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## **Instruction Manual**

# **ILT350**

## **Illuminance Spectrophotometer**

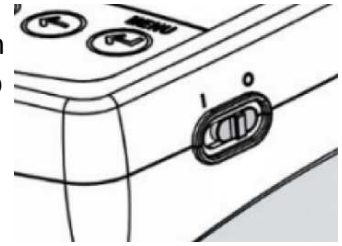
**03/14/2016**

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## 1. Quick Start Manual

Using the power switch on the right side of the meter body, turn the meter on by pushing the button down to the ( I ) on position. Allow the unit to warm up for 1-2 minutes when first turned on and after changes to the ambient temperature.



After a brief start up screen the meter will open in the measurement window, with “To Measure” in the lower message bar. (If not, press the left arrow button to access the “To Measure” screen).

*Note: First time users may want to review section 7G System, on page 10, to learn about programming language, date/time stamp, calibration warning etc.*

Step 1. Zero you meter. Assure the lens protector is in place.

1.

Press the MENU button one time. To open the Menu screen.

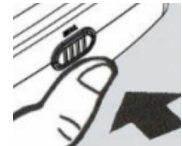


Press the toggle /scroll down button one time to select Zero Cal.



Press the Menu button to initiate selection. A date time screen will appear. Press the MEAS. Button located on the side of the housing to take a zero reading and save it.

Note: A timer will be displayed until the zero is complete and the Menu bar returns.



Step 2. Take a measurement.

1. Press the Left arrow button to move to “To Measure” mode.

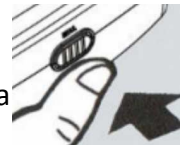


2. Remove the lens cover which is held in place magnetically over the receiving window. Note: The entire surface of the receiving window should be filled with light for most accurate measurements.


3.


Press the MEAS. button located on the side of the device to start a measurement.



Note: A message will appear in the message bar at the bottom of the display indicating a measurement is being performed. If audio is on, you will hear a small beep indicating the beginning and end of the scan.

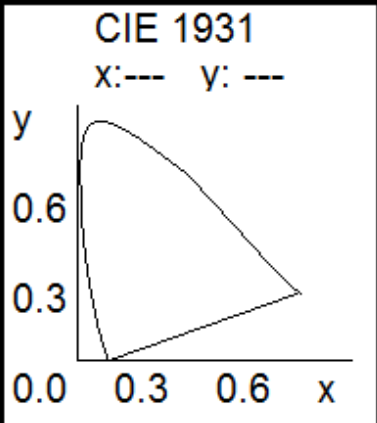
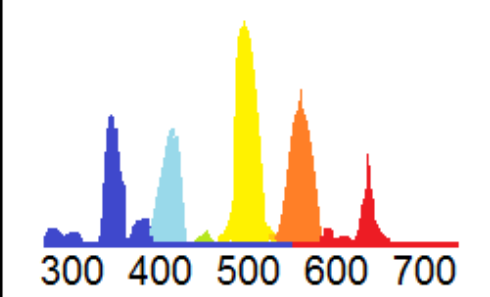
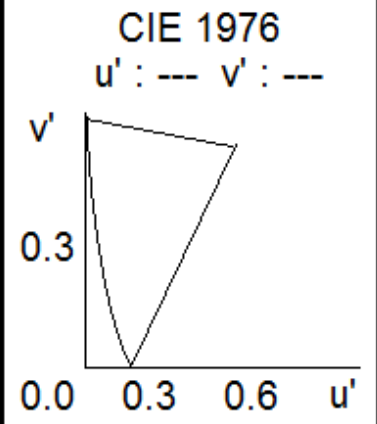






Once the scan is complete, the - - - indicating unpopulated Data Display fields, will all be replaced with populated data for the recent measurement.

