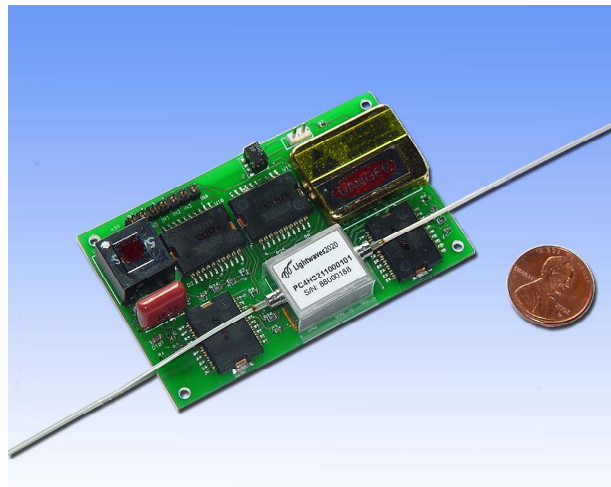


## **Product Specifications**

### *User Manual*

# **High-Speed Polarization Controller**



### **1. PRODUCT DESCRIPTION:**

The Lightwaves2020's high-speed polarization controller (PC) is based on novel optical material offering fast response in  $\mu s$  in contrast with conventional polarization controllers with speed in  $ms$ . The dramatic increase in response speed enables the new polarization controller suitable for demanding 40Gbs PMDC application as well as polarization Mux/DeMux application. In addition, the new high-speed polarization controller is ideal for fiber sensing in optical security, spectroscopy and polarization dependent imaging in biomedical applications.

An optional driver-PCB, on which the polarization controller is fixed, is provided. The device is driven by 0-5 VDC voltages to produce 0 -  $2\pi$  phase retardation of polarization state.

The high-speed polarization controller (PC) has options of three or four cell design. The fourth cell is added for faster searching and controlling.

## Product Specifications

### 2. FEATURES:

- High Speed ( $\mu$ s).
- Broadband wavelength ranges.
- No moving parts.
- Low insertion loss.
- Low PDL over wavelength range.
- Solid state technology

### 3. APPLICATIONS:

- PMD Compensation
- Polarization Generator
- Polarization Scrambler
- Polarization Multiplexing/Demultiplexing
- Polarization Instrumentations
- Fiber Sensing
- Polarization Dependent Imaging
- Polarization Coded Optical Security

### 4. SPECIFICATIONS

#### 4.1 OPTICAL PROPERTIES

Parameters	Performance
Operational Wavelength Range	1528nm to 1610nm
Response Time @ 23°C	Typ. < 10 $\mu$ s
Maximum Insertion Loss	<1.2 dB
PDL	<0.05dB
PMD	<0.05ps
Maximum Back-reflection	< -50dB
Driving Voltage (with driver)	0-5VDC
Driving Voltage (w/o driver)	0-180VDC

*Note: 1. All specification referred without connectors.  
 2. Measured at wavelength 1550nm.*

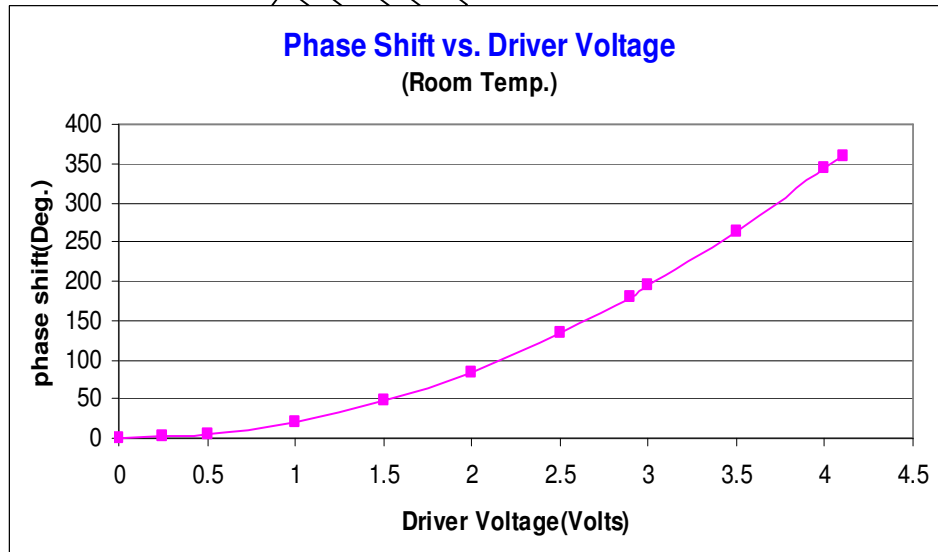
## Product Specifications

### 4.2 ELECTRICAL, MECHANICAL AND PACKAGE SPECIFICATIONS

Parameters	Unit	Specifications
PC Dimensions (LxWxH)	mm	38x15x9
Driver-PCB (LxW)	mm	79x52x12
Fiber Type	-	9/125 corning SMF-28
Fiber Pigtail	-	0.9mm tight buffer, 1.0m
Optical Connector	-	FC/PC, FC/APC, SC/UPC
Operating Temperature	°C	0 to 65
Storage Temperature	°C	-40-85
Relative humidity	%	0-95

