

CD400L

Component Delay - Dispersion System



Description

The CD400L delay/dispersion measurement system uses tunable lasers and DSP technology to provide state-of-the-art performance measurements of group delay and chromatic dispersion in DWDM components and fibers

Features

- Enables full group delay ripple detail to be characterised
- Transmission and reflection testing
- Fully integrated system with automated control software and easy factory interfacing
- Supports up to four lasers for broad wavelength coverage
- High chromatic dispersion and delay accuracy
- High dynamic range

Overview

The **PE.fiberoptics** CD400L Delay/Dispersion System uses tunable lasers to measure the group delay, chromatic delay and dispersion in DWDM fiber components and fibers. It is a special variant of **PE.fiberoptics'** standard CD400 instrument which measures chromatic dispersion in optical fiber, offering still higher accuracy and dynamic range.

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The CD400L works either by using the phase shift method to detect group delay in the fiber or component or by using the well-known differential phase shift method to isolate and directly measure the chromatic dispersion (CD) independently of the group delay.

The CD400L provides state-of-the-art delay repeatability below 1ps, yet uses only a 70MHz modulation frequency. This allows the full delay ripple in fiber Bragg gratings to be examined without loss of detail at the picometer level.

With the addition of an optional wavemeter, wavelength accuracy can be maintained to <1pm. The system software controls both the laser and the wavemeter whilst simultaneously collecting power, delay and dispersion data. The wavemeter can be used on-line for maximum accuracy, or off-line for speed to merely calibrate the laser periodically. The functionality of the CD400L is further expanded by the addition of the CD472 option, which allows connection and seamless control of up to four separate tunable lasers, giving full coverage of O,S, C and L bands.

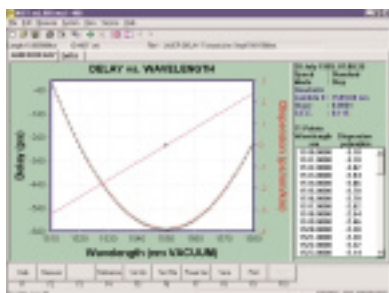


Figure A
Delay in a 10km dispersion - shifted fiber, showing a CD fit (red line)

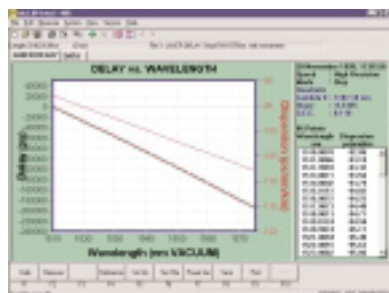


Figure B
Delay in 30km Dispersion Compensation fiber (DCF), and corresponding CD fit (red line)

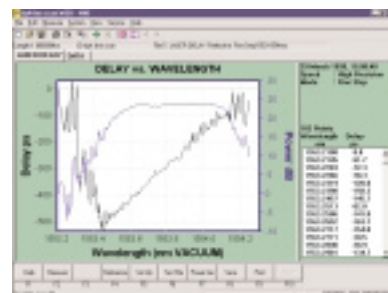


Figure C
Both insertion loss and delay can be acquired simultaneously as in this chirped fiber Bragg grating (FBG) reflection response measurement

The CD471 option enables the CD400L system to measure both reflection and transmission responses. This allows the device under test to be characterised in both directions (port A & B) without the need for a second optical connection. The CD431 Polarisation Mode Dispersion (PMD) option allows PMD measurements to be taken in the 1-100ps range.

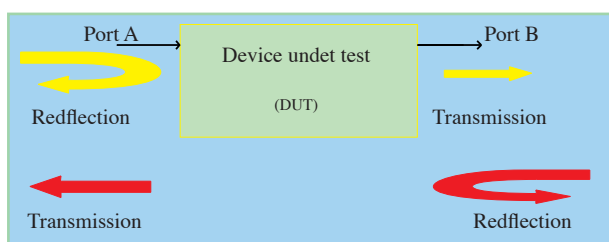


Figure D
The CD471 option allows measurement of reflection and transmission responses.

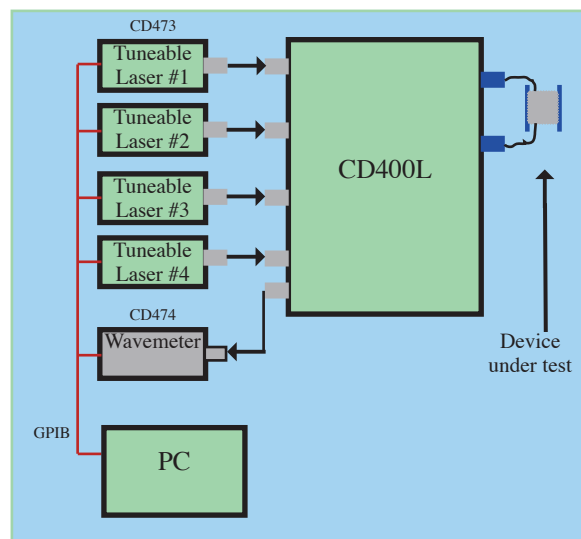


Figure E
With the CD472 option, up to four tunable lasers may be used. The CD474 wavemeter allows additional accuracy

Other information

All the same state-of-the-art performance features of the CD400L are also available in the CD450 add-on package designed for existing CD400 LED dispersion measurement systems. This permits LED and Laser dispersion measurements to be combined in one test set, a feature unique to

PE.fiberoptics. The CD450 can be purchased separately for upgrading, or as a combined CD400-450 system.