2°   AUTO   UC00   T01 	
Ev	--- lx
Tcp	--- K
$\lambda d$	--- nm
Ra	---
To Measure	

2°   AUTO   UC00   T01 	
Ev	274.4 lx
Tcp	3144 K
$\lambda d$	581.0 nm
Ra	83
To Measure	

To scroll through the screens of data, use the up and down toggle buttons   located below the display. Below is an example of the available data fields, Unpopulated (before measurement).

Ev	--- lx	Pe	--- %	<b>Observer</b> 
Tcp	--- K	X	---	
$\lambda_d$	--- nm	Y	---	
Ra	---	Z	---	
$\Delta uv$	---	Peak	--- nm	
Ra	---			
R1	 ---			
R2	 ---			
R3	 ---			
...	---			
R15	 ---			

Step 3. Save your readings

1. press the MENU button.

The Menu screen will open with the cursor on "Save Meas. Data", and the name of the file listed in the lower menu display message window. (ie:"save data as M006")

2. To initiate the save, press the MENU. button once. The message bar will indicate Mea. Data has been saved.

You may now continue with another measurement or continue viewing your data using the up/down toggle buttons.

To conserve power the meter will shutoff after approximately 10 minutes, or you can power off the meter by sliding the power button up to the off (O) position.

The lens cover should remain on when ever the unit is not being used to protect the delicate window of the cosine receptor. No force, shock, dents or scratching of the receptor or display should occur. Use care during use and storage to protect the window and display. Do not attempt to dismantle the ILT350 as this will cause damage and void all warranty.

## **2. ILT350 Introduction**

Thank you for choosing the ILT350. This instrument is a high precision, compact, light weight and mobile spectrophotometer designed to measure both lux and colorimetry functions.

The ILT350 includes built in rechargeable batteries and cosine correcting receptor window with a magnetic protective cover. In the box you will also receive:

- USB Micro Cable
- Carrying Case
- Calibration Certificate

Note: Instruction manuals and software will be provided on the ILT Website.

### **2A. Product package material**

When the instrument is not in use, it should be stored in its protective case. During shipment, please use the protective case and assure packaging reduces shock and vibration. If the protective case is lost, please contact ILT customer service for a replacement prior to shipment. ([ilservice@intl-lighttech.com](mailto:ilservice@intl-lighttech.com), 978 818 6180 x 118)

### **2B. Usage Precaution**

Please use the instrument properly according to this manual. Do not open the housing, as this may cause injury, electric shock or instrument damage and will void all warranty.

### **2C. Operating environment**

The instrument should only be operated under temperatures from 0 to 40<sup>0</sup> C and humidity less than 85%. Don't use in environments with steep temperature changes. Don't place the instrument directly in sunlight or close to a heat source as the internal temperature of the device can be much higher than the ambient temperature causing reading errors or damage. Don't use in environments that are wet, smoky or have increased risk of chemical exposure to prevent decreased performance or damage. Don't use near equipment causing a strong electromechanical field. Don't use at altitudes higher than 2000 meters.

### **2D. Measurement**

The reference plane is the front edge of the receiving window. Keep the receiving window clean (It is best to clean with lens cleaner wipes or other soft glass cleaning products). The measured value may change due to environmental conditions over long testing cycles. Periodic zeroing is suggested to assure accurate measurement.

