

OC-2010 Optical Coupler Manufacturing System Operational Manual

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1.Overview

OC-2010 Optical Coupler Manufacturing System is designed with conventional Fused Bi-Conic Tapering technology for fabrication of the most of popular low cost fiber optic couplers and wavelength division multiplexer(WDM), those all-fiber components, simple looks like, but play the key role, are widely used in today's fiber optic communication and sensing networks.

As a new generation optical coupler manufacturing system, OC-2010 is developed by Dowson engineering team in 2002, on the basis of OC-1010 and OC-2000 high reputation coupler/WDM workstation systems in China. OC-2010 is equipped with latest technologies, new features, and enhanced functionalities; the new generation optical coupler manufacturing system provides a turn-key solution for coupler manufacturers with unsurpassed performance quality.

OC-2010 Optical Coupler Manufacturing System is so versatile that can fabricate all common used optical fiber couplers,WDMs, and can be used for manufacturing some specialty components through some additional accessories or fixtures, one by N channel or NxN monolithic 3x3 or 4x4 couplers may be fabricated by OC-2010, provided suitable fixture can be equipped with. Furthermore, OC-2010 can be treated as an ideal platform for developing polarization maintaining coupler workstation system.

OC-2010 Optical Coupler Manufacturing System features incomparable accuracy in stage movement, enhanced functionalities, easy to use Graphic User Interface(GUI), powerful process management software, volume production hardened design, and the flexibility for manufacturing process changes, the system incorporates a high stability light source and a high accuracy power meter with integrated features, the new generation optical coupler manufacturing system provides the most reliable solution for fabrication standard and special feature couplers with high yields. This system enables the end products to have ideal output with low polarization-dependent loss(PDL),low excess loss, and highly repeatable coupling ratios.

2 . Key Features and Specifications

Key Features

High yield rate and high reliability

High-precision stages

Short cycle time

Low excess loss and high repeatability

Real time monitoring system

Anti-Vibration design to absorb external shocks

Easy access hot-key control panel for instant control and micro-adjustment

Special designed enclosure and machine platform to prevent working area from being contaminated

Modular design for convenience of maintenance and future upgrade

Ability to produce short length couplers

Windows 2000 based PC-2000 series software package

Specifications

1 . Power Supply

1.1 Power Supply : 220VAC \pm 10% , 50HZ

1.2 Power Consumption : < 320W

2.Hydrogen supply

2.1 Maximum Pressure:0.2MP

2.2 Recommended Pressure:0.12MP

2.3 Purity:>99.999%

3.Operation Environments

3.1Temperature : 0 ~40

3.2Humidity : < 90%RH

4.Key Specifications

4.1Maximum pulling length (one side) : 25.000mm

4.2 Movement Resolution Of Fiber Chucks(one side) : 2 nm

4.3Pulling speed (one side) : 0.001mm/s -- 0.4mm/s

4.4Pulling speed resolution (one side) : 0.001mm/s

4.5 Maximum movement range of torch unit : 20.00mm

4.6 Movement resolution of torch unit : 0.01mm

4.7Torch unit moving speed range : 0.1mm/s -- 9.9mm/s

4.8Torch unit moving speed resolution : 0.1mm/s

4.9Tapering length resolution : < 5um

4.10Tapering length resolution repetition : < 10um/50times

4.11Torch unit position control resolution : < 15um

4.12 Torch unit position control resolution repetition : < 15um/50times

4.13Power meter measurement range : +3 -- -70dBm

4.14Power meter linearity : \pm 0.02 %

4.15Wavelength range : 850nm -- 1650nm

4.16 Dimensions : 500mm(W) \times 398mm(D) \times 232mm(H)

5.Other functions for easy control the equipment

5.1Manual/Auto stop tapering functions

5.2All parameters can be logged, stored and recalled.

5.3Auto protect functions such as: short cut circuits, maximum movement range limits.

5.4Torch linear swing movement, circular movement.

3.Installation and operation instructions

3.1 Overview the whole system

Please see figure 1 :

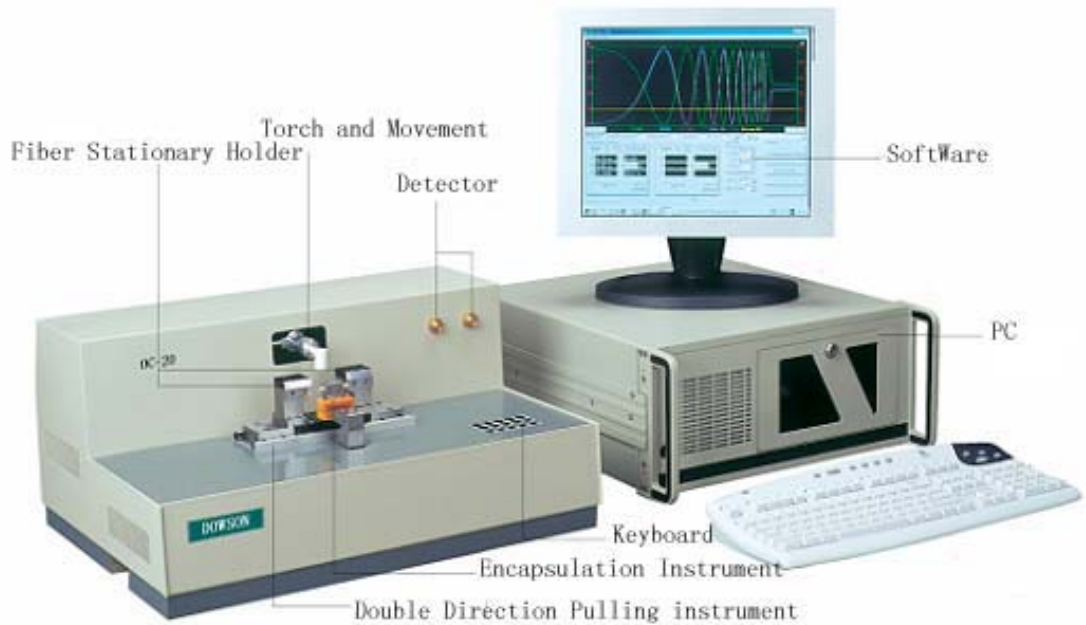


Figure 1 OC-2010 System

3.2 Installation

3.2.1 Please make sure that the system operation environment meets demands that are as per specifications said.

3.2.2 OC-2010 system is designed with high tapering movement resolution as 0.002um, therefore, please make sure that the OC-2010 being installed onto a secure, stable, horizontal bench.

