Core Tuner

Automatic/Manual Concentricity Instrument

Operation Instruction

V1.0

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Chapter I  Introduction

1.1 The introduction of Core Tuner

Core Tuner concentricity instrument is developed by Dimension Co., Ltd based on experience in fiber connector field in many years.

There are two different types of Core Tuner: Core Tuner (manual type) and Core Tuner S (automatic type). Either of these machines defines new standard of the concentricity instrument.

Core Tuner and Core Tuner S have very high performance due to its excellent image process function. The instrument is accurate, full automatic, anti-vibration, durable and intelligent with high repeatability.

![Figure 1-1 Core Tuner (manual)](image1) ![Figure 1-2 Core Tuner S (Automatic)](image2)

1.2 Function Introduction

Fiber connector has loss in data-link due to many causes, such as horizontal mismatch, vertical mismatch and axial mismatch.

The main cause of insert loss is horizontal mismatch. The mismatch between two fiber cores will cause large insert loss (figure 1-3).

![Figure 1-3. Large mismatch cases large insert loss](image3)

It is obvious to lower horizontal mismatch to decrease insert loss.

There are two ways to lower horizontal mismatch:

1. Use fiber connectors with lower concentricity.
2. Tune the direction of the fiber cores to the same direction.
Figure 1-4. Before tune
Figure 1-5. After tune
There are the figures indicates the distribution of fiber cores before and after tuning. The insert loss will be much lower after tuning. The quality of the connector will be improved much.

Before tune  IL=4.8dB

After tune  IL=0.8dB

The experiment shows the insert loss of 10 patch cords will change from 4.8dB to 0.8dB due to tuning (Figure 1-6).

1.3 Measure principle of Core Tuner

The Core Tuner fill the fiber core with light by a light source and measure the core position after each rotation (90 degree in SC mode, 60 degree in LC mode). Core Tuner will calculate the concentricity and bearing of the connector after measurement.

Then the system will indicate the key direction of the connector after measurement.
1.4 IEC Concentricity standard

The connector can be defined by four grades such as B, C, D and Failed in concentricity.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Grade A</th>
<th>Grade B (Figure 1-7)</th>
<th>Grade C (Figure 1-7)</th>
<th>Grade D (Figure 1-8)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Maximum</td>
<td>Minimum</td>
<td>Maximum</td>
<td>Minimum</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>0.0012</td>
<td>0</td>
<td>0.0015</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>0</td>
<td>0.0003</td>
<td>0</td>
<td>0.0003</td>
<td>0</td>
</tr>
<tr>
<td>H</td>
<td>0</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>0</td>
</tr>
</tbody>
</table>

1.5 Function and Application

Core Tuner has two main functions:
1. Measure concentricity of fiber connectors.
2. Tune the bearing angle of fiber connectors.

Application of Core Tuner
1. Measure and test master patchcord.
2. Measure the concentricity of fiber connectors in mass production.
3. Quality control of the fiber connector.
1.6 Features

1. Accurate
2. High Repeatability
3. Auto Exposure
4. Auto Focus
5. Durable
6. Anti-Vibration
7. APC Connector Compatible
8. Auto Mark Key Direction
7. Easy Operation

1.7 Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Core Tuner</th>
<th>Core Tuner S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotation of connector</td>
<td>Manual</td>
<td>Automatic</td>
</tr>
<tr>
<td>Measure Time</td>
<td>8S</td>
<td>4S</td>
</tr>
<tr>
<td>Repeatability of Concentricity*</td>
<td>± 0.1um</td>
<td>± 0.08um</td>
</tr>
<tr>
<td>Repeatability of Angle*</td>
<td>± 10°</td>
<td>± 5°</td>
</tr>
<tr>
<td>Focus method</td>
<td>Auto Focus</td>
<td></td>
</tr>
<tr>
<td>Brightness Adjustment</td>
<td>Auto</td>
<td></td>
</tr>
<tr>
<td>Connector Compatibles</td>
<td>PC &amp; APC 1.25mm ferrule &amp; connector</td>
<td>PC &amp; APC 2.5mm ferrule &amp; connector</td>
</tr>
<tr>
<td>Power Supply</td>
<td>DC 24V</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>27.0cm * 15.0cm * 11.2cm (L * W * H)</td>
<td></td>
</tr>
</tbody>
</table>

Remark: *Repeatability is sigma values.
The value calculated in 50 times measurement.
Chapter II  Hardware Introduction