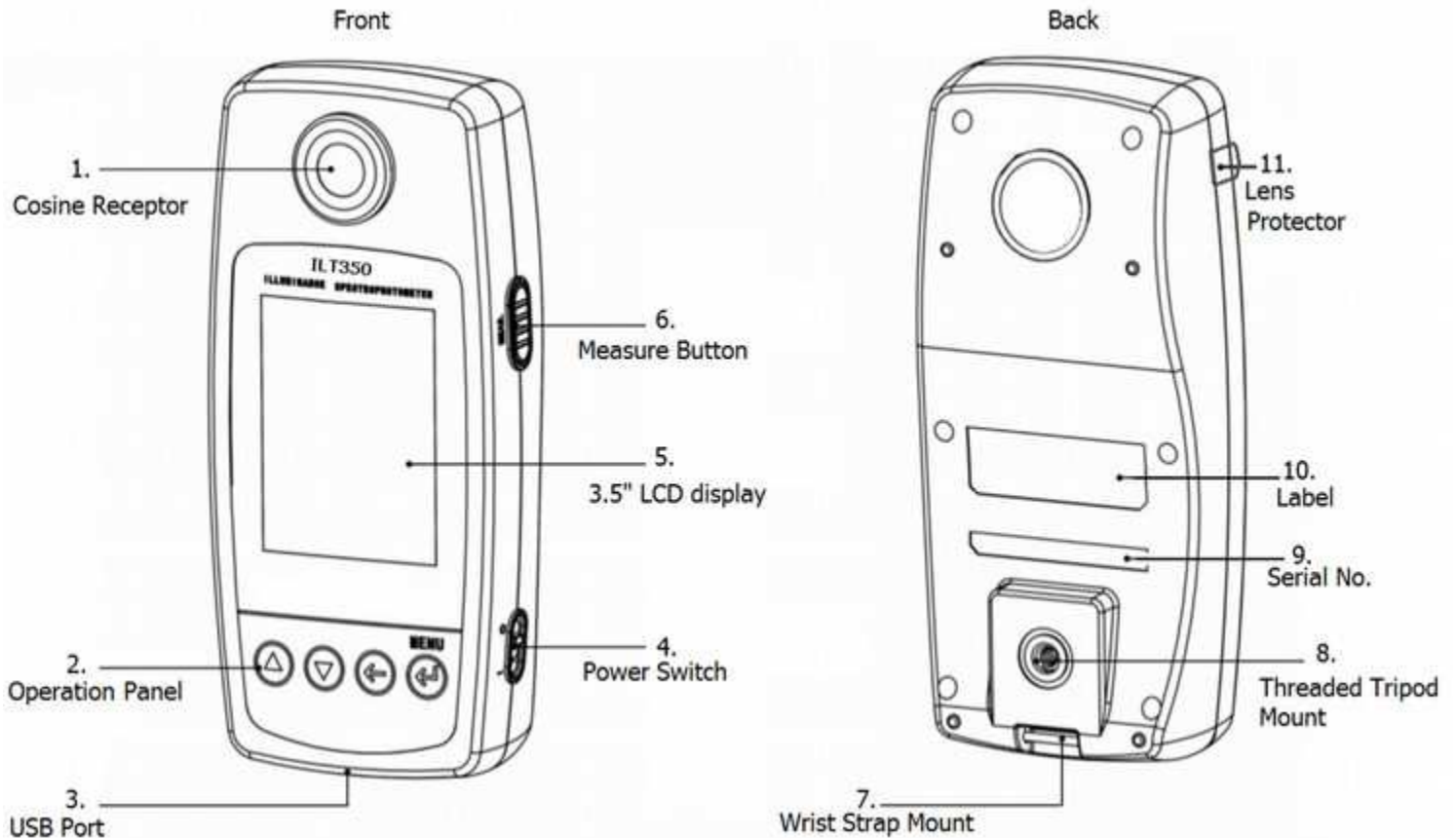
### **2E. Device care**

Do not strike, drop or shake the instrument. The receiving window is a highly delicate optical components. Please pay special attention to this area. Keep the cover on when not in use. Maintain a clean lens, prevent it from contact with light source or abrasive objects, prevent scratches and shocks.

### **2F. Internal battery**

The battery life is up to 6 hours after a full charge. It takes approx. 4 hours to fully charge the lithium battery. The internal circuit will prevent over charge. Do not attempt to replace the battery as this will void the warranty and calibration and can damage the device. Please contact customer service for battery change. <http://www.intl-lighttech.com/services/return-material-authorization/rma-form>.

## 2G: Front and back Panel



**1. Cosine Receptor:** Used to gather the light into the spectrometer. The reference plane is the front edge of the cosine receptor. For best results, the entire white surface of the window should be covered with light during measurement. The receptor should be covered when not in use and cleaned prior to use as needed. Dents, debris and scratches on the receiving window will impact the accuracy of the readings. Repair/Replacement should only be performed by ILT technicians.