3.2.3 System connection please see figure 2, you may find the power supply cable in OC-2010 system packing.

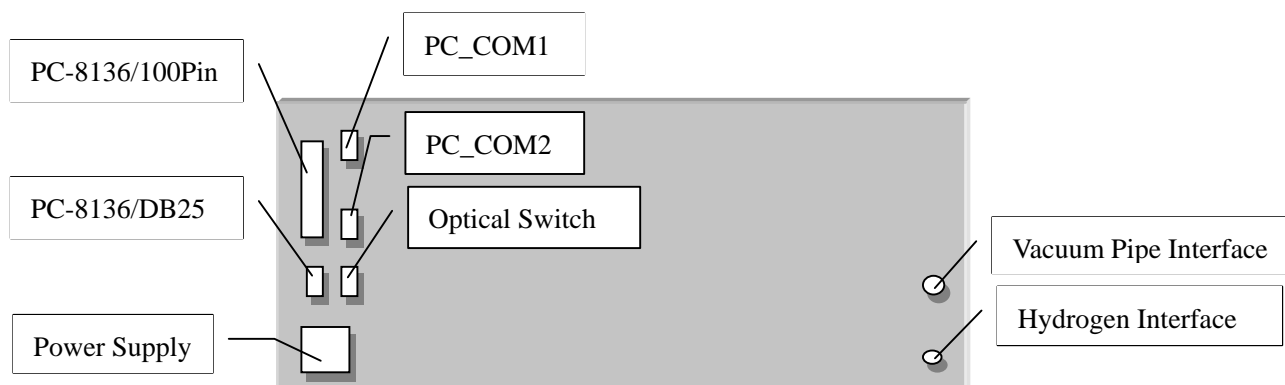


Figure 2: Connection the system

Important Note : The OC-2010 system needs AC Power 220VAC/50HZ ; Firm and reliable ground connection is a must. OC-2010 just has “ Short-cut protection ” function, we strongly recommend that customer ’ s power supply circuits include leakage of

electricity circuits. A sample is as follow (Figure 3):

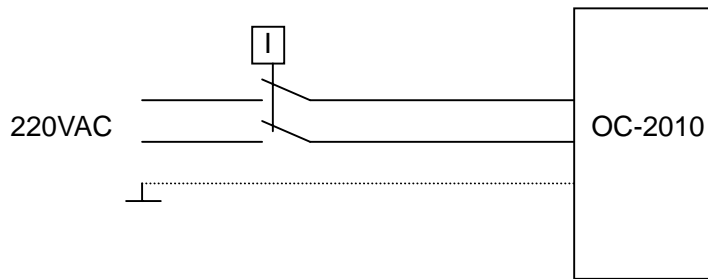


Figure 3: Leakage of Electricity Protection

3.2.4 Connect external Vacuum Pump with OC-2010 Vacuum Pipe Interface through a qualified pipe, and make sure the connection is airtight enough.

3.2.5 Connet external hydrogen gas container with OC-2010 Hydrogen Gas Interface through a qualified pipe, and make sure te connection is airtight enough, reliable. It is very important to gurantee hydrogen gas pressue within the range of **0.15MPa--0.2Mpa. External hydrogen gas supply should have “on/off” switch, flow control devices that can be controlled manually by the oporaor.**

3.2.6 Connect OC-2010 system interfaces: PC_COM1; PC_COM2 and DOWSON Control Card with PC accordingly through the other three cables that included with OC-2010 system packing.

3.3Operation

3.3.1 Power on

- Inspect all connections carefully before power on the OC-2010 system.。
- Switch on PC and wait for PC standard by (ready to work properly)
- Power on OC-2010 system.

Run OC-2010 system software.。

3.3.2 Stop

- Exit OC-2010 software
- Switch off OC-2010
- Switch PC

3.3.3Keyboard functions and display

See Figure 4

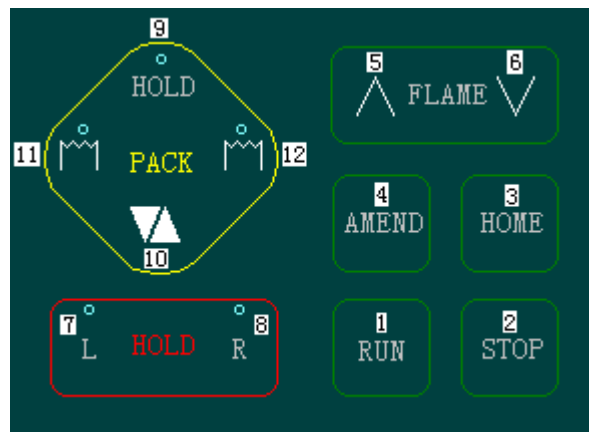


Figure 4: Keyboard and display

3.3.4 Keyboard Operation

- (1) RUN : Start tapering
- (2) STOP : Stop tapering
- (3) HOME : Electrical machinery return to pre-setting position that was fixed at factory.
- (4) AMEND : Amending
- (5) FLAMEUP : Flame moving upside (this function is live when tapering)
- (6) FLAMEDOWN : Flame moving upside (this function is live when tapering)
- (7) HOLDL : Right vacuum absorption fixture open/close
- (8) HOLDR : Right vacuum absorption fixture open/close
- (9)PACKHOLD : Pack Platform open/close
- (10)PACKUPDOWN : Pack Platform moving forward/ backward
- (11)HEATL : Left Heating , can be shut down manually or by computer
- (12)HEATR : Right Heating , can be shut down manually or by computer

4. Software Installation and Operation

4.1 Software Installation

4.1.1 Insert OC-2010 software disk into CD/DVD driver, and enters into then run Setup.exe by double click Setup.exe , restart your computer. Please note that OC-2010 software can be used at Win95, Win98, WinNT, Win2000).

