

## Automated PER Measurement Duo (CUBE-PM100 and CUBE-ER100)

### Description

In the polarization extinction ratio (PER) measurement of a polarization maintaining (PM) device under test (DUT), large PER measurement uncertainties often arise if the PER of the light source is low or is not well aligned with the PM fiber axis. To minimize such measurement uncertainties, In-line Photonics is proud to introduce the industry's first automated PER measurement duo, which can automatically eliminate the error sources in the PER measurements. The duo comprises a polarization maximizer cube (CUBE-PM100) and a PER meter cube (CUBE-ER100), which are coordinated to automatically optimize the linear polarization into the PM fiber pigtail of DUT while measuring the PER at high speed. Collectively, they reduce the total PER measurement time (including setup time) to under two minutes while assuring a high measurement accuracy with an uncertainty of less than 0.25 dB, which are more than ten times the improvement for both the measurement time and accuracy over conventional PER measurement systems.



CUBE-PM100 is a motorized linear polarization generator that converts input broadband light to highly linearly polarized light (PER > 45 dB) and couples the light into a PM fiber in free space. A motor can finely adjust the angle between the linear polarization and the PM fiber axis to achieve an over 45 dB maximum PER.

The CUBE-ER100 is a high-performance PER meter with a PER measurement range of 52 dB, an angular resolution of 0.028°, a wide operating wavelength range from 600nm to 1620nm, and a fast measurement speed of up to 50 data points per second.

CUBE-PM100 and CUBE-ER100 each come with a full-speed USB 2.0 port for computer control and a UART port for interconnecting with other LabCUBE™ modules from In-line Photonics for expanded functionalities. CUBE-ER100 also has two analog outputs for the closed-loop control in the PM fiber auto-alignment system and two general-purpose TTL inputs/outputs for measurement and control synchronization. CUBE-PM100 is designed to replace the inline polarizers and the time-consuming fusion splicing between the inline polarizer and the DUT in conventional PER measurement systems. Instead, the user connects the input and output PM fibers of DUT to CUBE-PM100 output and CUBE-ER100 input through two FC bare-fiber adapters, respectively. Then the CUBE-PM100 will automatically read PER test results from CUBE-ER100 through the UART port and retrieves the maximum PER by optimizing the alignment angle in CUBE-PM100. With the duo, no more worries about the PER measurement uncertainties of PM fibers or devices.

### Features:

#### *Polarization Maximizer CUBE-PM100:*

1. Free-space coupling to PM bare fiber
2. High polarization extinction > 45 dB
3. Compact size
4. Motorized polarization angle alignment
5. Automatic PER maximization by CUBE-ER100
6. Easy to be integrated into automatic fiber pigtailling systems

#### *PER Meter CUBE-ER100:*

1. One unit for all wavelengths: 600 ~ 1600nm, or 800~1700nm
2. Measurement speed up to 50 data points per sec.
3. Compact size
4. Expandable to multiple channels
5. Flexible input options with different adapters
6. Mounting holes for 16mm cage assembly system for adapters
7. High PER dynamic range > 52 dB
8. Easy to be integrated into automatic fiber pigtailling systems