**2: Operation Panel:** Left to Right; Up  $\wedge$  and down  $\vee$  arrows scroll up and down to select a feature or change between display windows. The left arrow is the  $\leftarrow$  Back button used to return to a previous function/ window and the MENU button  $\leftarrow^I$  is used to open the menu window and make a selection.

**3. USB port** accepts a USB mini cable for downloading data and charging batteries.

**4. Power Switch** Turns the device on and off.

(Device will auto shut off even in the on position to save battery)

**5. LCD color display.** This is not a touch screen display. Do not apply pressure to display. When storing the device, assure no objects will dent, scratch or apply excess pressure to the display. If the display is damaged, factory repair will be required. Opening the housing will void the warranty and the calibration. Be sure to obtain an RMA prior to returning goods for service:

<http://www.intl-lighttech.com/services/return-material-authorization/rma-form>

**6. MEAS. Measurement Button** initiates zero and spectral measurements.

7. Wrist strap mounting pin for optional wrist strap.

8. Mount for tripod.  $\frac{1}{4}$  – 20 thread

9. Serial number

10. Label area for device data

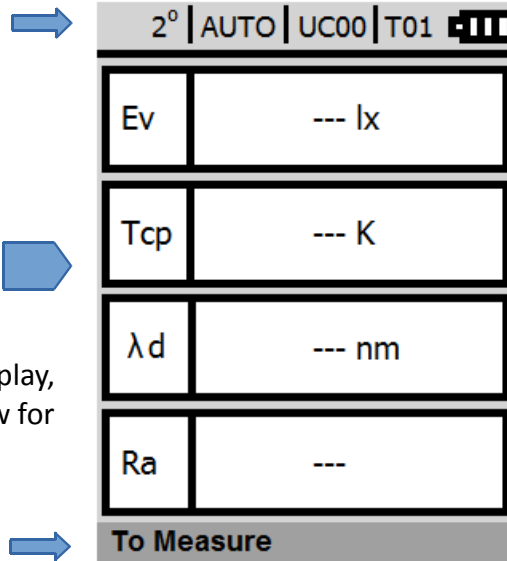
11. Mounting slot for magnetic Lens/Window cover

### 3. Start Up:

Turn on the meter by sliding the power switch to the on ( I )/ lower position. The system opens in measurement mode as shown below. If not press the ← arrow to access Measurement Mode:

**3A. Settings Bar** displays the following data from left to right:

1. 2° or 10° observer
2. Integration time
3. User calibration file name
4. Reference data file name
5. Battery life indicator



### 3B. Data Display Window:

There are 10 Data display windows. The - - - indicate there is no measurement data to populate the display fields. To populate the display, Press the MEAS. Button on the side of the device. See section 5 below for additional information on data fields.

### 3C. Message Bar:

The message bar indicates which applications are pending and/or in process. ie. when the MEAS. Button is pressed, “To Measure” will change to “Measuring...Cancel:[ ← ] button”.

### 4. Available Data Displays.

After each scan is complete, the 10 data display windows will be populated with data. To change between screens use the up and down arrow buttons ⏴ ⏵ below the display to toggle through each of the ten available data display screens.

### 5. Display Definitions:

**Ev Lx:** The readout value is in lux.

**Tcp K:** Shows the color temperate in degrees Kelvin.

**λd:** Is the dominant wavelength. This is calculated by drawing a line from white reference thru the test source out to the dominant wavelength.

**Δuv:** Delta UV calculates the distance of the test source to the black body curve. The smaller the value, the closer the match.

**Pe %:** Calculates the excitation purity using the λd and the reference illuminant (white reference) and the ration of their distances to the illuminant point.

**X, Y, and Z:** Are the 2° XYZ tristimulus values for the color space as defined by C.I.E.

**Peak:** Shows the peak wavelength followed by a full color spectral distribution graph.

**Ra:** is the CRI, a measurement that evaluates how well colors are represented by the light from the test source, compared to how the colors are rendered with the light coming from a reference illuminant.

