where light is being lost from a fiber. Optical test sets and OTDRs are useful in finding the amount of loss or general loss locations, but to actually pinpoint a fault, a visible laser source has traditionally been the instrument of choice.

Visible laser sources inject red light into a fiber. Any red light that is visible indicates the fiber being tested, loss points, or breaks. The problems with visible lasers however are that they have a range of only a few miles, do not work with more opaque buffer colors (black, blue, green, etc.) and are not visible in well lit areas.

The Flashpistol® leak detection probe solves these problems. This pistol type device looks for an INFRARED tracer signal which can carry up to 300km, penetrate most 250 and 900uM buffers regardless of color, and is detectable in bright light conditions.

PX-Q500 Flashpistol® leak detection probe is designed to sense light three different ways:

Mode 1: Raw IR light detection

The "All IR" status indicator illuminates when any IR light hits the sensor at the tip of the probe. This includes communications traffic, strong room light, or sunlight. Its purpose is to detect IR light including traffic, tracer signals, or CW light. This allows identification of light at uncovered ports or to locate some severe bends and breaks in lightly colored fibers.

Mode 2: LOCAL tracer source light detection

The "Local" indicator (next to the 2kHz indicator at the rear of the unit) will illuminate only when the probe is sensing light from it's own internal source at the rear of the unit. This is the most sensitive mode of operation. Its purpose is to examine ports, fibers, splices or connectors for the presence of locally generated tracer light (from rear of probe). This mode is specifically for the detection of light leaks at the ends of a fiber link.

Mode 3: 2kHz remote tracer source light detection

The "2kHz Tracer" indicator at the rear of the probe will illuminate only when the probe is sensing a 2kHz modulated signal from the remote tracer source unit. Light can also be detected from any 2kHz light source operating between the wavelengths of approximately 1000-1700nM depending on the filter head employed, 1550nM light is recommended. Its purpose is to examine ports, fibers, splices or connectors for the presence of a 2kHz IR tracer light. This allows identification of light at uncovered ports up to 300km away or to locate severe bends / breaks in most 250 or 900um buffered fibers. This mode works throughout the length of a fiber link as well as at the ends.

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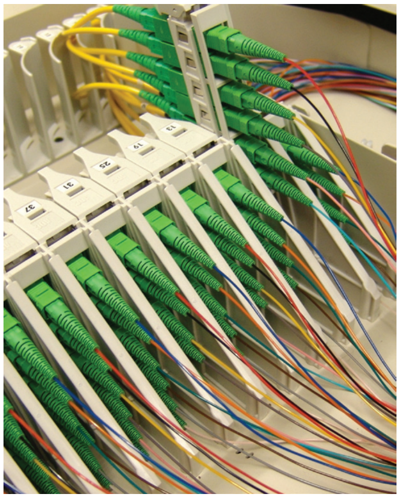
ENHANCED APPLICATION OVERVIEW

Fault location in splice enclosures and hubs



The PX-Q500 Flashpistol® leak detection probe is the only product specifically designed to passively troubleshoot fiber optic splice enclosures and hubs. Pinpointing faults in mid-span splice enclosures and hubs after an OTDR has indicated a problem is traditionally more about guesswork than actually “locating”. The only two tools currently available, until now, have been the visible fault locator (VFL) and the fiber identifier.

VFLs are only effective over a few kilometers, in darkened conditions, and in fibers with lighter colored buffer coatings. These limitations make the VFL virtually useless in troubleshooting mid-span splice enclosures and outdoor hubs.

Fiber identifiers can locate some faults by process of elimination but require the user to physically clamp on a fiber in multiple locations to work toward a fault. This requires the highly risky technique of clamping strands intertwined among potentially dozens or hundreds of active strands.

The PX-Q500 does not require physical contact with fibers or splices to locate faults. The technician simply connects a tracer source in place of the OTDR, opens the splice enclosure, squeezes the PX-Q500 trigger, and scans over suspect areas. In a typical splice enclosure, the probe would be swept over breakout areas, over splice trays, under trays, and along routed strands. If leakage is detected, a tone will be heard and a red indicator LED will light at the rear of the unit.

