

DPC5500-T Benchtop In-Line Deterministic Polarization Controller

Introduction

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 research and development to industrial applications. The



polarization controller is available as a complete benchtop unit including a preconfigured laptop, the DPC5500 module and TXP mainframe (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 an SOP. Software modules for electronic SOP control, SOP tracing on the Poincaré sphere, and SOP scrambling are available for specific applications.

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-T

Benchtop Polarization Controller
(Includes Pre-Configured Laptop and TXP5000)

Specifications

- **SOP Adjusting:** 150 μ s (Typical)
- **Wavelength Range:**
 - 1510-1640 nm (Calibrated)
- **SOP Accuracy:** $\pm 0.25^\circ$ on Poincaré Sphere
- **DOP Accuracy:** $\pm 0.25\%$
- **Insertion Loss:**
 - < 1.2 dB (Including Connectors)
- **PDL:** < 0.05 dB
- **Dynamic Range:** 35 dB
(-20 dBm to 15 dBm)
- **Operating Modes:** DPC, IPM Single-Mode, IPM Array Mode, Scrambler Mode (Optional)
- **Analog Interface:**
 - Outputs: S1, S2, S3, Power/dBm, DOP
 - Input: Trigger
- **Digital Interface Outputs:** S1, S2, S3, Power/dBm, DOP, Azimuth, and Ellipticity
- **Operating Temperature:** 5 - 40 $^\circ$ C

*Specified at 1550 nm or user calibration wavelength and +3 dBm input power. DOP accuracy over entire specified wavelength range is $\pm 0.5\%$

Highlights

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

The DPC5500-T includes a TXP5000 series mainframe and a pre-configured laptop. See page 1476.

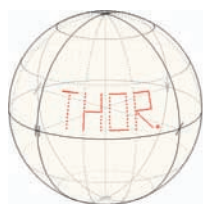


Figure 1

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

SOP Scrambler

The system also includes an SOP Scrambler, which can be used to depolarize a source to minimize Polarization-Dependent Gain in fiber networks, to eliminate polarization dependencies of fiber optic sensors, or to perform PDL measurements.

The SOP Scrambler provides three modes of operation to adapt to the users application. These modes differ in the way the SOP values are generated and controlled (full deterministic SOP scanner, semi-deterministic SOP scanner, and deterministic randomizer). The options have different operation speeds depending on their involved complexity.

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ITEM #	\$	£	€	RMB	DESCRIPTION
DPC5500-T	\$ 11,906.00	£ 8,572.30	€ 10,358.20	¥ 94,890.82	Benchtop In-Line Deterministic Polarimeter, Laptop Included