2.1 Core Tuner (manual type)

Figure 2-1 Front Panel of Core Tuner

1. Power Indicator
2. 2.5mm light source
3. 1.25mm light source
4. Fixture of products
5. Platform.

2.2 Core Tuner S (automatic type)

Figure 2-2 Font Panel of Core Tuner S

1. Power Indicator
2. Light Source.
3. Fixture
2.3 Back Panel
Core Tuner and Core Tuner S have the same back panel (Figure 2-3)

![Back Panel Diagram](image)

1. Information Label
2. Foot Switch
3. Power Supply
4. Power Switch
5. Power Source for External Light Source
6. Control switch for External Light Source
7. USB 2.0 Connector

2.4 Core Tuner Manual Fixture for Ferrule

![Fixture Diagram](image)

1. Fixture Lock Handle
2. Fixture Hole for Ferrule
3. Position Limit Hole
4. Fixture Screw Hole
5. Position Piece
2.5 Core Tuner S Fixture for 2.5mm / 1.25mm Ferrule

1. Holder for Metal Ferrule Tail
2. Positioner for Holder
3. Positioner for Fixture
4. Fixture Screw Hole
5. Fixture Hole for Ferrule
6. Position Piece

2.6 Core Tuner Rotation Holder

1. Ferrule Positioning Piece for Metal Ferrule Tail
2. Rotation Holder

2.7 System Key

There is a system key inside of the instrument. The software will warn when time expired. Please contact sales of Dimension when encountered the situation.
Chapter III  Software Introduction

3.1 System Requirement

System: Windows 7 or above  
Ram: 2GB or Above  
Other Requirement: Office 2007 or above, .net Framework 4.5  
Setup: Run the set up following the instruction in the software disk.

3.2 Software Features

1. WPF Software suitable for various resolutions.  
2. Auto Connect to System.  
3. One Click Exposure Adjustment  
4. One Click Auto Center  
5. Full Automatic Focus  

3.3 Interface

Connect the instrument to computer and make sure the power is on. Start Core Tuner software. The interface will show like picture below.

Figure 3-1 Core Tuner S Interface
The software will change the interface following machine type automatically.

The interface has real-time area, result area, measurement set area and control area.

### 3.3.1 Real-time area

1. Real Time Image Display Area.
2. Test Step Zone: shows current test step.
### 3.3.2 Result Area

**Figure 3-4 Result area**

1. **Parameter Display Zone**
   - Connector Grade: B, C, D, Failed
     - B: Green
     - C: Blue
     - D: Orange
     - Failed: Red
   - Concentricity of Connector (um)
   - Bearing (degree)
   - 1310nm insert loss (dB): calculation of insert loss in 1310nm
   - 1550nm insert loss (dB): calculation of insert loss in 1550nm

2. **Test Result Area**

   The dot indicates key direction of the connector

**Figure 3-5 Mark Indicator**
### 3.3.3 Measurement Set Area

1. **Measure Task**: Choose right task for current measurement.
2. **ID**: Display current ID, if AutoInc is checked, the ID will automatic add 1 after each measurement.
3. **Description**: Manual description of product that will insert to data and report.
4. **File Name**: Input the file name of data and report.
5. **Save Data**: Decide save data or not.
6. **Save Report**: Decide save report or not.
7. **Edit**: Enter task setting mode.

![Figure 3-6 Measure setting area](image)

### 3.3.4 Control Area

- **Manual Mode** — it will only show in Core Tuner S
- **Barcoder**

**Focus**

- Manual Mode
- Barcoder

**Open Data**

**Open Report**

**Settings**

**Change Fixture**

**Auto Center**

**Auto Exposure**

**Measure**

3-7 Core Tuner S Auto Mode

3-8 Core Tuner S Manual Mode

3-9 Core Tuner Interface

- **Focus** — Click to perform auto focus once.

**Abbreviations**

- Core Tuner
- Auto Mode
- Manual Mode
- Barcoder
---Manual Focus controller

<<: Left fast control
<: Left slow control
>>: Right fast control
>: Right slow control

Open Data—Open last saved data.
Open Report—Open last saved report.
Setting—Enter Setting window
Change Fixture—Enter change fixture window (only available in Core Tuner S)
Auto Center—Auto Center the fiber center.
Auto Exposure—Auto adjust the exposure time.
Measure—Click once to perform whole measure steps (Core Tuner S Auto Mode)
Click once to perform one measure step (Core tuner and Core Tuner S Manual Mode)
Cancel—To cancel current measure steps in manual mode.
Tune—Tune the connector to find the bearing direction.