Fault location in dead zones

Similar to splice enclosure testing, the PX-Q500 Flashpistol® leak detection probe is also well suited for fault location at either end of a fiber link, areas which generally fall within an OTDR “dead zone”. Once again, VFLs and fiber identifiers, with their limitations, have been the only fault pinpointing solutions to date. While VFL devices are more useful at either end of a link than in splice enclosures, they still have problems with bright ambient light and dark buffer colors such as black, blue, brown, and green.

The PX-Q500 is uniquely capable in this application as well. Using its built in infrared light source, the Flashpistol® probe can detect leakage from not only breaks but bends in nearly all types of fiber buffers. Due to its extremely high sensitivity, only the PX-Q500 can also directly detect light leakage from broken splices, bulkhead adapters, broken or disengaged connectors, and fan-outs, even in bright ambient light conditions.

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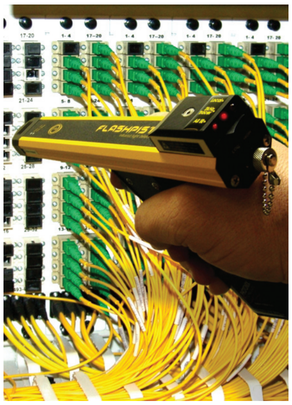
ENHANCED APPLICATION OVERVIEW

Fiber tracing end to end (300km+)



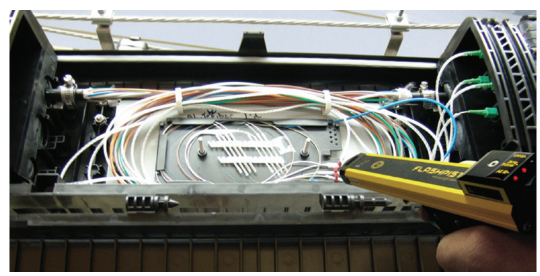
Another common application for the PX-Q500 is end to end fiber tracing. Working in tandem with a 2kHz tracer source, the Flashpistol® probe can trace fiber links with overall losses in excess of 70, 80, or even 90dB. This level of performance represents an ability to trace even un-amplified fiber spans well over 350km in length.

To trace a fiber, a 2kHz tracer signal is placed on the port of interest and the PX-Q500 is simply swept over output ports at the far end. The test technicians do not need to look for visible VFL laser light with the naked eye, sharply bend fibers with a fiber identifier, or physically connect to open ports with a meter. Again, because the PX-Q500 never makes contact with the output connector, there is no special cleaning or port inspection for every port tested. Hundreds of output ports can be scanned at a distance for tracer light in just seconds.

In situations where patch cords are connected to the output ports, simply bending patch cords over a finger will permit tracing. When used with Photonix high power tracer sources, the PX-Q500 can even trace ports through most plastic end caps or by connector bulkhead leakage.

Fiber tracing by mid-span leakage

Another application unique to Flashpistol® leak detection probes is the ability to passively trace a fiber mid-span using splice or connector leakage. Whenever a tracer signal passes through a splice or connector interface, a small amount of light is scattered from that point even if the associated loss is not significant as with a broken splice or damaged connector.



Analyzing this tiny leakage, this can be useful when checking for the presence of a signal passing through a patch panel or splice enclosure or verifying a splice scheduled for rework. By checking one side and then the other of a fusion splice, the technician can determine if a tracer signal is passing through it and which direction it is moving in; the signal only appears on the leeward or exit side of a good splice. If significant light is detected on both sided of a splice, it is likely damaged.

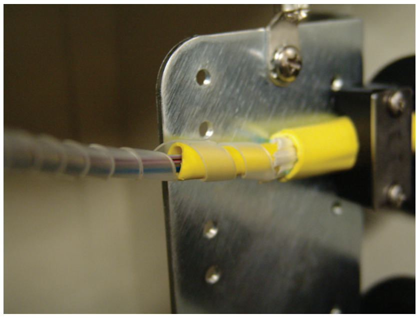
Fiber tracing by local bend

Bending a patch cord or buffered fiber over a wide mandrel or finger will extract enough tracer light from a fiber to permit detection with the PX-Q500. Such a minor bend, while enough to trace with, will induce far less attenuation in a fiber than the clamping heads on most fiber identifiers. This gentle bend is easier to perform in the field and is less likely to cause signal drop out on active fibers.