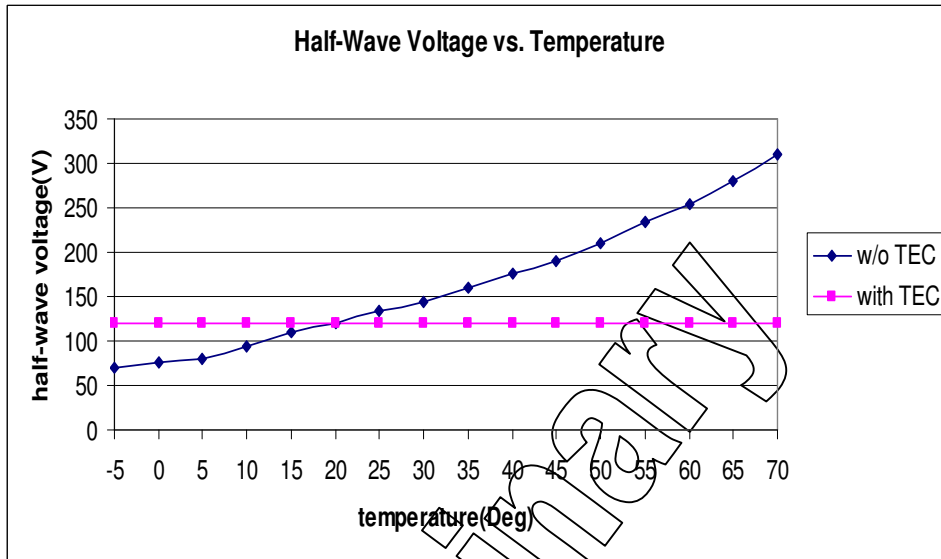
## 5. PERFORMANCE:

### 5.1 Phase Retardation vs. Drive Voltage:



## Product Specifications

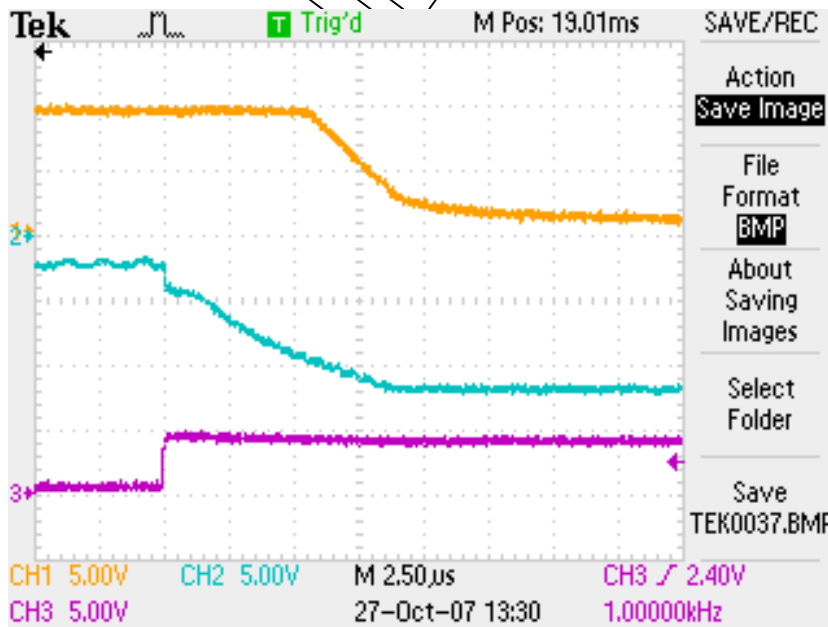
### 5.2 Half-wave Voltage vs. Temperature:



