

## SOP for Filmetrics F40:

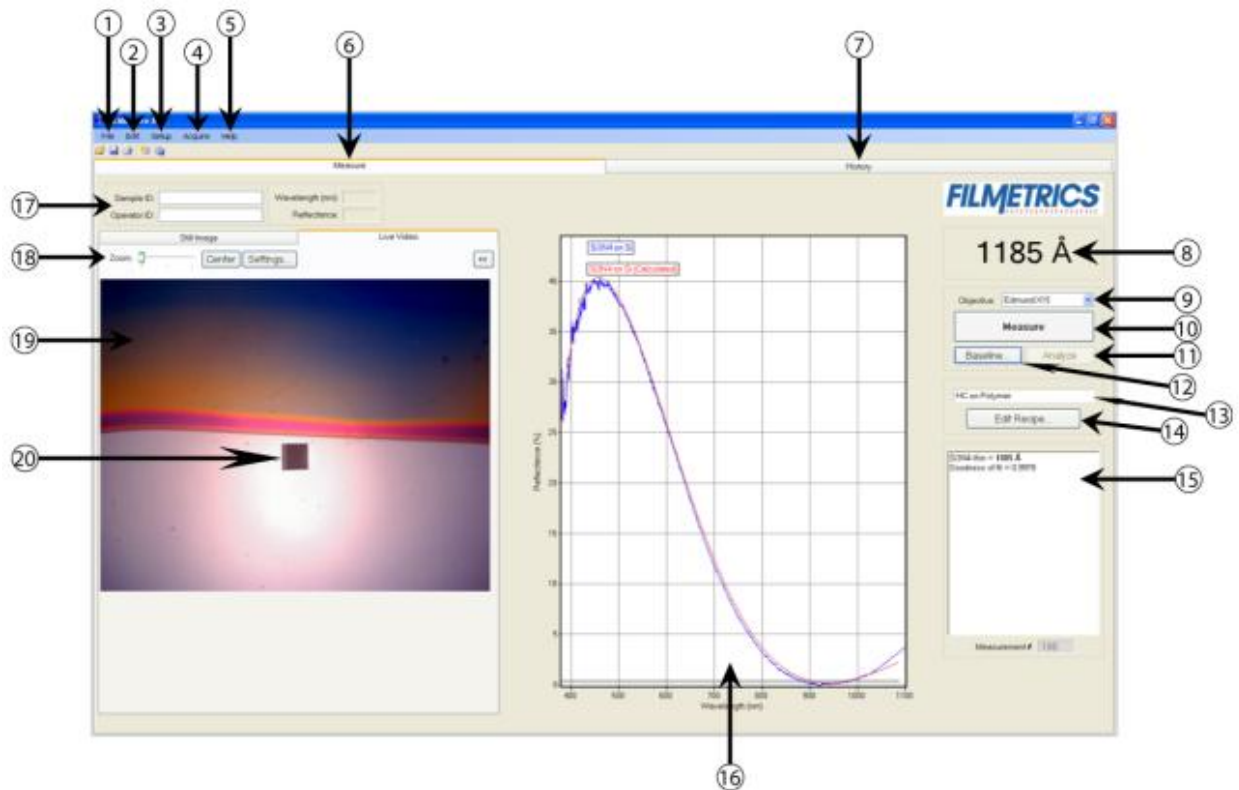
The Filmetrics F40 is used to measure the thickness and optical constants (n and k) of dielectric and semiconductor thin films.

### Spot size

As small as 5 microns

**Films that cannot be measured include very rough films and metal films.**

For thin film measurement:



1. Standard Windows File menu for saving and retrieving data, printing, etc.
2. The Edit menu is used for viewing and editing the material library.
3. Used to Setup various parameters and the graphic display.
4. For starting and stopping continuous reflectance acquisition and data measurement.
5. Used to access the Help, Diagnostic and Support functions of the software.
6. Shows that the Measure tab is currently selected.
7. Used to select the History tab.