To test, attach a tracer source to the port of interest and simply bend the cord or cords under test over a finger to search for light leakage. Scanning over the bend, tracer signals may be detected and as with splice testing, direction can be determined by the by the location of scattered light.

ENHANCED APPLICATION OVERVIEW

Fiber bend and break pinpointing



The PX-Q500 was designed with a 10-20 degree acceptance cone for light at its receiver head. This means that the closer the PX-Q500 is to the fault, the more precise it is, accurate to 1/8" or less depending on the head installed. Conversely, it is possible to detect some faults from several meters away or more where the scanned surface can be over a meter in diameter. Therefore, when troubleshooting, it is best to start at a distance and work in toward a fault once a tone is detected. This technique will speed the process of fault location and may help discriminate between multiple loss points in a single enclosure.

Macrobends, microbends, and breaks in an optical fiber will all radiate light to varying degrees depending upon strength of the tracer source, distance to the fault, and buffer characteristics. Dark fiber buffers may attenuate light escaping from a fiber discontinuity by several more decibels than a light colored buffer. The PX-Q500 has variable gain to accommodate all common buffer styles.

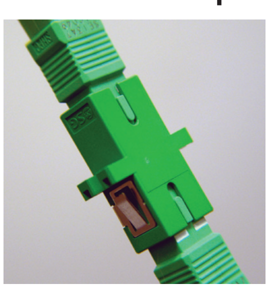
Escaping light can sometimes be intense enough to cause the buffer or adjacent structures to glow or reflect ghost signals. Ghost signals can be useful in the initial phase of fault location in that they can help the technician to quickly find a general region of leakage even if the fault is not in direct view. For example, a break underneath a stack of splice trays might not be directly visible to the PX-Q500 but a glow coming from reflected light might be detectable. Glow scattering through a single plastic splice tray can indicate which tray contains a broken splice before unstrapping the entire stack. The PX-Q500 will readily detect such signals so it is a good idea to isolate a suspect strand to pinpoint damage once a tracer signal has been detected.

Connector damage detection

Damaged connectors can be detected with the PX-Q500 either engaged in a bulkhead adapter or standalone. A contaminated or damaged connector pair in a bulkhead adapter will not only attenuate light as seen by traditional test equipment, it will scatter a significant amount of light that the PX-Q500 can detect as a glow in and around a bulkhead adapter and the leeward connector boot area.

A connector not engaged in a system can still be checked if a tracer signal is present. A normally functioning connector will project light from its endface in a conical pattern roughly representing the acceptance cone of the fiber under test. Because of this fact, no light should be detected when a connector is viewed from the side. Connector endface contamination or internal damage will scatter light to the side of a connector where the PX-Q500 can it; a handy feature for times when a microscope is not available.

Bulkhead adapter troubleshooting



Similar to mated connector contamination or damage detection, the PX-Q500 will detect leakage radiating from around a bulkhead adapter if it has a damaged or contaminated alignment sleeve or if the connectors inside are not fully engaged with one another. IR radiation can be detected through many plastic bulkhead adapters or from the leeward boot areas of a mated connector pair.

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ENHANCED APPLICATION OVERVIEW

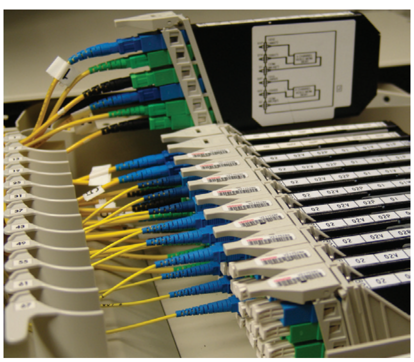
Live port detection

The PX-Q500 includes an “All IR” indicator which illuminates in the presence of IR light greater than approximately -40dBm. This useful feature allows the test technician to simply point the Flashpistol® probe at an open port or fiber endface to check for the presence of signal. This method is more reliable than using phosphor detection cards which are difficult to see. It is safer as well since the laminated cards can often reflect port emissions directly into the eye. Furthermore, since the Flashpistol® probe is a non-contacting device, there is no need to clean and inspect patch cords and no risk of cross contamination or port damage.