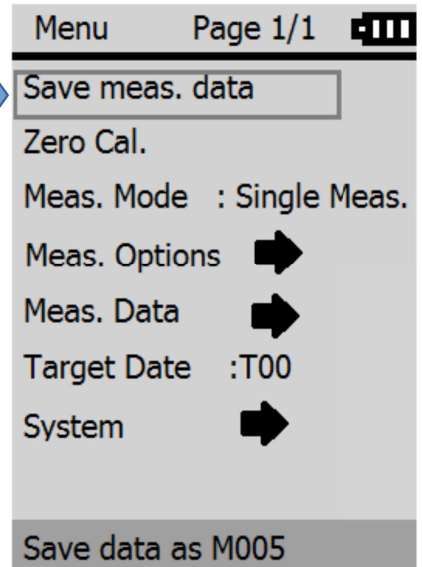
Ra provides a value between 0 and 100.100 means that there is no difference in color rendition between the light of the test source and the light of the reference illuminant.

**CIE1931, CIE 1976:** CIE (International Commission on Illumination) standards for mapping color.

## 6. MENU B



The Menu button is used to access the menu screen as well as to make selections and initiate an activity. When you first press menu, the Menu start up screen will open as shown below:



**6A. Settings Bar** indicates you are on the “Menu” Screen “Page 1 of 1”.

**6B. Data Display** Window provides a list of the available applications. Use the up and down buttons to highlight the required application. ie. Save meas. data.

**6C. Message Bar:** Once the feature has been highlighted the message bar along the bottom will provide information on the feature selected ie Save data as measurement number M005.

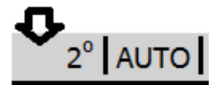
Press the MENU button again to initiate the activity selected.

## 7. Menu Screens:

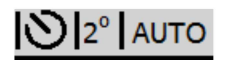
**7A. Save Meas. Data:** Saves the data to the internal device memory.

**7B. Zero Cal.:** With the lens cover in place, Zero cal will replace the existing Dark Zero value with a new dark zero value. This is used to account for any changes to the dark zero caused by the environment. Zero Cal. should be used every time there are environmental changes and periodically during long term continuous measurements to improve the accuracy of the readings.

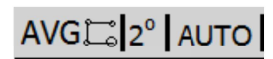
**7C. Measurement Mode.** There are three available Options for Meas. Mode. The standard is Single with no time delay which will have no icon in the setting bar as shown. To change the mode, use the toggle buttons to cursor over the desired selection, then press the menu button to activate.



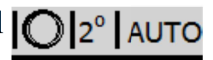
**Single:** Takes 1 measurement. A delay can be selected from 0(standard) to 999 seconds. The menu bar indicates when a delay has been programmed.



**Avg:** Averages the readings for a user defined time period between ( 0-999) seconds.



**Cont:** Press MEAS. to start continuous measurement mode. Press and hold MEAS. Until menu bar says Continuous Meas. Stopped.



**7D. Meas. Options →** allows the user to program the following parameters:

Display Type:

**Absolute:** Display the absolute value of the measurement. (Does not use target data)

**Color Difference:** Uses the target data to compare with the current measurement. See Sections 7F on page 10 to learn more about creating/selecting a target.

**Select Rank:** Not in use at this time.



**Color Space:** In this field you can select which screen is displayed first upon turning on the spectrometer and after completing a measurement.

Ev/Tcp/Ra  
x/y  
u'/v'  
Ev/Tcp/uv  
X/Y/Z  
Ev/ $\lambda$ d/Pe  
CRI  
Spectral

**Meas. Time:** The default setting is set to Auto to optimize the integration time based on the light level. It is possible to override this setting and select faster or slower measurement speeds.