3.3.5 Task Setting Window

![Task Setting Window](image)

3-8 Task setting window

Measure Task — Choose measure task to configure.
Connector Type — Choose connector type of task.
Angle — Angle limit in B,C grade.
Task Name — Change task name
Edit — Click to enter edit mode
Add — Click to add a task based on current task
Delete — Delete current task
Save — Save current tasks
Cancel — Cancel current edition
Grade zone — Display current zone settings.
OK — Confirm current edition and exit.
Cancel — Discarding current edition and exit.
4.3.6 Setting Window

3-9 Video Setting

Exposure Time —— Slide the slider to change the exposure time.
Exposure Gain —— Change exposure gain of the camera
Auto Exposure Target —— Change the auto exposure target

3-10 Path Setting

Data Path —— Path of data files.
Report Path —— Path of report files
Company —— Company name in data and report files.
Operator —— Operator name in data and report files.

3-11 System Setting

Pixel width —— System Default value.
Back Focus to Zero —— Initialize focus position.
3.4 Operation Instruction

3.4.1 Change Fixture for Core Tuner S

Click Change fixture in main interface

Step 1: Remove current fixture: select fixture to change, click next to enter next step.

Step 2: Put the next fixture on the platform.
Install the fixture with screws
Rotate the mark to fit

Click "Next" to enter next change fixture step.

Step 3: Try the fixture back to zero function and finish the change of the fixture.

3.4.2 Add Measure Task

Add measure task following the instructions
1. Click Edit button in main interface.

![Task setting window](image)

3-14 Task setting window

2. Select the standard to be added.
3. Click add to add the standard, the new standard will add “-custom” in the end of the name.

![Add task](image)

3-15 Add task

![Custom standard](image)

3-16 Custom standard

4. Click Edit to enter edit mode
5. Click Save to save the standard
6. Click OK or cancel to exit the task setting
7. The custom standard will be found in the end of the menu.

### 3.4.3 Delete custom standard

1. Enter task setting window by click “Edit” in main interface.
2. Click Delete button and select yes to delete current standard.
3. Click Save or OK to confirm the changes and return to the main interface.

![Warning](image)

3-17

Remark: Only custom standard could be deleted.

### 3.4.4 Edit custom standard

1. Enter the task setting interface and select the standard that you want to edit.
2. Click the Edit button and make the parameters editable.
3. Edit the parameters as you wish.
4. Click save button to save the tasks.
5. Click OK or Cancel to enter the main interface.

Remarks: Only custom standards can be edited.
Chapter IV  Installation of System

4.1 Connect to PC

1. Pick out instrument and PC computer, put them on stable table.
2. Connect the USB cable between instrument and PC and lock the screws. Connect the power supply of the instrument and turn switch on.
3. Start software.

Remarks:
- The instrument is high precision optical instrument. Be careful to move the instrument.
- Confirm the connection between PC and instrument.
- If any problems occurred, please refer Chapter V. If you can’t solve the problem, please contact us.

4.2 Fixture installation

4.2.1 Core Tuner fixture installation

Figure 4-1

1. Fit the position pillar and position hole and put the fixture on the platform.
2. Use four screws to fix the fixtures.

4.2.2 Core Tuner S fixture installation

Please refer 3.4.1
4.3 Measurement

Measurement Steps:
1. Choose correct fixture and install it to the instrument.
2. Select right measure task.
3. Insert the connector and lock it and make it focused.
4. Click Auto Exposure to make exposure time right.
5. Click Auto Center to make the image center.
6. Measure:
   a) Core Tuner S: Click Measure to proceed all measure steps
   b) Core Tuner: Click Measure to proceed one measure step; when in measurement steps, rotate
      the rotate holder one step angle as you wish (90 degree in SC measurement, 60 degree in LC
      measurement)

   7. Tuning: After measurement if the mark is not to the key direction, you have to rotate it to the key
      direction and click tune to make sure the key is that direction

Remark: make the image clear when measuring.
Chapter IV  Maintenance

5.1 Caution

1. Keep it in good environment
2. Don’t use it in high vibration environment.
3. Keep the ceramic ferrule in the fixture clean
4. Make sure the force of the fixture is enough to keep the ferrule tight.
5. Use cover cloth to keep the instrument out of dust.
6. Use only the power adaptor provided by Dimension.

5.2 Trouble Shooting

1. Cannot open camera: more than one software has opened the camera or the camera is broken
2. No camera found: The software cannot find the camera. The instrument is not on or not connects to the computer.
4. No control board: The instrument is not on or not connects to the computer.
5. Focus Fail: Please redo autofocus again or focus manually.
6. USB Key time Expired: please contact our sales.

5.3 Contact us

You can find our contacts on the website: www.weidujs.com/en