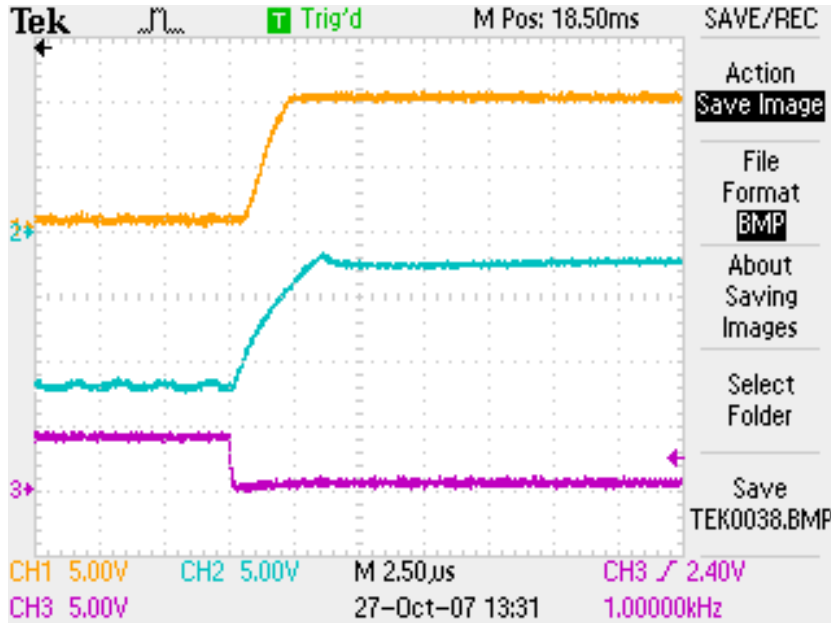
### 5.3 Raising and Falling Time:

**Raising time: < 2.5 $\mu$ s, Falling time: < 8.0 $\mu$ s**

(Red trace: Control Signal, Green: Voltage applied on PC, Yellow: Light Intensity)

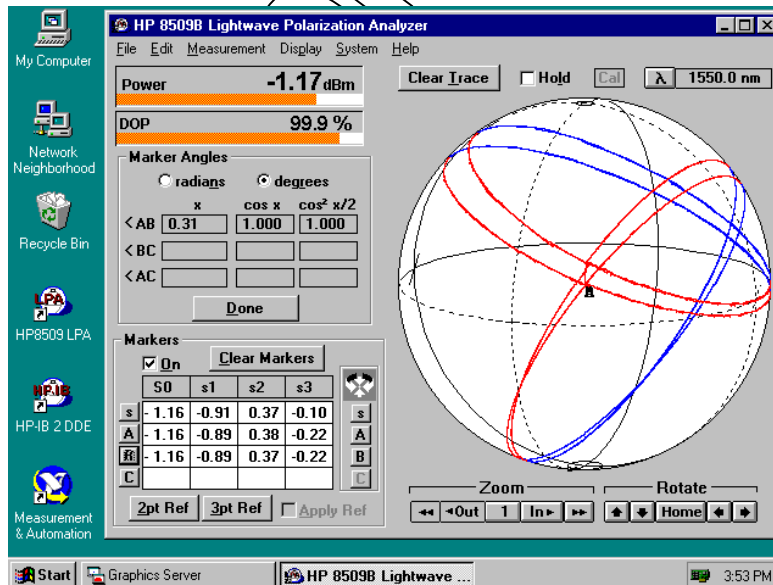


## Product Specifications



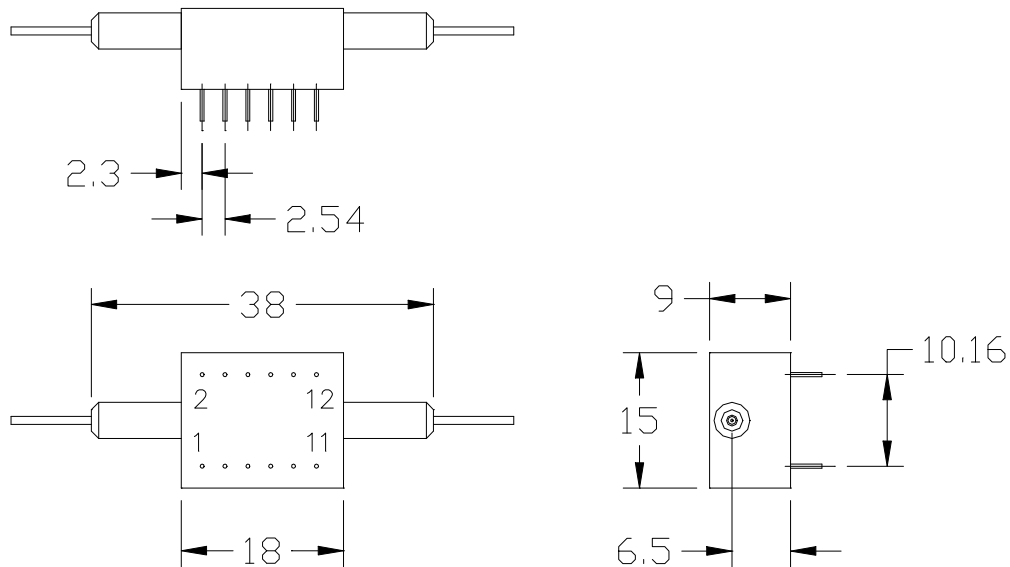
### 5.4. Measured Phase Retardation

- $V_{\pi}=120V, V_{2\pi}=165V$  @ RT
- Phase Change trace perpendicular for  $0^{\circ}$  cell and  $45^{\circ}$  cell
- $IL \leq 1.2dB$