8. This is the thickness result from the measured spectrum.
9. This option should be set to the current objective being used.
10. This button causes spectra to be acquired and analyzed.
11. The baseline measurement sequence, which is required before measurements are made, is initiated by pressing the Baseline button.
12. This button analyzes the selected spectra.
13. This is used to select Recipe settings that correspond to different samples to be measured.
14. This is where the Recipe (the film stack definition and data acquisition and analysis settings) is set. Hundreds of recipes can be saved and later recalled.
15. This box provides more details about the calculated thickness, as well as any additional parameters that were solved for, including Roughness, n and k, and Non-Uniformity as well as the Goodness of Fit (GOF).
16. Graphical display for spectra. A click of the right mouse button while the cursor is within the graphical display activates a blue line (one click for measured curve) for easy reading of cursor values in the main FILMeasure window. Keyboard up/down and right/left arrows move the line to a desired location.

#### Graph:

The graph limits can be changed by double-clicking on the graph display. The Horizontal Axis Minimum and Maximum fields are used to control the wavelength range displayed on the screen. Use the Vertical Axis Minimum and Maximum fields to control the vertical-axis display. Check the Autoscale Maximum checkbox to activate y-axis autoscaling. The lower value is always 0 for autoscaling; the maximum y-axis upper limit is 5000. Changing the Vertical Axis will change the reflectance axis, the Vertical Axis 2 will change the transmittance axis. The axes can be set to display in percent or as a decimal value (100% = 1).

Graph Options can be accessed and edited by double-clicking on the main graph window.

17. This allows the user to enter information about the Operator and Sample for tracking purposes.
18. Camera settings such as zoom, focus, etc. are set using these controls.
19. The video image is displayed here.

20. The measurement spot is viewed as a black square near the center of the video image.

To start the system and to take measurement:

1. Switch on the system and the computer.
2. Turn on the D2 lamp
3. Wait for 25 sec
4. Turn on the Halogen lamp
5. turn the shutter on
6. start the software Filmetrics
7. edit the recipe
8. take a baseline measurement-
9. put your sample under the microscope
10. click accure
11. then put the reference sample
12. click accure
13. put the 45 degree tilted sample under the microscope
14. click accure
15. again put your actual sample to be measured
16. click measure

### **Does not:**

Fiber optic cable:

1. Do not touch the fiber end face with bare hands.
2. Do not apply excessive shock such as drop impact to the optical fiber. Do not place any object on the optical fiber. Doing so may break the optical fiber.
3. When bending the optical fiber during use or storage, always observe the allowable bending radius. Excessive bending may break the optical fiber.

### **Operation**

1. Turn on the main power switch (~ on rear panel).
2. Use the switches (9,10,11 on front panel) to operate the D2 lamp, halogen lamp and shutter .

#### **• D2 lamp**

**To turn on:**

1. Turn on the D2 lamp switch (9 on front panel).
2. Wait for about 25 seconds until the lamp's filament is preheated.
3. After about 25 seconds, the trigger voltage and anode current are supplied to the lamp and

the lamp will light up.

**To turn off:**

Turn off the D2 lamp switch (9 on front panel) .

**• Halogen lamp**

**To turn on:**

Turn on the halogen lamp switch (10 on front panel).

**To turn off:**

Turn off the halogen lamp switch (10 on front panel) .

**• Shutter**

Press the shutter switch (11 on front panel) to open or close the shutter .

**• Adjustment of halogen lamp light intensity**

The halogen lamp intensity can be adjusted with the trimmer (12 on front panel) . Use a precision Phillips screwdriver to make adjustment. The light intensity can be adjusted within  $\pm 20\%$  of the center value .

1. To increase the light intensity, turn the trimmer clockwise .
2. To reduce the light intensity, turn the trimmer counterclockwise.

**NOTE**

- Avoid turning on and off each lamp at short intervals. Doing so may shorten the lamp's service life.
- The D2 lamp, halogen lamp and shutter operations can be checked by the LED indicators (6,7,8 on front panel).
- When you want to operate the D2 lamp, halogen lamp and shutter by external control, see **External control functions**.