Wavelength detection

A feature associated with live port detection is the ability to discriminate between wavelengths during live port detection. The PX-Q500 has an interchangeable head design which allows the technician to swap out the standard broadband detection head for a narrow band filter head which will only pass 1310nm, 1490nm, 1550nm, or 1625nm light. By testing with a wavelength specific head, the technician can determine if that particular wavelength is present.

Splitter and WDM troubleshooting



Splitters can be checked for damage by scanning in a method similar to that used for fiber bend and break testing. In addition, ports can be checked end on for the presence of light or by bending output fibers over a finger or mandrel. Splitters with division ratios as high as 1:32 are verifiable in this way due to the high sensitivity of the PX-Q500. WDM devices can also be tested with the use of narrow band heads to verify proper wavelength diversion.

Aerial damage verification

Aerial damage due to firearms, rodents, birds, or arcing can be detected from a distance using the PX-Q500 sister products, the PX-Q550 Flashpistol® or the PX-Q650 Flashfinder™ aerial leak detection probes. The PX-Q500 does however have use in aerial applications. Once a suspected damage area is found in an outdoor cable, it can be scanned at close range for tracer signal leakage. A detected tone serves as confirmation that the fiber is indeed damaged in the suspect region.

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ENHANCED APPLICATION OVERVIEW

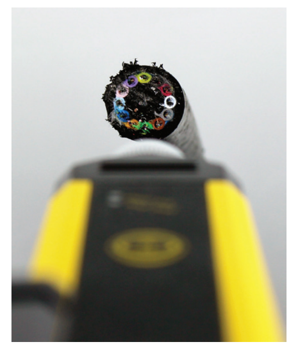
Saw cut and riser guard examination

In the field, rodent damage under telephone pole riser guards or conduit entrances can sometimes be detected using the optional PX-Q731 24” flexible adapter head. By pushing the tip of the flexible fiber bundle into the tube, it is possible to detect stray radiation scattered from rodent chew points.

A similar technique can be used to probe roadway saw cuts in instances where a conduit cut is suspected. Blowing out the test area with compressed air is sometimes helpful during this type of test.

Raw fiber location and continuity testing

Occasionally it may be necessary to locate specific strands of fiber in a bundle where the individual fibers cannot be identified by color code or numbering. Traditionally this task can be a time consuming process of clamping strands one at a time in a fiber identifier or using a bare fiber adapter to connect to a meter. The PX-Q500 can quickly locate a strand by separating a bundle into subgroups and scanning for tracer light. By breaking the detected group into smaller and smaller bundles, a single strand can be traced in seconds, even out of a cable with hundreds of fibers.

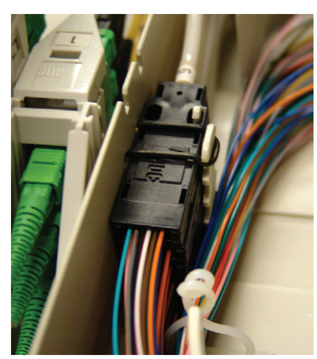


Ribbon fiber orientation testing

Vintage ribbon fibers sometimes have a problem with color code fading. This presents problems with restoration or splice repair when it comes to determining ribbon orientation. By placing a tracer signal on “fiber 1” at the CO or head end, the PX-Q500, fitted with a PX-Q721 fine point tip can be used to locate which strand is actually “fiber 1” in the field ribbon.

New installation scanning

During the initial installation phase of a fiber link, testing is often required to establish a baseline for future measurements. Such measurements are made with an optical power meter or OTDR and are useful in demonstrating loss performance in a link. The PX-Q500, while not a quantitative analysis tool, can be very useful in scanning a new installation for potential bends, breaks, or other “hot spots”. By connecting the internal laser of the PX-Q500 to a newly terminated fiber, the end enclosure can be scanned for light leaks and suspect areas can be scrutinized.



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