## Product Specifications

### 6. MECHANICAL DIMENSION:



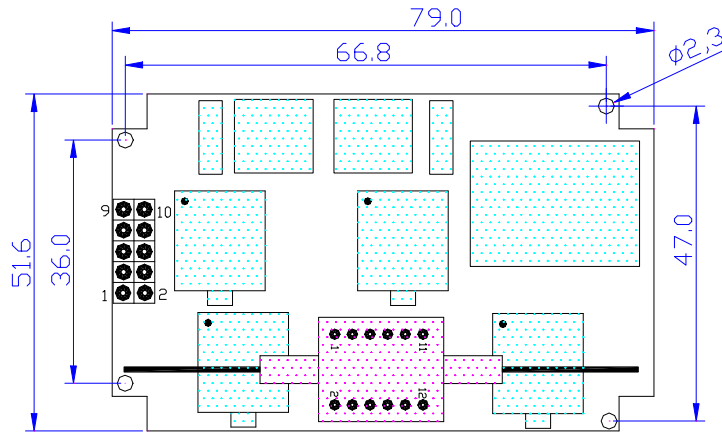
**Pin Layout**

1	Cell-1(+)	2	Cell-1 (GND)
3	Cell-2(+)	4	Cell-2(GND)
5	Cell-3(+)	6	Cell-3(GND)
7	Cell-4 (+)	8	Cell-4 (GND)
9	Thermister	10	Thermister
11	TEC(+)	12	TEC(-)

### 7. DRIVER LAYOUT:

- Output Voltage: 200VDC
- Response Time: <math><10\mu\text{s}</math>
- Input setting voltage: 0-5VDC
- Power Consumption: <math><3\text{W}</math> @ 65°C
- Operating Temperature: 0°C - 65°C

## Product Specifications



### Driver Pin Description:

( Pin P/N: Santec: ESQT-105-02-G-D-455, Female)

1	Channel-1 Input	2	Channel-2 Input
3	NA	4	Channel-3 Input
5	NA	6	Channel-4 Input
7	GND	8	GND
9	+5VDC	10	+5VDC

All input setting voltage 0V-5.0V corresponding to 0-360° phase shift.

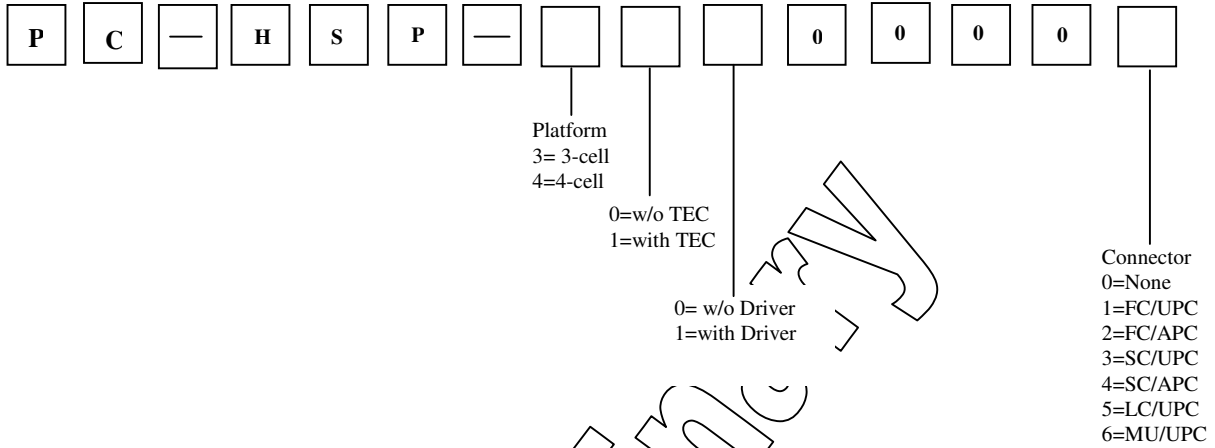
## 8. LABELING AND MARKING

The module will be labeled with the following information.

1. Manufacturer's name and Logo
2. Model Number
3. Serial Number.

## Product Specifications

### 9. ORDERING INFORMATION



Preliminary

