Operation Manual for the 746 ISIC Monochromator.

This document assumes that the 746 instrument has been set up and aligned to point at a light source, and that all cables and power cords have been correctly connected. Directions are for a configuration using the Si (silicon) detector. (PbS (lead sulfide) detector related directions are included in brackets.)

Power up and configure system components --
- Power to Controller (model 740-1C/D) ON.
- Power to Lock-in Radiometer (model 736) ON.
  {If using PbS detector, turn PbS temperature regulator ON}
- Power to controlling PC ON.
- Set DETECTOR TYPE switch (on 736) to 1 {set to 2 for PbS detector}.

Adjust wavelength drive and readout to reflect actual grating position --
- Set 746 monochromator wavelength drive to MANUAL (use small knob on side of 746).
- Use wavelength manual drive (large turning knob on side of 746) to set wavelength to 400 nm (refer to analog wavelength display on 746).
- Set 746 monochromator wavelength drive to MOTOR (small knob on side of 746).
- Press PRESET button on.
- Raise grating knob (on top of 746), turn to G-05-1200 grating setting.
  {For PbS detector, turn grating knob to G-16-600 setting.}
- Press grating knob down, making sure that grating has seated correctly.

Check and adjust zero for autorange feature --
- Set CHOPPER switch (736) to OFF.
- Set FILTER WHEEL switch (740-1C/D) to MANUAL.
- Press and hold filter wheel INCREMENT button till filter number 9 is displayed (display is above increment button).
- Set response time switch (736) to FAST.
- Set range switch (736) to AUTO (“-11” {-4 for PbS} is displayed on LED above range switch).
- Turn METER ZERO knob till signal display reads “.000  -11” {-4 for PbS}.
- Push UP button once (display will read –10).
- Turn METER ZERO knob till signal display reads “.000  -10” {-3 for PbS}.
- Continue through ranges -9, -8, and –7, {-2, -1 for PbS} adjusting each signal to “.000”.
- Set range switch to AUTO.

Allow at least 30 minutes warm-up time for 740-1C/D and 736.

Find and record correct phase angle (while source is warming up) –
- Press FAST, FORWARD, and ON buttons (740-1C/D, wavelength drive buttons).
- Press STOP when the wavelength LED readout reads 1600.0 (use SLOW, FORWARD, REVERSE, and STOP buttons to adjust).
- Switch Chopper (736) ON; allow 10 seconds for chopper to come up to speed.
- Set PHASE ANGLE switches (736) to MANUAL and 180°.
Turn PHASE ANGLE knob till LED phase angle readout displays 320° {360° for PbS detector}.
Set FILTER WHEEL switch to MANUAL.
Push INCREMENT button until LED filter display shows “3” {4 for PbS detector}.
Set RANGE switch to AUTO, then back to MANUAL (wait a few seconds for system to automatically set gain).
Turn “0°-360°” knob (736) counterclockwise till signal readout on 736 is close to .000 (make sure number is positive).
Note DEGREES display.
Turn “0°-360°” knob clockwise + 90° from present degree readout.
{Note: with PbS detector, it may be necessary to switch PHASE ANGLE 0/180 switch to 0°, should the nominal degree setting for the chopper turn out to be greater than 360 degrees.}
Record degrees, signal, and gain.
Re-adjust phase angle during source warm-up, and record drift of phase angle / signal.

Start control program –
Set RANGE switch to AUTO.
Set FILTER WHEEL switch to COMPUTER.
Double-click 746.BAT on PC (this batch file runs GRAPHICS and 746SIG-C.EXE).

Set grating cut-on wavelength for grating 2 –
Press [F3] function key (on PC) to get grating screen.
Press [F3] to select grating to modify.
Type 2 [enter] to select grating 2.
For blaze: type 1.60 [enter] (this is nominal wavelength for grating, in micrometers).
For grooves: type 600 [enter] (this is grooves per inch for grating).
For cut-on: type 1111 [enter] {use 800 for PbS detector} (this is the cut-on wavelength in nm).
[F10] to exit grating screen.
[F5] to store grating properties.
[F10] to continue with program.

Enter scan control data –
The program will request an upper and lower bound to be entered.
For Si detector, type 380,1100 [enter]. {For PbS type 900,2500.}
For the wavelength interval, type 10 [enter] {20 for PbS}.
Enter the date in yymmd format and press [enter] (to use the default date which is usually correct, press [enter]).
Press [enter] (no printer output).
Check items on screen checklist, then press the spacebar.
Enter the lab temperature, in C.
Enter the relative humidity (e.g. 58% would be typed as 58 [enter]).
Enter the slit size (pressing [enter] will default to 2.5mm slits).
Press [enter] for a default minimum sample of 5 per wavelength.
Press [enter] for a maximum sample rate of 20 per wavelength.
Press [F1] if using the Si detector. {[F2] for PbS}
Press a function key to choose the noise threshold (usually [F4] for .5%).
Type in the run designation (e.g. if scanning Hardy, user might type 16 lamps
Hardy [enter]). Do not type commas.
Type an appropriate filename (usually syymmdda [enter] where s is an
alphanumeric representing the source, yymmdd is the date, and a is an
alphanumeric representing the chronological order of the scan).
Press the spacebar to start the scan.
{If using PbS, the program will prompt for a grating change at 1600 nm. When
prompted, raise the grating knob and turn it to the G-20-300 setting, then
push it down until it seats solidly.}

After scan is completed –
Adjust and record the phase angle at the end of each scan. (See directions under
Find and record correct phase angle above.)
Press [F5] if another scan is desired, or press [F10] to end the program.