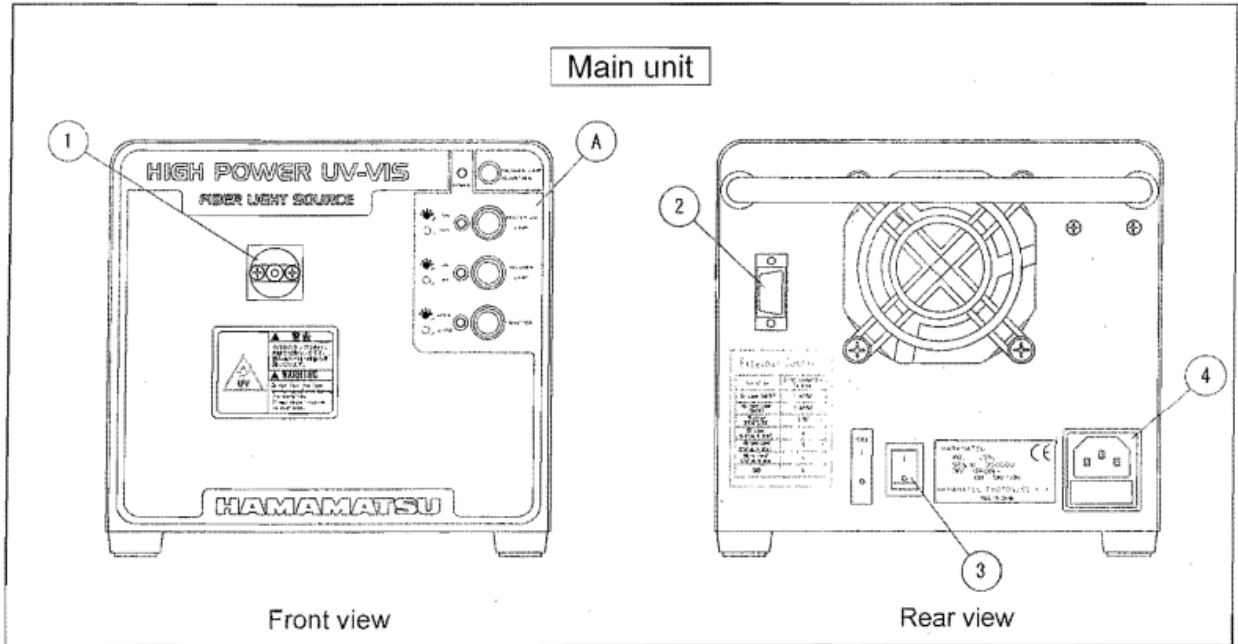
- When you want to check the 'D2 lamp, halogen lamp and shutter operations externally, see **External control functions**

■ **External control functions**

| Pin No. | Signal name                    | Description   |
|---------|--------------------------------|---|
| ①       | D2 lamp ON/OFF                 | D2 lamp turns off when 5 Vdc is applied across pins ① and ⑨.<br>D2 lamp turns on when pins ① and ⑨ are open (0 Vdc). *1   |
| ②       | Halogen lamp ON/OFF            | Halogen lamp turns off when 5 Vdc is applied across pins ② and ⑨.<br>Halogen lamp turns on when pins ② and ⑨ are open (0 Vdc). *1   |
| ③       | Shutter open/close             | Shutter opens or closes each time 5 Vdc is applied across pins ③ and ⑨.   |
| ④       | D2 lamp status signal          | Pins ④ and ⑨ are shorted together when D2 lamp is on.<br>Pins ④ and ⑨ are open when D2 lamp is off.<br>The maximum voltage and current supplied across pins ④ and ⑨ are 50 V and 20 mA.                   |
| ⑤       | Halogen lamp status signal     | Pins ⑤ and ⑨ are shorted together when halogen lamp is on.<br>Pins ⑤ and ⑨ are open when halogen lamp is off.<br>The maximum voltage and current supplied across pins ⑤ and ⑨ are 50 V and 20 mA.         |
| ⑥       | Main power input status signal | Pins ⑥ and ⑨ are shorted together when main power input is on.<br>Pins ⑥ and ⑨ are open when main power input is off.<br>The maximum voltage and current supplied across pins ⑥ and ⑨ are 50 V and 20 mA. |
| ⑦       |                                | N.C. (no connection)  |
| ⑧       |                                | N.C. (no connection)  |
| ⑨       | GND                            | Signal input/output COM (common)  |

\*1: The switch (⑨⑩ on front panel) of each lamp must be on to operate it by external control. External control is not possible if the lamp switch is off.