**FAST:** .5 seconds (less averaging can mean more noise and less accuracy)

**SLOW:** 2.5 Seconds

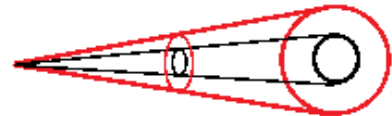
**AUTO:** .5 – 27 seconds depending on light level (Best setting for improved accuracy and repeatability)

**Observer:** To select an observer use the toggle buttons to select, and press menu to apply.

2°  
10°

The color sensitivity of the eye changes according to the angle of view/object size. Because the 1931 2° observer is not ideal for large-field visual color judgements the CIE defined a second set of observer functions with a 10° fov (field of view). To clarify, using a distance of 50cm, 2° fov would be a 1.7cm circle while a 10° fov would be an 8.8cm circle.

At greater distances the size difference increases.



**User Cal:** The ILT350 can store up to 10 calibration factors. Prior to changing the calibration factor, the correct selection should be verified on the most recent calibration certificate.

UC00 - UC09

**Illum. Unit:**

LX if for readout in lux ( $\text{lm}/\text{m}^2$ )  
fcd if for readout in foot-candles ( $\text{lm}/\text{ft}^2$ )

**7E. Meas. Data →:** Meas. Data opens a list of the stored measurements in the format M#### from M000 to M099.

M001  
M002...  
M099

To select a saved measurement, use the scroll buttons to move the cursor until the desired file is highlighted, then use the MENU button to open the desired file. Once selected use the scroll buttons to toggle through the 10 data display screens.

Use the back and menu buttons to toggle between the file list and the display.

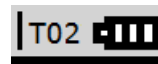
Press the MENU button twice to access the file processing screen

**7E1. File Processing** Allows the user to create a target file, delete one measurement, or delete all saved measurements.

**Registration:** Allows the user to create a Target from a previously stored/selected measurement. With the cursor over the desired target measurement press the MENU button. Cursor over Registration and press MENU. Cursor to the desired target name ie. T01. Press MEAS two times. Use the scroll button to Highlight OK. See confirmation in the message bar “Target has been registered”. Use the back arrow to exit.

**Delete a data:** Deletes a single saved file, scroll to OK, press MENU and the file will be deleted (see confirmation in the message bar)

**Delete all:** Deletes all saved measurements, scroll to OK, press MENU and the file will be deleted. See confirmation in the message bar.



## 7F. Target data

The ILT350 can store up to 20 sets of Target (baseline) data scans. Target files range from T00 to T19. The selected target value is shown in the Settings Bar at the top of the display to the left of the battery life indicator.

To select a target, place cursor over Target Data, Press MENU, use the scroll buttons to highlight the desired Target. Press the MENU button to apply. See confirmation in the message bar “Display Target Color T##) has been registered”. Use the back arrow to return to the main menu, or the scroll buttons to view the target data screens.

## 7G. System

**Buzzer On/off:** Turns on and off the audible indicator (beep sound)

**Invert Display** Flips the display 180°

**Date/Time:** Sets the date and time in the format

**Year/mo/da Hr:min:sec.**

Use the MENU button repeatedly to move between fields, Use the scroll up and down buttons to change parameters in the selected field. Use the back arrow to return to the System menu.

**Auto Power off :** on/off. When auto power off, “on” is selected the device will go to sleep to conserve battery life after approximately 10 minutes. In “off” mode the power will stay on until the power button is moved to the off position or the battery is drained.

**Cal. Warning:** Sets the calibration reminder parameters

Cal warning: sets the time to announce the warning

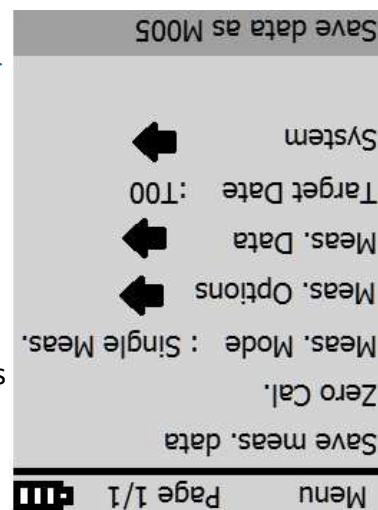
Svc.Cal.Expir→ Sets the due date for the reminder.