4.2 Software Operation

4.2.1. Start OC_2010 software. See Figure 5 :

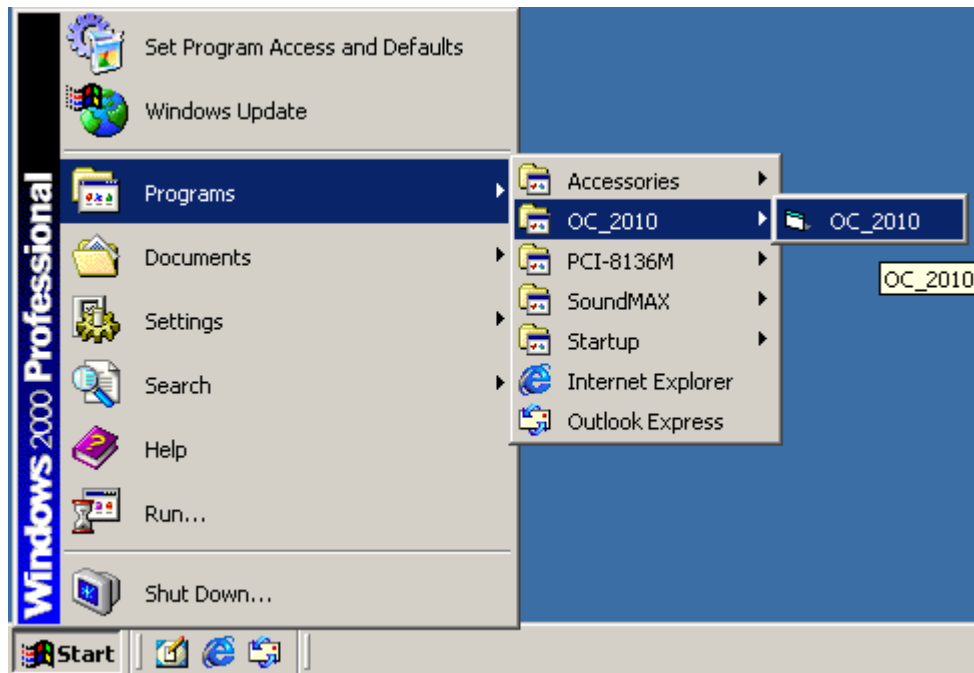


Figure 5 Start OC_2010 Software

If you see the follow window (Figure 6), there are problems on keyboard communication, please inspect OC-2010 system power supply, OC-2010 maybe not operating, or there maybe poor connection between mainframe with computer.

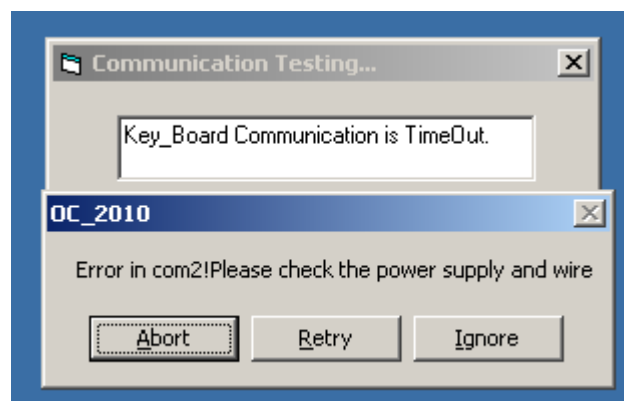


Figure 6 Communication failure warning window

The window below appears every time when you run OC-2010 software :

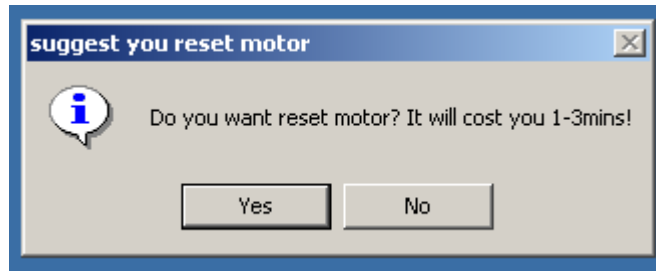


Figure 7 Electrical Machinery resetting window

If any electrical machinery of OC-2010 system is not at proper position, please click “ Yes(Y) to reset electrical machineries, otherwise, OC-2010 system can not work properly, worse, the electrical machinery may be damaged.

OC-2010 software main page is as below (Figure 8) :

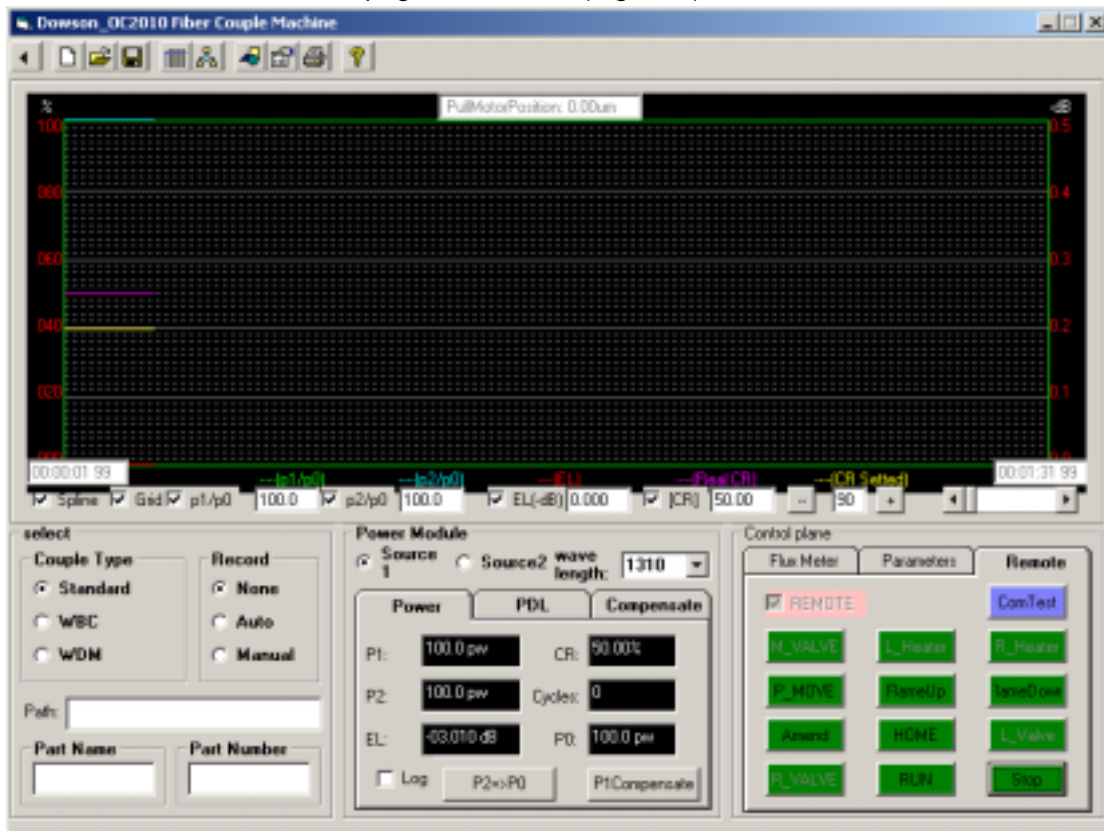


Figure 8 Main page of OC-2010 software

Notes: When OC-2010 software is started, all parameters last time used (or set) will be recalled automatically.

