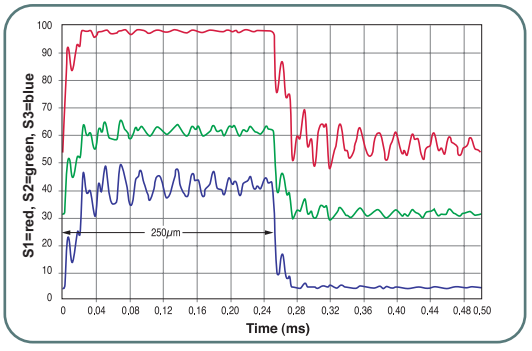
IPM5300 In-Line Polarimeter – Page 2 of 2

An example of the measurement capability of the IPM5300 polarimeter is demonstrated in the data shown to the right. The experimental setup is depicted in Figure 3. A fiber-pigtailed laser was used as the input to the polarization controller. The signal from the controller was input to the IPM5300 which was installed in a TXP chassis and controlled via a local computer. The acquired data included the state of polarization (SOP), the change in the SOP, the power, and the degree of polarization (DOP). This data is shown in Figures 2 and 3.

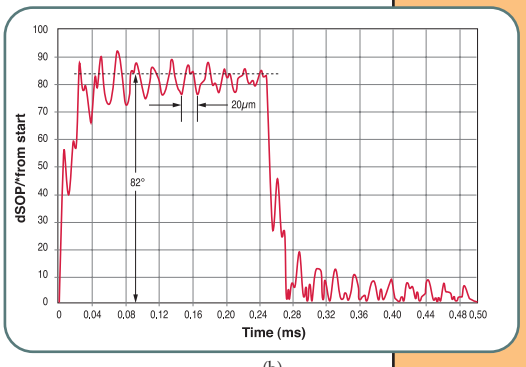
The piezoelectric-based polarization controller was controlled with a square wave signal at 2kHz to cause quick changes in the state of polarization into the polarimeter. The induced polarization change was 82° on the Poincaré sphere. Figure 1a shows the measured Stokes vector elements (S1, S2, and S3), while Figure 1b shows the angular deviation in the state of polarization on the Poincaré sphere. Figure 2 shows the total measured power and the DOP versus time. One aspect of the data that is clearly evident in Figure 1 is the ripple. The polarimeter, with a data acqisition rate of 10^6 samples per second, accurately measures the SOP as the controller changes polarization (Figure 1a). The ripple in the data has a period of 20µsec (50kHz), which is easily resolved by the polarimeter. This ripple displays true variation in the SOP caused by variations in the mechanical stress on the fiber due to a 50kHz mechanical resonance in the piezo controller.

Despite the resonance, the measured optical power and the DOP was constant as the polarization was changed. The deviations in the data are at the measurement uncertainties of the polarimeter, <0.02dB and <0.1%, respectively.

This example shows the precision and accuracy of the IPM5300 series even on fast changing states of polarization.



(a)



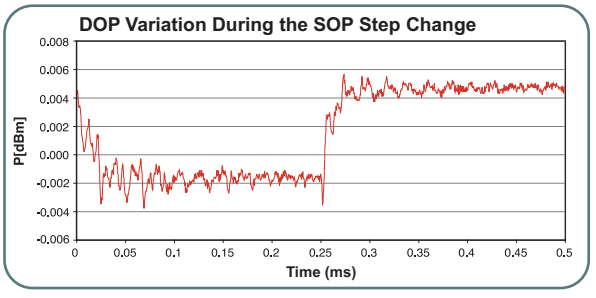
(b)

Figure 1

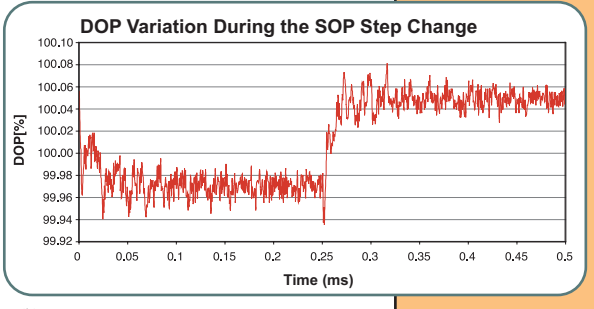
This data was taken using a standard piezoelectric polarization controller to change the input SOP to the IPM5300 from one state to another. The ripple in the data is due to mechanical resonance in the piezo elements.

a) Shows measured S1, S2, and S3 versus time as the input SOP is changed from one state to another.

b) Shows the deviation in the SOP versus time as the polarization is changed from one state to another. This shows ~82° deviation on the Poincaré sphere.



(a)



(b)

Figure 2

This data was taken at the same time as the data in Figure 1.

a) Shows measured optical power (dBm) versus time as the input SOP is changed from one state to another via a standard piezoelectric polarization controller.

b) Shows the DOP versus time as the polarization is changed from one state to another. This shows ~82° deviation on the Poincaré sphere.

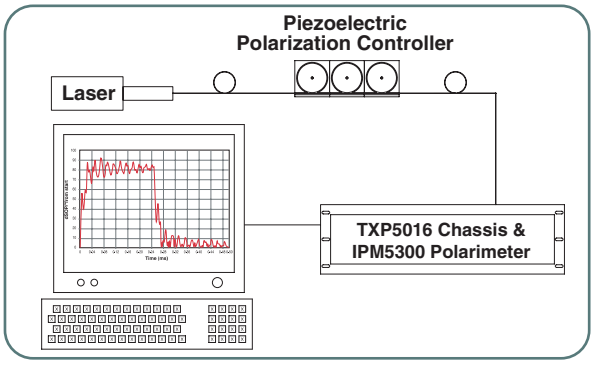


Figure 3

Experimental setup to measure polarimetric effects due to mechanical resonance in a piezoelectric-based polarization controller.

High-Speed In-Line Polarimeter Module and Chassis

ITEM#	$	£	€	RMB	DESCRIPTION
IPM5300	$ 8,760.00	£ 5,518.80	€ 8.146,80	¥ 83,658.00	In-Line Polarimeter Card
IPM5300-T	$ 9,958.80	£ 6,274.00	€ 9.261,70	¥ 95,106.50	Benchtop In-Line Polarimeter, Including Preconfigured PC