Parts names and functions:



**(1) SMA connector**

Connect an optical fiber to this connector.

**(2) External control connector**

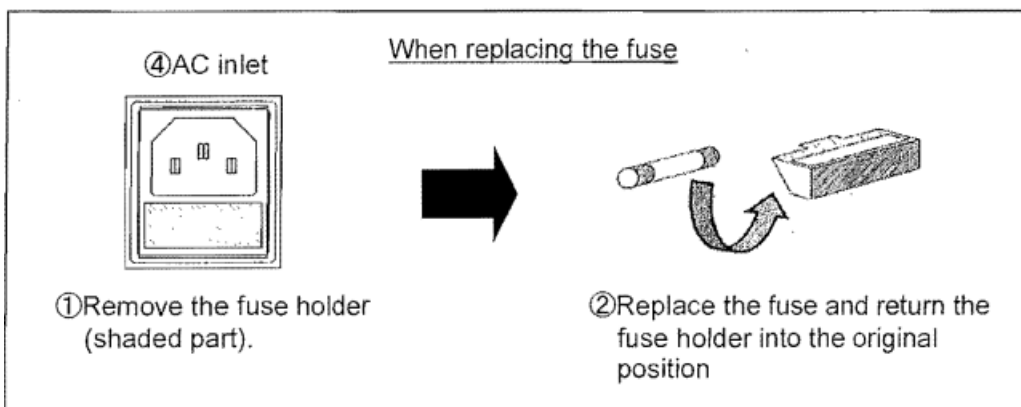
This connector is used for external control signal input and also for lamp status signal output.

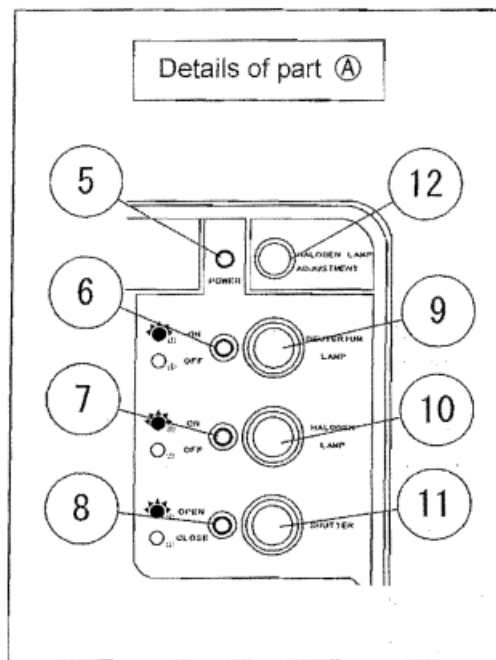
**(3) Power switch**

Use this switch to turn the main power on or off.

**(4) AC inlet (with fuse holder)**

Plug the supplied AC cable into this AC inlet. (A 3.15-ampere fuse is contained in the fuse holder.)





**(5) Power LED**

Lights up when the main power is turned on.

**(6) D21amp LED**

Lights up when the O2 lamp turns on.

**(7) Halogen lamp LED**

Lights up when the halogen lamp turns on.

**(8) Shutter LED**

Lights up when the shutter is open.

**(9) D2 lamp switch**

Use this switch to turn the O2 lamp on or off.

**(10) Halogen lamp switch**

Use this switch to turn the halogen lamp on or off.

**(11) Shutter switch**

Use this switch to open or close the shutter.

**(12) Halogen lamp intensity adjustment trimmer**

Use this trimmer to adjust the halogen lamp intensity.