4.2.2. Select to fabricate different components

OC-2010 software provides three different couplers standard fabricating processes that are common used optical fiber fused couplers today. Standard Optical Coupler, Wideband Optical Coupler and Wavelength Division Multiplexer, you may select each of them for easy operation. See Figure 9

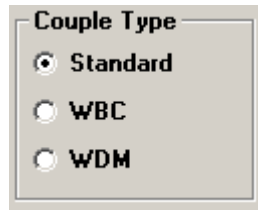


Figure 9 Select different components

4.2.3. Tapering parameters setting

4.2.3.1 Parameters setting window .See Figure 10



Figure 10 Main Tool Bar

Click “ New ” enter into parameter setting window. See Figure 11. In this window, the operator can change, input and storage all related parameters.

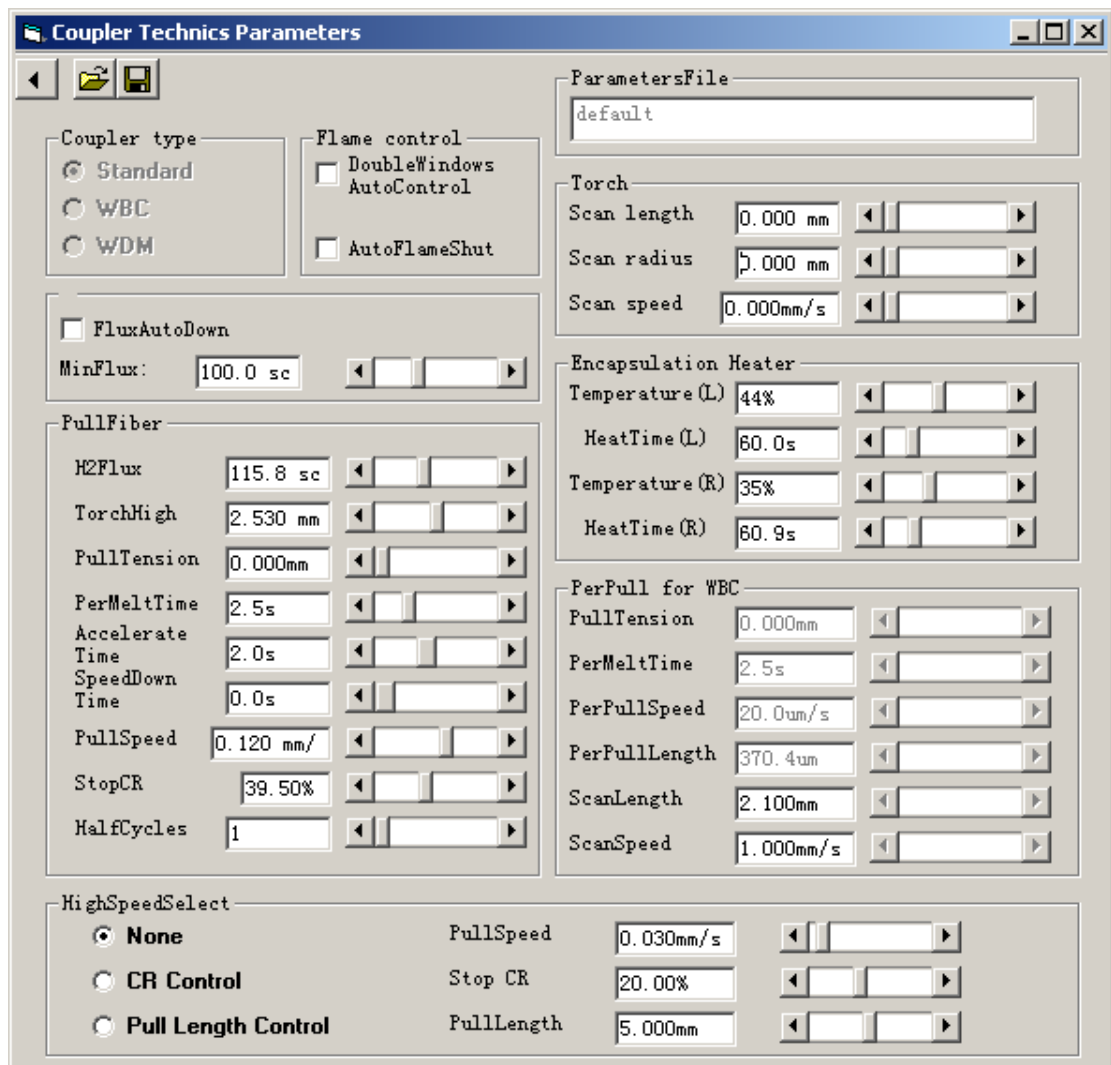


Figure 11 Parameters Setting Window

4.2.3.2 Storage Parameter Files

When you need to save parameters files into hard drive, you may click save button, see Figure 12, select file name and route, then click “ S (save) ” .

