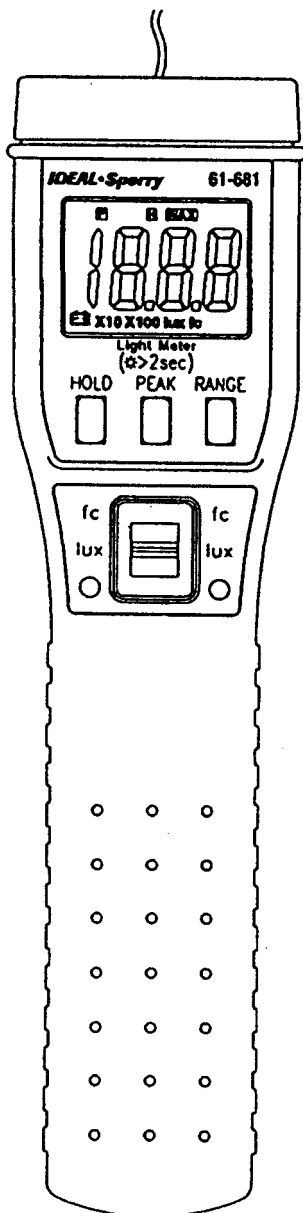




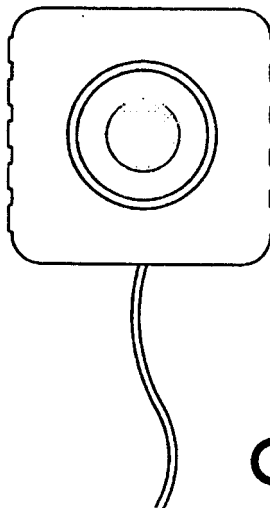
#61-681

# OPERATING INSTRUCTIONS DIGITAL MULTIMETER



## PLEASE READ THESE OPERATING INSTRUCTIONS CAREFULLY

Misuse and or abuse of these instruments cannot be prevented by any printed word and may cause injury and or equipment damage. Please follow all these instructions and measurement procedures faithfully and adhere to all standard industry safety rules and practices.



IDEAL INDUSTRIES, INC.  
Sycamore, IL 60178, U.S.A.  
800-304-3578 Customer Assistance  
[www.idealindustries.com](http://www.idealindustries.com)  
ND-1734



## INTRODUCTION

This instrument is a portable easy use 3½ digit, compact-sized digital lightmeter designed for simple one hand operation. Provides selected the lux and fc units. Meter with Backlit LCD display, PEAK-HOLD (50mS pulse light) and DATA-HOLD feature.

## SAFETY INFORMATION

It is recommended that you read the safety and operation instructions before using the lightmeter.

### WARNING

- To avoid electric shock, do not operate this product in wet or damp conditions.
- To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.
- To avoid eye injury, wear eye protection if there is a possibility of exposure to high-intensity rays.
- Do not immerse in liquids, clean the sensor head using only a damp cloth.
- Cover sensor head when not in use to extend silicon photodiode sensor life.

The  $\Delta$  symbol on the instrument indicates that the operator must refer to an explanation in this manual.

## SPECIFICATIONS

### GENERAL

#### Display:

3½ digit liquid crystal display (LCD) with maximum reading of 1999

Total accuracy for CIE standard illuminant A (2856K):  $\pm(3\% \text{rdg} + 10 \text{dpts})$

CIE standard illuminant A can be realised by means of CIE standard source A, which is defined as: A gas-filled tungsten-filament lamp operating at a correlated colour temperature of 2856K

Temperature Coefficient:  $0.1\%$  (specified accuracy)/°C ( $<18^\circ\text{C}$  or  $>28^\circ\text{C}$ ),  $0.056\%$ (specified accuracy)/°F ( $<64.4^\circ\text{F}$  or  $>82.4^\circ\text{F}$ )

Peak Hold response time:  $>50\text{mS}$  pulse light.

## OPERATING INSTRUCTIONS

### Push buttons

#### Back-Light ( $\star > 2\text{sec}$ ) and Peak-Hold Switch :

Press this button to toggle in and out of the PEAK-HOLD mode. The "P MAX" annunciator are displayed. (Response Time:  $>50\text{mS}$ )

Press this button for two seconds to turn the Back-Light on. As this also activates the PEAK-HOLD mode, briefly press the button to return to normal display. To turn the Back-Light off press again for two seconds.

#### Range Select Button

Press "RANGE" button to select the desired lux or fc range. Each time you press "RANGE" button, the range (and the input range annunciator) increments, and a new value is displayed.

Overrange: (OL) is displayed

Low battery indication: the "E" is displayed when the battery voltage drops below the operating level

Measurement rate: 2.5 times per second, nominal.