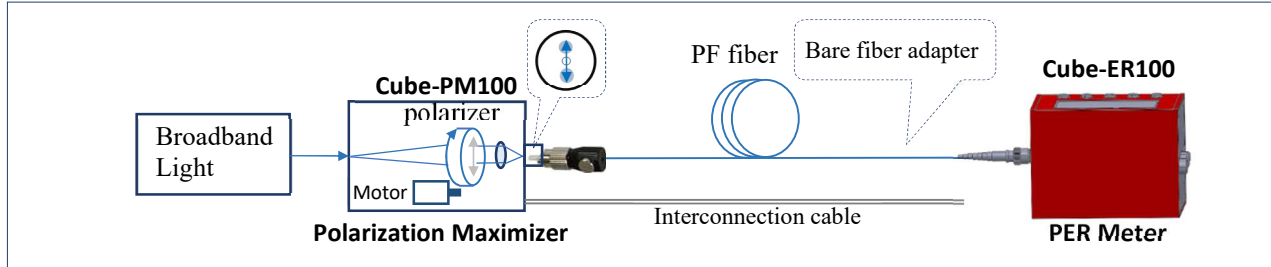
### Applications

1. Fast and accurate PER measurement of PM fiber coils and PM components
2. Fast and precise PER screening of PM fiber spools
3. Active angle alignment of PM devices: Fiber Gyro IOCs and PM fiber fusion splices
4. Automatic PM fiber axis alignment for pigtailling light sources
5. Automatic PM fiber axis alignment for pigtailling passive components
6. Key alignment for PM fiber connectorization.
7. PER measurement of PIC, fiber array, and PM collimator
8. Characterization of depolarizer
9. Integration in automatic fiber pigtailling assembly systems

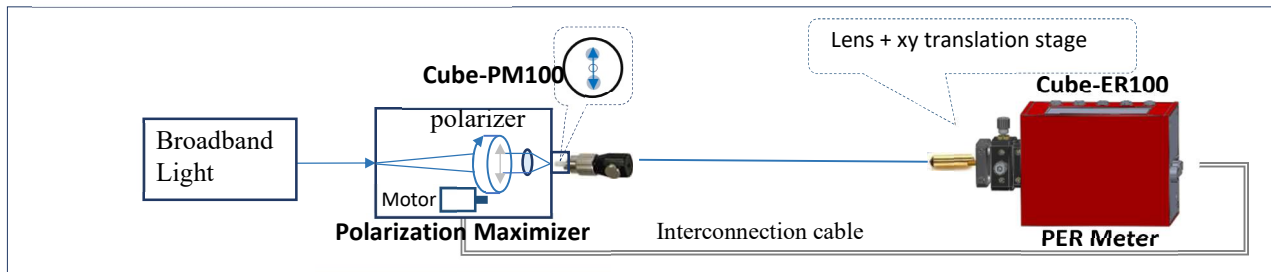
<b>Preliminary Specifications <sup>1</sup></b>	
<b>CUBE-ER100</b>	
Operating Wavelength Range <sup>2</sup>	600~1600nm
Calibration Wavelength	630nm, 980nm, 1060nm, 1310nm, 1550nm
PER Range @1310 or 1550nm	0~52dB for input power -5 to 11dBm (for 1550nm) 0~50dB for input power -5 to 11dBm (for 1310nm) 0~40dB for input power -20 to 5dBm 0~30dB for input power -30 to -20dBm
PER Range @630,980 or1060nm	0~45dB for input power -5 to 11dBm 0~35dB for input power -15 to -6dBm
Input Adapters <sup>3</sup>	FC/LC/SC optical fiber adapters Free-space beam adapter Fiber-array adapter
Optical Power Range <sup>4</sup>	-65dBm ~11dBm @1310/1550nm
PER resolution	0.05dB
Angular resolution	0.028°
Angular absolute accuracy	±1 °
Angular repeatability	±0.06 °
Optical Power Measurement Accuracy	±0.5dB
Optical Power Resolution	0.02dB
Measurement Rate	Up to 10 measurements per sec for normal mode Up to 50 measurements per sec in tracking mode
Measurement Mode	Continuous mode, tracking mode, manual mode
Operating Temperature	0°C to 40°C
<b>CUBE-PM100</b>	
Operating Wavelength Range	1310±30nm or 1550±30nm
Output Polarization Extinction Ratio	>45dB
Insertion Loss <sup>5</sup>	8dB (typical: 6dB)
Insertion Loss Variation vs Rotating Angle	2dB (Typical)
Polarization Azimuth Angle Range	0~360°
Azimuth Angular Resolution	0.11° (panel control), 0.028° (remote control)
Angular Repeatability	±0.11 °
Relative Angular Accuracy	±0.22 °
Absolute Angular Accuracy	±2 °
Rotating Speed	Up to 2 Rev/sec.
Operating Mode	Auto, manual, and continuously rotating
Input Adapter	Narrow key FC/APC
Output Adapter	Wide key FC (free-space coupled)
<b>Others</b>	
Display	2.42" 128x64 OLED graphic display
Electrical Power Supply	DC 12V/1A
Communication Interface	USB and UART
Dimensions	63.5mm x63.5mm x85mm
Notes:	
<ol style="list-style-type: none"> <li>Specifications are given at 23±5 °C</li> <li>The wavelength range can be 800~1650nm, please contact <a href="mailto:info@inlinephotonics.com">info@inlinephotonics.com</a> to get more information</li> <li>FC/PC connector with narrow key</li> <li>The power range can be extended to 14dBm~-70dBm, please contact <a href="mailto:info@inlinephotonics.com">info@inlinephotonics.com</a> to get more information.</li> <li>For Corning 1550nm Panda PM fiber.</li> </ol>	