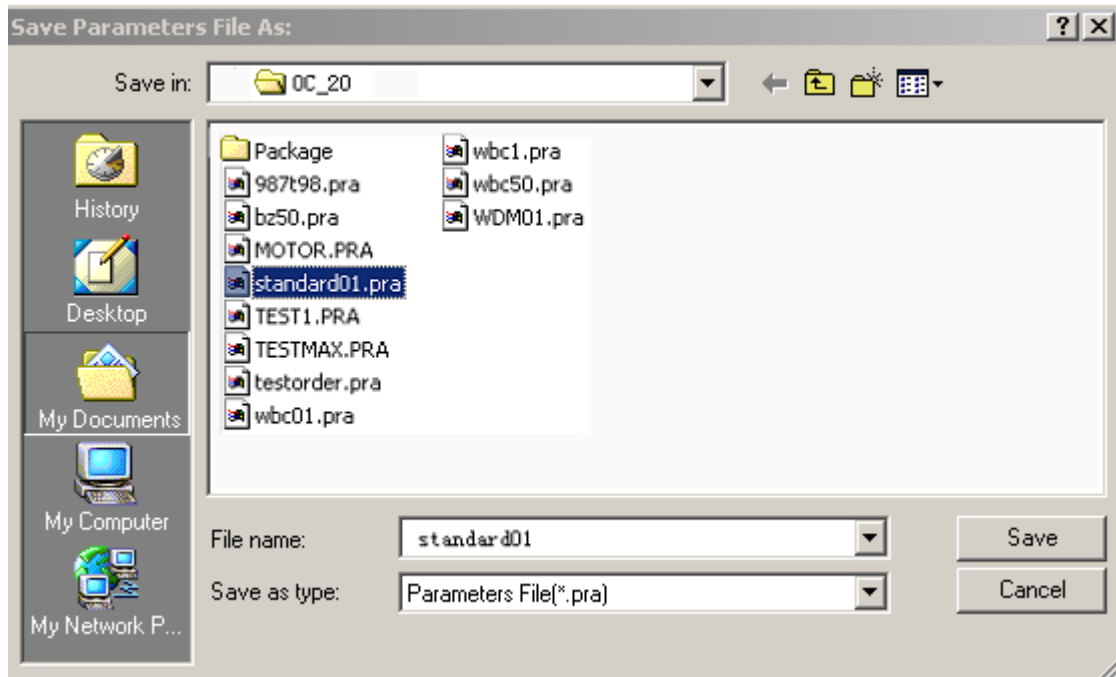


Figure 12 Save parameter file

4.2.3.4. Recall Parameter Files from Hard Drive

When you need to recall a certain parameter file, please click “ Open ” , select route and file name that you want to recall, and then click “ O (open) ” .

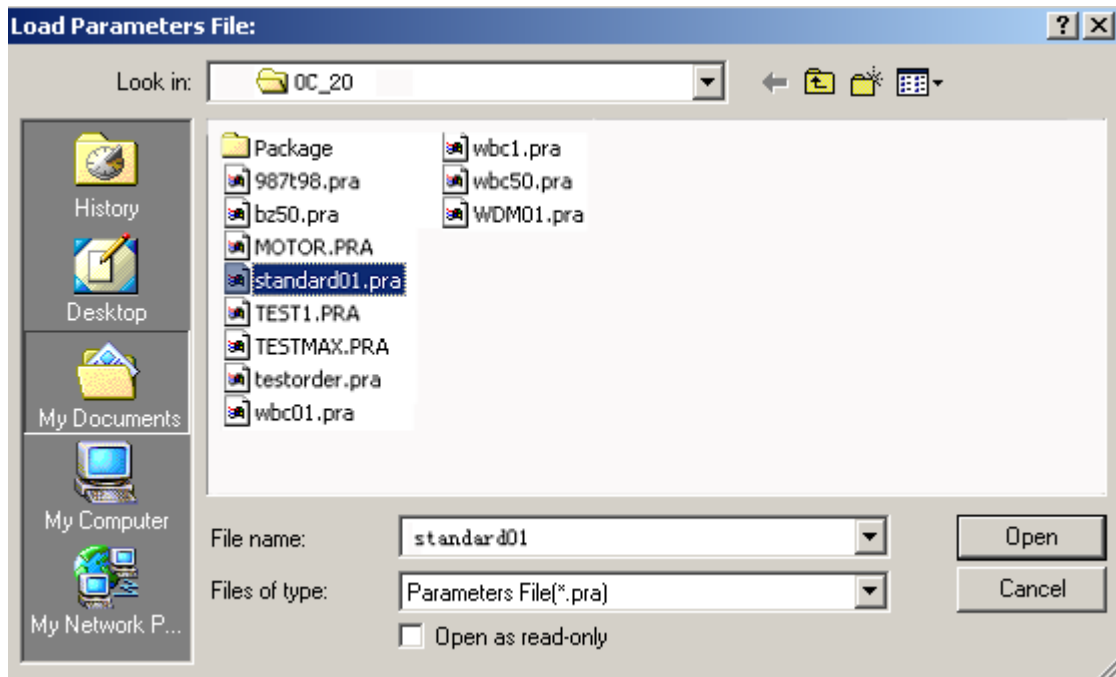


Figure 13 Recall parameter file

4.2.4 Change Frequently-used Parameters

During tapering process, especially at the first begging, some parameters need to be adjusted or changed frequently, OC-2010 software provides a special window in which the operator can change those frequently-used parameters easily. When you change parameters at main page frequently-used parameter window, all changed parameters will be showed at tapering parameter setting window, respectively. See Figure 14.

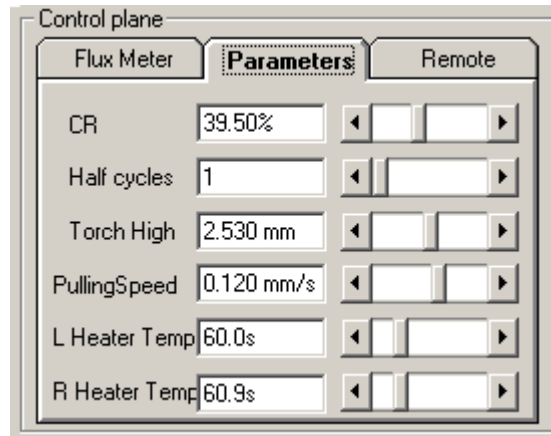


Figure 14 Change Frequently-used Parameters

4.2.5 Control Flow Meter

Click “Flow Meter” at OC-2010 software main page, Control Panel. See Figure15

Click “Open” to turn on hydrogen gas flow switch.

Click “Close” to turn off hydrogen gas flow switch.

Click “Washing” to wash flow meter pipe.

Click “Ignite Test” to test ignition about 0.5 second.

When Hydrogen flow meter turned off or flow zero-setting, click “Zero Flow” can calibrate Flow Meter zero status. This function is useful when there is a relatively big difference between setting flow from measured gas flow.

Important Notes: When you use zero Flow key, please make sure that the Flow Meter is turned off, or set flow to zero and wait for stable flow is obtained by Flow Meter. We recommend waiting for at least ten seconds.

