DPC5500 In-Line Deterministic Polarization Controller

Polarization
Measurement/Control

PMD/PDL
Measurements

Polarization
Accessories

Introduction - DPC5500

The DPC5500, an in-line deterministic polarization controller for the TXP5000 systems, combines deterministic state of polarization control, high speed, low loss, and high accuracy in a unique all-fiber-based solution. It is a versatile polarization control solution that may be utilized in many applications, ranging from R&D to industrial applications. The polarization controller is available as a module (DPC5500) for the TXP mainframe (page 444) or as a complete benchtop unit including a preconfigured PC (DPC5500-T Series).

The DPC5500 is based on our high-speed, low-loss IPM5300 polarimeter technology and a non-deterministic state of polarization (SOP) controller. A digital signal processor (DSP) produces a feedback signal from the polarimeter to drive the fiber squeezer-based state of polarization controller. The DPC5500 is ideal for applications that require precise deterministic control or locking of a SOP.Software modules for electronic SOP control, SOP tracing on the Poincaré sphere and SOP scrambling are available for specific application.

How It Works

Central to the DPC5500 is a DSP, which enables high-speed control and locking of the SOP. The DSP monitors the polarization feedback signal

from the polarimeter and drives the non-deterministic SOP controller, which is comprised of a multitude of piezoelectric based fiber squeezers. A simple yet robust calibration algorithm accounts for the inherent nonlinearities in the piezoelectric elements and allows for accurate and stable deterministic SOP control.

This facilitates SOP control at a user-defined location in the optical system such that the SOP can be varied to accurately and precisely follow a prescribed path on the Poincaré sphere (see Figure 1).

Comparison to Existing Systems

The DPC5500 eliminates the inadequacies of most commercially available SOP controllers whose output SOP depends on the input SOP. Any input SOP change will implicitly lead to a corresponding output SOP rotation. In addition, most commercial high-speed SOP controllers are trial and error controllers and suffer from drift and hysteresis effects. They are non-deterministic and are dependent on environmental and prior conditions. This all-fiber technology provides deterministic control with very low insertion loss. The desired SOP may either be defined via its azimuth/ellipticity parameters or its corresponding Stokes values, which are graphically defined by a point on the Poincaré sphere or electronically defined by supplying a feedback signal from a control loop.

DPC5500
Polarization
Controller Module

DPC5500-T
Benchtop Polarization Controller
(Includes Pre-Configured PC)

Highlights

- Deterministic Polarization Control and Locking
- Generates Precise SOP Sequence for Jones and Mueller Matrix Characterization Methods
- Accurate Component PDL/PMD Characterization
- External Trigger Allows Synchronized Measurement
- Monitoring the S Parameters by Analog Outputs
- High-Speed Feedback for Automatic Polarization Control

Specifications

- **SOP Adjusting:** 150µs (Typical)
- **Wavelength Range:**
  1510-1640nm (Calibrated)
  1200-1700nm (Upon Request)
- **Measurement Rate:** 1MSamples/s - 3Samples/s
- **SOP Accuracy:** ±0.25° on Poincaré Sphere
- **DOP Accuracy:** ±0.25%
- **Insertion Loss:**
  < 0.6dB (Excuding Connectors),
  < 1.1dB (Including Connectors)
- **PDL:** <0.05dB

- **Dynamic Range:** 35dB (-20dBm to +15dBm)
- **Operating Modes:** DPC, IPM Single-Mode, IPM Array Mode
- **Analog Interface:**
  Outputs: S1, S2, S3, Power/dBm, DOP
  Input: Trigger
- **Digital Interface:** Outputs: S1, S2, S3, Power/dBm, DOP, Azimuth, and Ellipticity
- **Width:** 2 TXP Slots
- **Operating Temperature:** 5-40°C

The DPC5500 requires a TXP5000 series mainframe for operation. See page 444 for details.

SOP Scrambler

The systems also includes a SOP Scrambler, which can be used to depolarize a source to minimize PDG in fiber networks, to eliminate polarization dependencies of fiber optic sensors, or to perform PDL measurements.

The SOP Scrambler provides six modes of operation:

- Random Distribution of Successive SOPs
- Random SOP Trace
- Predefined SOP Trace

Figure 1
The degree to which we can deterministically control the state of polarization within an optical system is shown

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Please Call or Visit Our Website for Delivery Information

ITEM#	$	£	€	RMB	DESCRIPTION
DPC5500	$ 10,140.00	£ 6,388.20	€ 9.430,20	¥ 96,837.00	In-Line Deterministic Polarization Controller Card
DPC5500-T	$ 11,338.80	£ 7,143.40	€ 10.545,10	¥ 108,285.50	Benchtop In-Line Deterministic Polarimeter, PC Included

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