CD400L Component Delay - Dispersion System

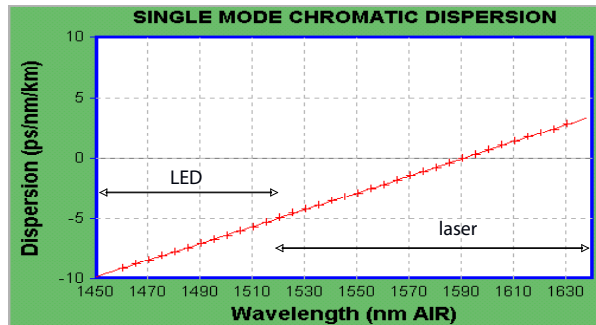
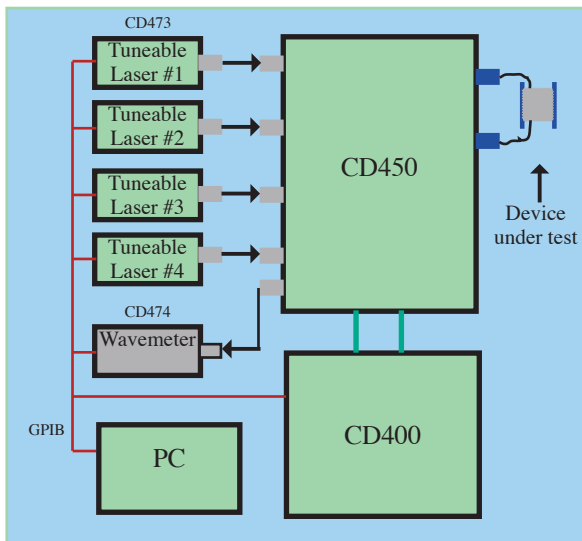


Figure F
The CD400-450 system allows combined LED and laser chromatic dispersion measurements.

Figure G
Dispersion result from a 50km NZDF fiber using the CD400-450 system, showing directly measured CD points from mixed LED and tunable laser sources.

Features

- Fully Integrated group delay and chromatic dispersion measurement modes.
- Delay conforms to: TIA FOTP169, IEC 60793-1-42, ITU G650
- Full differential phase shift method for dispersion
- Conforms to TIA FOTP-175, IEC 60793-1-42C
- Reduces thermal drift effects in fiber
- Provides a direct dispersion readout
- Only need to measure the wavelengths required
- No data fit to get dispersion values
- User selection of air or vacuum wavelength calibration
- Optional use of wave meter for improved wavelength accuracy
- Integrated length measurement facility
- Reflection or transmission response measurement (CD471)
- Up to four external tunable laser sources supported (CD472 option)
 - 1310 laser (typically 1260-1330 range)
 - 1550 C band (typically 1460-1580nm range)
 - 1590 L band (typically 1510-1640nm range)
- Extensive range of group delay and dispersion data fits
 - 3 term Sellmeier
 - 5 term Sellmeier
 - Quadratic
 - Linear
 - Polynomials
- High Dynamic range >55 dB on laser sources (at 0 dBm laser power)
- High repeatability
 - Custom low-noise phase detection hardware (<1ps noise)
- Operates at only 70MHz
- High Accuracy, fully traceable to NIST/NPL
 - Use of wavemeter for laser wavelengths is optional, referenced to He-Ne laser standard
 - Phase detector calibration to NPL fiber delay standards
 - Fiber slope and lambda zero traceable to NIST/NPL fiber CD standards
- Fully automatic software
 - Windows 98/NT/2000 Operating System
 - Full remote control capability for factory interfacing
 - Full export and print facilities
- Fully integrated PMD Testing (CD431 option)
 - Wavelength scanning Fourier Transform method
 - Conforms to TIA FOTP-113, JEC 60793-1-44, ITU6650
 - 1 - 100ps PMD range for long fibers

CD400L Component Delay - Dispersion System

Ordering information

For detailed operating and environmental specifications, please refer to the CD400L specification sheet, available from **PE.fiberoptics**

Ordering information

The CD400L is available in three configurations:

1. CD400L Laser-based tunable laser system unit (one laser input), transmission only.
2. CD450 Slave tunable laser system unit to couple to existing CD400 (one laser input), transmission only.
3. CD400 - 450 Complete CD400 and CD450 system (one laser input), transmission only.

Options available on all three configurations include:

1. CD431 Polarisation Mode Dispersion option
2. CD471 Reflection Reflection and transmission measurement for DWDM component testing.
3. CD472 Laser Input Optics for three more additional laser inputs.
4. CD473 Laser Tunable Laser source, to specification.
5. CD474 WA1600 Wavelength meter, 0.3pm accuracy.
6. CD474 WA1100 Wavelength meter, 1.5pm accuracy.

PE.fiberoptics reserve the right to change or amend specifications without notice.

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