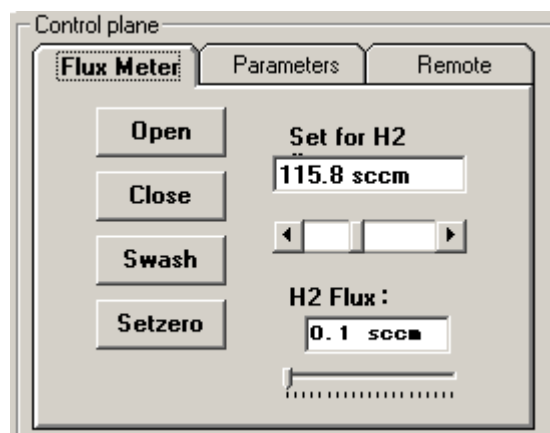


Figure 15 Control Flow Meter

4.2.6 Remote Control

Click “Remote Control” at OC-2010 software main page, Control Panel. See Figure 16 :

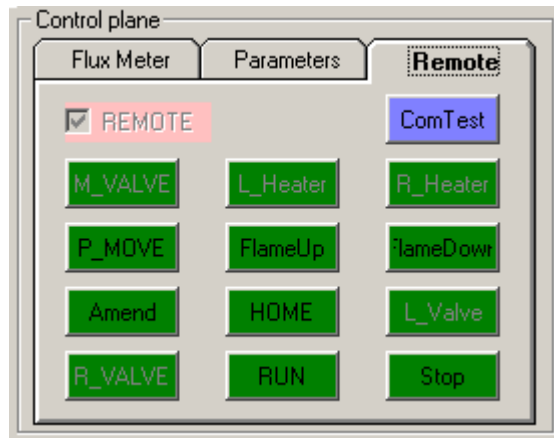


Figure 16 Remote Control

Remote control functions are mainly for maintenances purpose. Please use this functions carefully .

4.2.7 Power Meter

Click “Power Meter” at OC-2010 software main page, See Figure 17

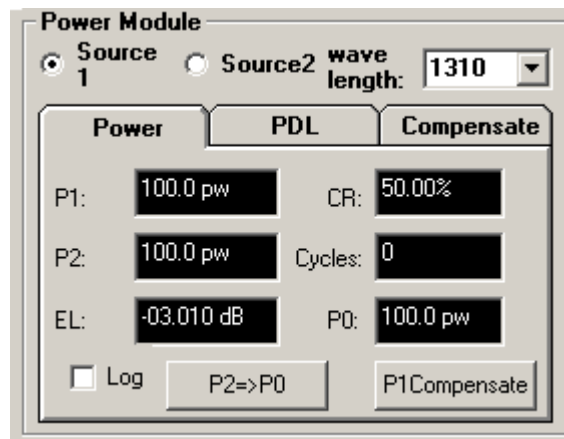


Figure 17 Optical Power Meter window

All value display is against used light source

P1 : Channel one power

P2 : Channel two power

EL : Insertion loss

CR : Actual Splitting ratio

Cycle : Half-Cycle number

P0 : Power value before tapering

Log : mW/dBm Switch

4.2.8 Power Compensation

See Figure 17 :

Before tapering, the operator input the first fiber into Channel 1, and then input the second fiber into Channel 2, then click “P2=>>P0” button, P0 records an optical power value. Click “P1 Compensation” button, the OC-2010 software will equal two channel light power automatically.

4.2.9 PDL Measurement

Click “PDL” at OC-2010 software main page, See Figure 18 :

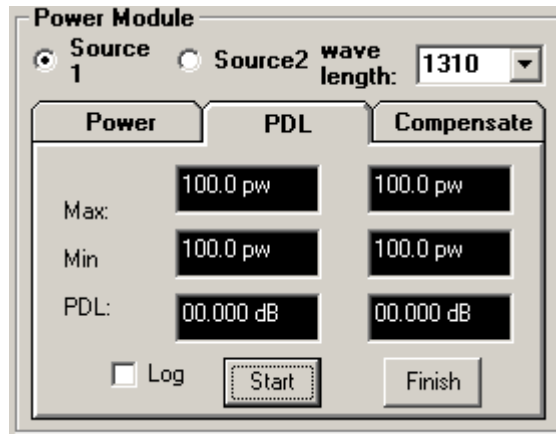


Figure 18 PDL Measurement

Notes: PDL measurement needs to connect with an external polarization controller. Push “Start” key to start PDL measurement , push “Finish” key to stop measuring.

4.2.10 Save Tapering Curve File

When you need to save a certain tapering curve parameters as a file into hard drive, you may click “ Save Tapering Curve File ” button, see Figure 12, select file name and route, then click “ S (save) ” See Figure 19 :

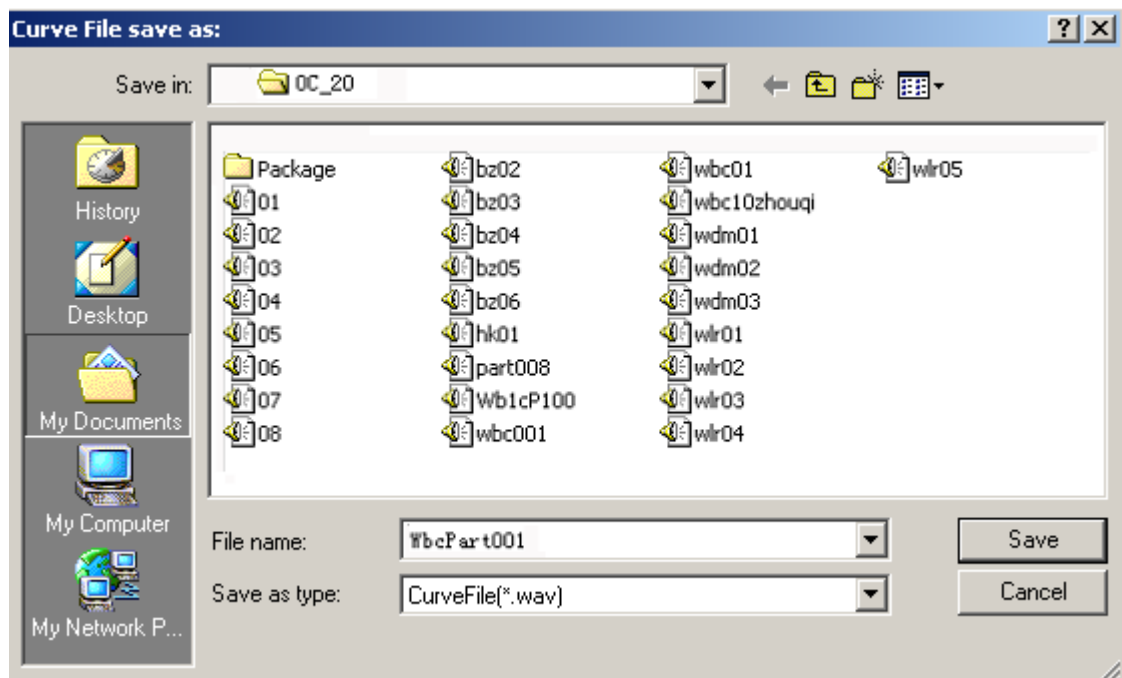


Figure 19 Save Tapering Curved File

4.2.10 Tapering Curve File Recall

When you need to recall a certain tapering curve file p , please click “ Open ” , select route and file name that you want to recall, and then click “ O (open)See Figure 20