## Typical Applications

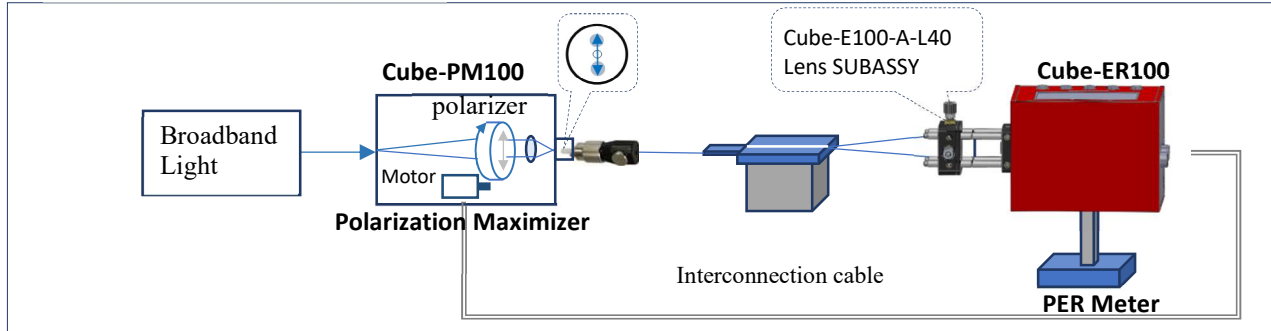
### PER Measurement of PM Coil



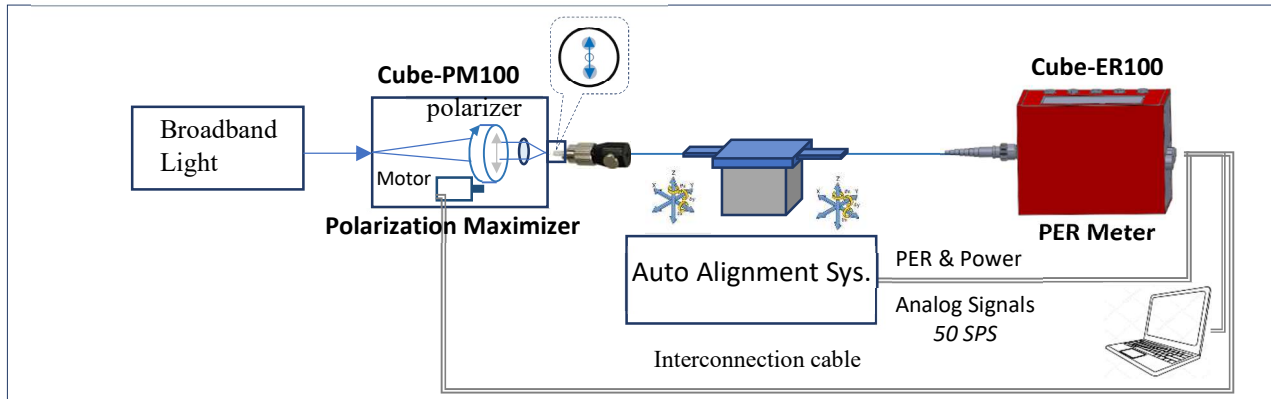
### PER Measurement of PM Collimator



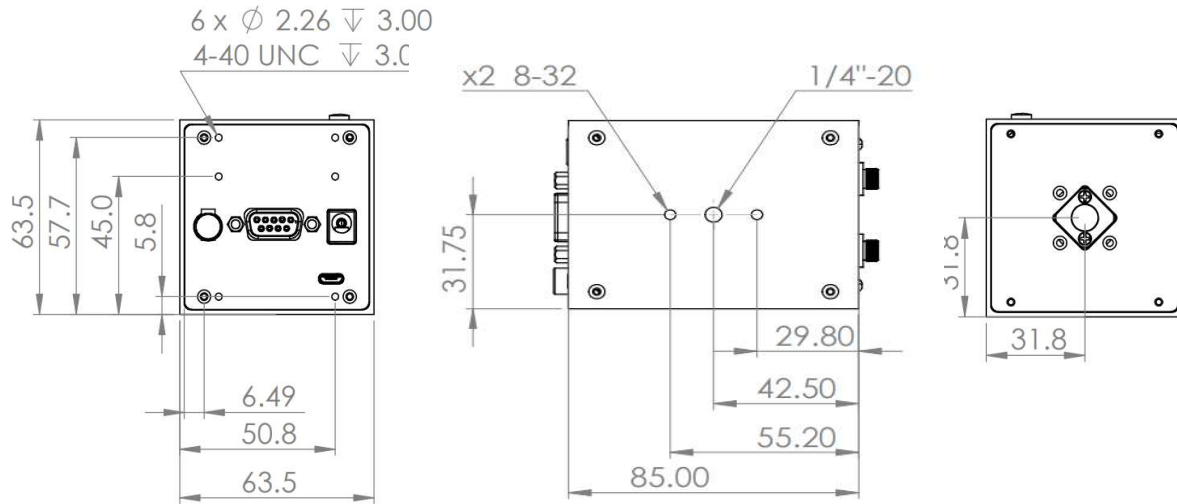
### Free-space PER Measurement



### Angle and Power Active Alignment of PM Device



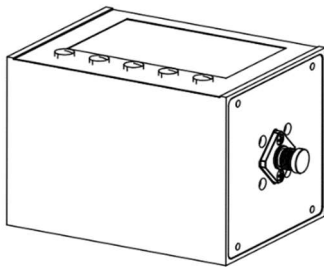
## Dimensions (mm)



Real View of PER-100

Bottom View

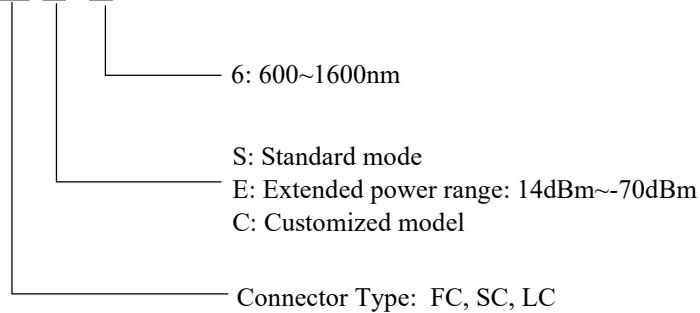
Front View



## Order Information

### Polarization Extinction Ratio Cube

#### **CUBE-ER100-XX-X- X**



#### CUBE-ER100 Accessories:

#### **CUBE-ER100-A-XXXX**

- L40: Lens Assembly for free-space beam (f=40mm)
- FA: 1D fiber array adapter for the fiber array with width of 1~5mm
- COL: Colimator Holder
- FAH: Fiber Array Holder
- MTP: MTP Connector Holder
- 10A: High Power Attenuator (10dB)
- 20A: High Power Attenuator (20dB)
- LC: LC optical input adapter
- SC: SC optical input adapter
- FC: FC optical input adapter
- IC: Communication cable between

### Polarization Maximizer Cube

#### **CUBE-PM100-FC**

#### CUBE-PM100 Accessories:

#### **CUBE-PM100-A-FC**

Low stress bare FC fiber adapter

#### Ordering Information:



800 Village Walk #316  
 Guilford, CT 06437  
 Ph: 203-401-8093

Email orders to: [sales@xsoptix.com](mailto:sales@xsoptix.com)  
 Fax orders to: 800-878-7282