Cal.Warn: Turns the warning on and off.

**Language:** Allows the user to select Chinese or English

**Initialize:** Returns device to factory settings. Erases all stored measured and target data. Does not erase calibration factors.

**Info (serNO./Ver):** Not in use at this time. Will display the model number only.



## 8. Features & Specs:

- Built in 3.5" color display
- NIST traceable ISO17025 accredited calibration
- Hand held, compact, ergonomic design
- Built in data storage for up to 100 readings
- Built in rechargeable battery lasts up to 6 hours
- Software for English, Chinese traditional and Chinese simplified
- 10 full color displays for easy data analysis including: Lux, CCT, CRI, CIE1931 color, spectrum and more
- Sony CCD Linear Image Detector with 16 bit A/D resolution
- Luxmeter Manager software is Windows XP, Windows 7 and Windows 8 compatible
- Measurement Range: 380- 780 nm
- Dynamic Range: 20-10,000 lux
- USB: Micro for data download
- Input optic: 12 mm dia. Cosine Receptor
- Temperature: 0-40 Deg C.
- Size: 160 x 75 x 43 mm
- Weight: 260 g
- CE certified: No RF noise.
- CIE 1931/1964 2/10 degree observer option

## 9. Quick Start Guide- Using ILT350 to compare lamps.

The ILT350 has the ability to store 100 readings and up to ten Target/Baseline readings. Once a measurement has been saved it can be converted into a target. After creating a target, it can be selected as a baseline to compare against additional/future measurements. The Software will insert a delta  $\Delta$  prefix in front of all displayed values to indicate the displayed values are a comparison.

1. With the display type set to "Absolute, and the display menu set to "To Measure", take a reading of the light standard that will be used as the target/baseline by pressing "Meas.". (see **7D. Meas. Options** for additional advise on setting display to absolute as needed.)
2. Press MENU to generate a file name which will be noted in the message bar ie M008. Press MENU again to save the file, **"Mea. data has been saved"** will appear in the Message Bar.
3. Retrieve the reading by pressing MENU, scroll down and cursor over Meas. Date →. Press MENU to access the file of saved readings. Scroll down and cursor over the file, IE M008.
4. The file will open in display mode. The name of the file will appear in the Setting and Message bar. Verify the file selected is the correct target file.
5. Press MENU to access the "registration →" and press MENU again to access the Target List.
6. Use the scroll buttons to cursor over the target file name to be used, ie T02 and press MENU. The message "No Target data" will appear if you select an empty target.  
(note: if you are over writing an existing target, the target file will open and the message bar will appear: "display target color" and the file name. Press MENU again and a message will ask if you "need cover ?" which means do you want to over write the file. If yes, go to step 7 if not cancel and select a new T0# file name)
7. Use the scroll button to select OK and press MENU to create a new target. Message bar will say **"Target has been Registered"**

8. press the back button ← to return the to menu.
9. Scroll up/down to target Date: T## and hit menu
- 10 Scroll Up/down to select the target and press menu twice
11. Use the back arrow← to return to the Menu Screen and verify Target Data is applied.
12. Scroll to Meas. Options→ and press MENU
13. With cursor on Display Type press MENU to enter, then scroll to Color Difference and press MENU.
14. Press the back arrow twice← ← and verify the delta prefix is in front of all displayed value labels.  
ie **ΔEv**.

Your set up for Color Difference is now complete. You can proceed with taking measurements of the sample light sources (press Meas.) and the display will continue to show the Differences between the Target/Baseline and the sample/current measurement.

To return to standard measurement/data display mode, press MENU, scroll to Meas. Options→, press MENU, Cursor to Display Type and Press MENU. Scroll to Absolute and press MENU. Use the ← back arrow to return to the “to Measure” screen and the measurement will now be display in standard mode, with no comparison to the target.