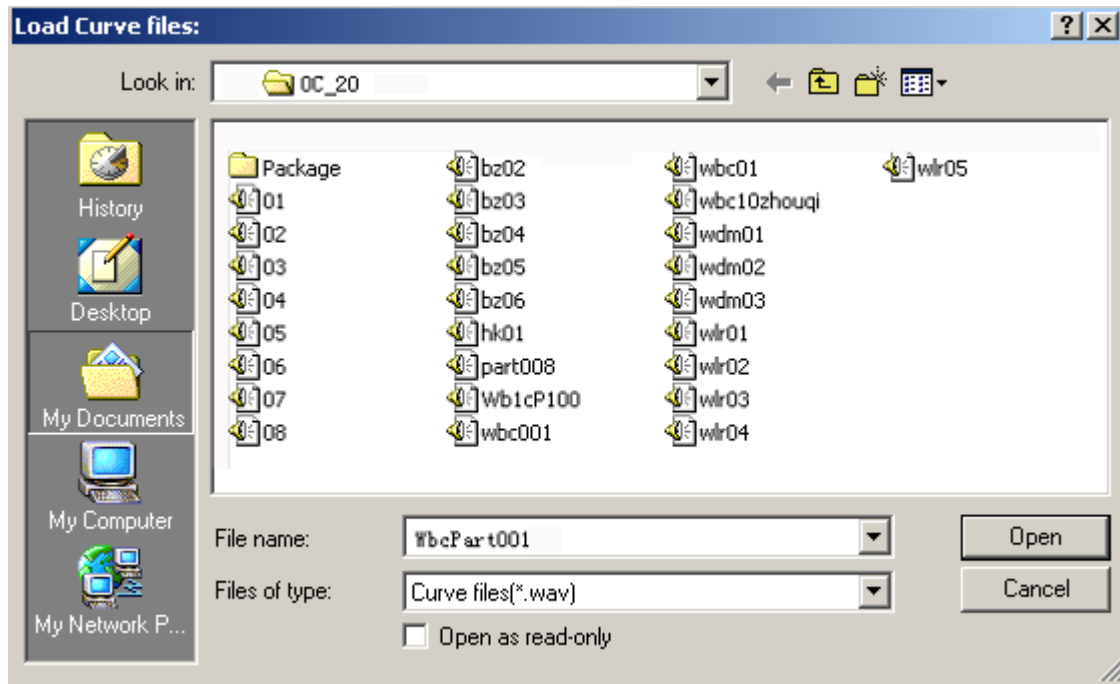


Figure 20 Tapering Curve File Recall

4.2.11 Component Parameters Record

OC-2010 software can record tapered components parameters both manually and automatically. See Figure 21

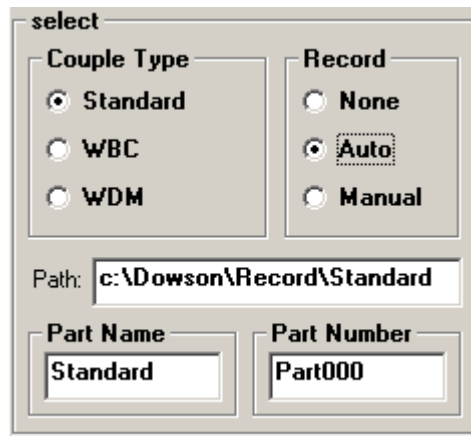


Figure 21 Parameters Record

Auto : When you want to use auto record function, please set a file as: c:\dowson\record , OC-2010 software itself will set three files as: Standard; Wbc(Wide band coupler); and Wdm (Wavelength division multiplexer) , and name saved files by the way as increasing numbers of each file accordingly. Please note that auto record function may cover the recorded file when new file name is as same as previous one.

Manual: Save files manually.

All components parameters files are in TXT format. The files can be opened by

Notebook or Microsoft word.

4.2.12 How to observe tapering curves

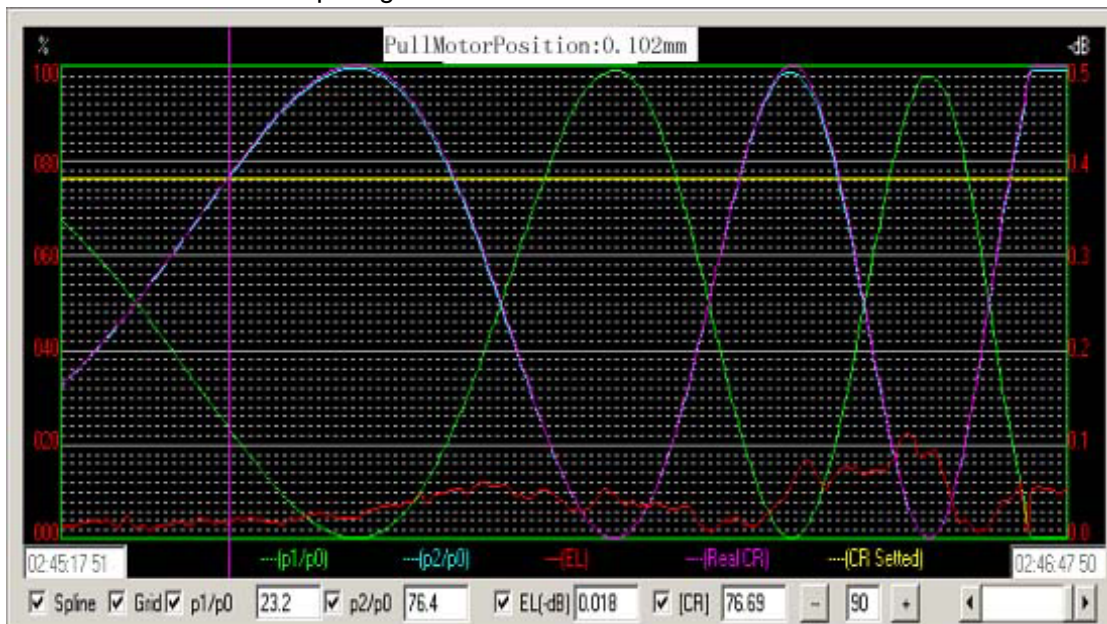


Figure 22 Tapering Curve

When OC-2010 is not tapering, click any point of the tapering curve, some key parameters will be showed at the bottom line of the window.