Operating Environment:  $0^\circ\text{C}$  to  $50^\circ\text{C}$  ( $32^\circ\text{F}$  to  $122^\circ\text{F}$ ) at  $<70\%$  relative humidity

Storage Temperature:  $-20^\circ\text{C}$  to  $60^\circ\text{C}$  ( $-4^\circ\text{F}$  to  $140^\circ\text{F}$ ), 0 to 80% R.H. with battery removed from meter

Accuracy: Stated accuracy at  $23^\circ\text{C} \pm 5^\circ\text{C}$  ( $73^\circ\text{F} \pm 9^\circ\text{F}$ ),  $<70\%$  relative humidity

Battery: 4 pcs 1.5V (AAA size) UM-4 R03

Battery Life: 200 hours typical with carbon zinc battery

Dimensions: 170mm(H) x 44mm(W) x 40mm(D)

Weight: 220g (7.76oz) including batteries

## ELECTRICAL

### Photometric Formulas:

$10.764 \cdot \text{footcandles} = \text{lumens/meter}^2$

$0.0929 \cdot \text{lumens} = \text{footcandles}(\text{lumens/foot}^2)$

Range: 20lux, 200lux, 2000lux, 20000lux

20fc, 200fc, 2000fc, 20000fc

Resolution: 0.01lux, 0.01fc

Spectral response: CIE photopic

The CIE photopic curve is an international standard for the color response of the average human eye

Acceptance angle:  $f' < 2\%$  cosine corrected ( $150^\circ$ )

### HOLD (DATA-HOLD) Button

Press "HOLD" button to toggle in and out of the DATA-HOLD mode. In the DATA-HOLD mode, the "H" annunciator is displayed and the last reading is held on the display.

## OPERATION

1. Set the function switch to the desired lux or fc units.
2. Remove the sensor head cover.
3. Hold the sensor head steady and make certain that the light source completely fills the cosine correction dome.
4. Move away from the sensor head to avoid shadowing it. The sensor head has a 1.5 meter cable to allow separation between the observer and the measurement location.
5. Read the illuminance value from the display. If magnitude of lux (or fc) is not known, press RANGE button to the highest range and reduce until a satisfactory reading is obtained.
6. Cover sensor head to extend sensor life.

## SPECIAL CONSIDERATIONS

- Keep the plastic domed cosine corrector clean and free of scratches. It may be cleaned with a soft cloth and isopropyl alcohol.
- When light is received from many directions simultaneously, take special care to avoid reflections or shadowing the sensor with your body.
- For best accuracy, repeat the measurement several times to ensure that the light source has remained stable.
- Avoid flexing the cable excessively at either end of the cable.

### • The Inverse-square Law

The law stating that the illuminance  $E$  at a point on a surface varies directly with the intensity  $I$  of a point source, and inversely as the square of the distance  $d$  between the source and the point. If the surface at the point is normal to the direction of the incident light, the law is expressed by  $E=I/d^2$ .

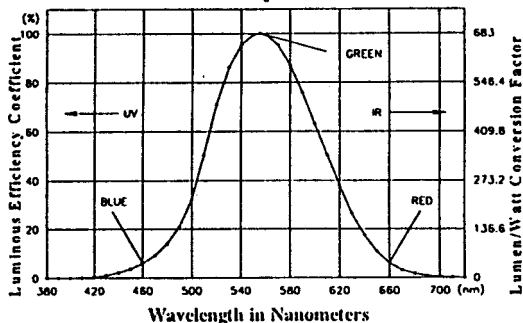
### • Cosine Law

The law that the illuminance on any surface varies as the cosine of the angle of incidence. The angle of incidence  $\theta$  is the angle between the normal to the surface and the direction of the incident light. The inverse-square law and the cosine law can be combined as  $E=(I \cos \theta)/d^2$ .

### Cleaning

Periodically wipe the case with a damp cloth and detergent, do not use abrasives or solvents.

**CIE Photopic Curve**



Wavelength (nm)	VA CIE Photopic Luminous Efficiency Coefficient	Photopic Lumen/Watt Conversion Factor
380	0.0000	0.05
390	0.0001	0.13
400	0.0004	0.27
410	0.0012	0.82
420	0.0040	2.73
430	0.0116	7.91
440	0.0230	15.7
450	0.0380	25.9
460	0.0600	40.9
470	0.0910	62.1
480	0.1390	94.8
490	0.2080	142.0
500	0.3230	220.0
510	0.5030	343.0
520	0.7100	484.0
530	0.8620	588.0
540	0.9540	650.0
550	0.9950	679.0
555	1.0000	683.0
560	0.9950	679.0
570	0.9520	649.0
580	0.8700	593.0
590	0.7570	516.0
600	0.6310	430.0
610	0.5030	343.0
620	0.3810	260.0
630	0.2850	181.0
640	0.1750	119.0
650	0.1070	73.0
660	0.0610	41.4
670	0.0320	21.8
680	0.0170	11.6
690	0.0082	5.59
700	0.0041	2.78
710	0.0021	1.43
720	0.0010	0.716
730	0.0005	0.355
740	0.0003	0.170
750	0.0001	0.0820
760	0.0001	0.041