Spine : Tapering Curve Flatness

Grid : Grid display

P1/P0 : P1 Power Ratio P2/P0 : P2 Power Ratio

EL : Excess Loss CR : Coupling Ratio

+/- : Tapering time adjustment Rolling Bar: Rolling

4.2.13 Three types typical optical fiber couplers curves

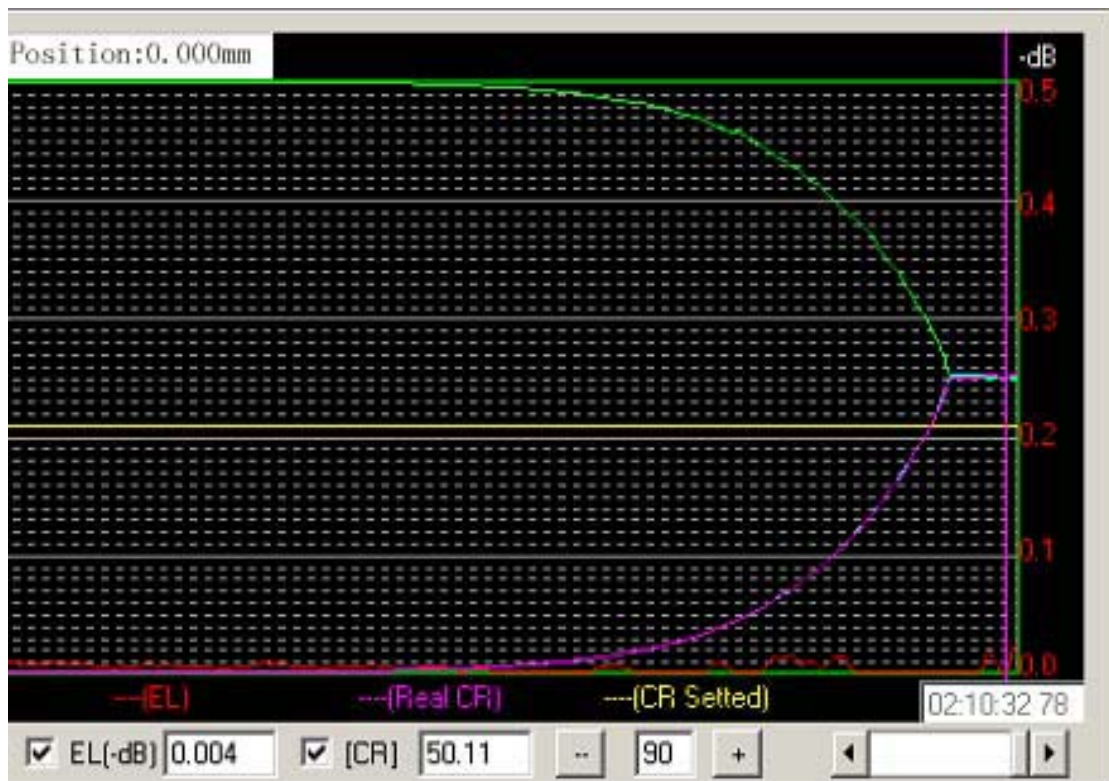


Figure 23 50/50 Standard Coupler

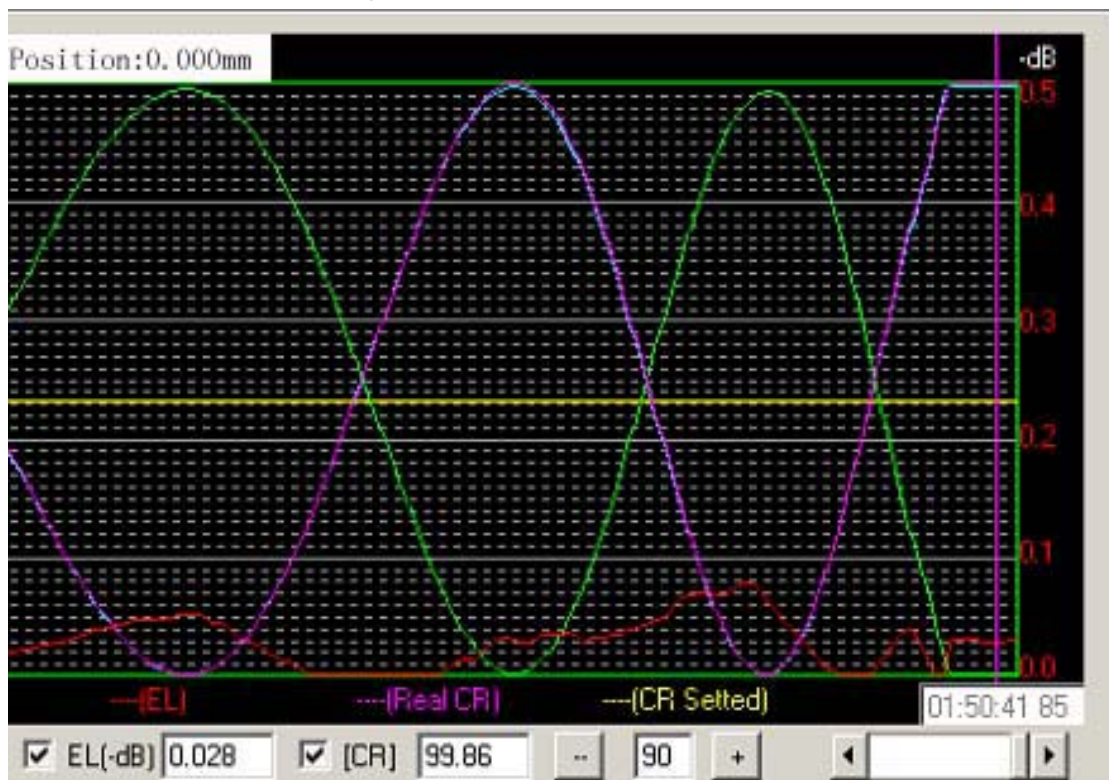


Figure 24 Wavelength Divisions Multiplexer



Figure 25 Dual-window Wideband Coupler