UNI-T®

UT690
Series Optical Products User Manual

Preface
Thank you for purchasing the new UT690 series optical products. In order to use these products safely and correctly, please read this manual thoroughly, especially the *Safety Warning* part.

After reading this manual, it is recommended to keep the manual at an easily accessible place, preferably close to the device, for future reference.

Limited warranty and liability
Uni-Trend guarantees that the product is free from any defect in material and workmanship within one year from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination or improper handling. The dealer shall not be entitled to give any other warranty on behalf of Uni-Trend. If you need warranty service within the warranty period, please contact your seller directly.

Uni-Trend will not be responsible for any special, indirect, incidental or subsequent damage or loss caused by using this device. As some countries or regions do not allow limitations on implied warranties and incidental or subsequent damages, the above limitation of liability may not apply to you.

1. Safety Warning

⚠ This manual contains the necessary operation instructions and equipment maintenance methods. Please read each part of it carefully before using the equipment.

⚠ If the manual is not read or the operating instructions are not understood, the operation may cause inaccurate test results or damage the equipment, or even endanger personal safety.

⚠ Mini-USB charging port is reserved for charging lithium battery, which is not applicable currently.

⚠ This version of the manual is subject to change without prior notice.

Symbol Description:

▣	Double insulated	CE	Conforms to EU standards
⚠	Warning	📖	Please read the instructions before use.
🗑	Do not discard the battery as unsorted municipal waste. Please place it in a fixed battery recycling station for disposal.		

2. Introduction
UT690 series optical products include optical power meters, light sources, optical multimeters, etc. They are mainly used for optical signal power measurement, optical fiber line loss test, optical device insertion loss test, optical fiber fault detection, optical fiber breakpoint location, end-to-end optical fiber identification and so on. These products are designed to meet the ergonomic requirements and advanced cold molding technology is adopted to make them beautiful and durable. Provided with IP65 dust and water prevention function, UT690 series can be widely applied to optical cable construction and maintenance, optical fiber communication, optical fiber sensing, optical CATV and other fields.
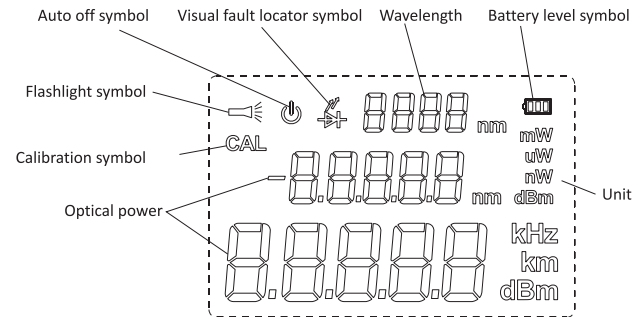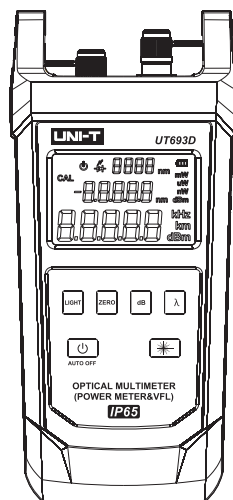
2.1 Models

Models	UT692D/UT692G	UT693D	UT696	UT697
Name	OPTICAL POWER METER	OPTICAL MULTIMETER	OPTICAL LIGHT SOURCE	OPTICAL MULTIMETER
Main function	Power meter	Power meter + visual fault locator	Light source	Power meter + light source

2.2 Features
- IP65 dust and water prevention
- Auto power off
- Low battery indication
- Backlight on/off
- Flashlight function (UT692D, UT692G, UT696)
- Optical power meter:
  - o User self-calibration function
  - o Simultaneous display of linear mW and non-linear dBm
  - o Wavelength memory function
  - o Reference power memory function
  - o Eight calibrated wavelengths (850, 980, 1300, 1310, 1490, 1550, 1625 and 1650 nm)
- Visual fault locator:
  - o Optical fiber fault detection
  - o Optical fiber breakpoint/bend location
  - o End-to-end optical fiber identification
  - o Two operating modes (pulse/continuous red light)
- Light source:
  - o CW and multiple modulated light output
  - o Adjustable output power (adjusting range: 4dB; stepping: 2dB)
  - o Dual wavelength (1310nm, 1550nm)
- Conforms to EN61326-1:2013 and EN61326-2-2: 2013 standards

3. Structure

3.1 Structure Diagram

3.2 Key Description

3.2.1 UT692D/UT692G

No.	Key	Description
1	⏻	Power key:Power the meter on by pressing this key within 1s and off by long press.
2	AUTO OFF	This key enables the auto power off function (The top left corner of the LCD will display a reminder), which will power off the unit when no keys have been pressed for 10 minutes.
3	LIGHT	1. Press this key for 2s in the power on state to turn the flashlight on or off. The flashlight symbol will be displayed in the top left corner of the LCD. 2. Press the "LIGHT" key once in the power on state to turn the LCD backlight on or off. If no keys have been pressed within 2 minutes, the LCD backlight will be automatically turned off. The backlight can be turned on again by pressing the "LIGHT" key once under this condition. The LCD backlight is turned on and the flashlight is turned off by default.
4	ZERO	Long press this key to automatically zero the optical power meter. At this time, the LCD is fully displayed to indicate the success.
5	dB	Press the "dB" key to toggle the meter's measurement mode between relative power (dB) and absolute power (dBm) to measure the optical power at the corresponding wavelength.
6	λ	Eight calibrated wavelengths (850, 980, 1300, 1310, 1490, 1550, 1625 and 1650 nm) can be selected by this key and displayed on the LCD simultaneously.
7	ZERO + LIGHT	Self-calibration mode: Press "ZERO" + "LIGHT" simultaneously (press again to exit the calibration mode) to enter the calibration mode. At this time, the character "CAL" is displayed in the top left corner of the LCD. Press the "LIGHT" key to add 0.05dB and "dB" key to decrease by 0.05dB at a time. This is used to calibrate the measurement error. After adjusting, press the power key to save the calibration data.
8	ZERO + AUTO OFF	Factory reset: Press "ZERO" + "AUTO OFF" simultaneously to restore factory settings.

3.2.2 UT693D

No.	Key	Description
1	⏻ AUTO OFF	Power (AUTO OFF) key 1. Short press to power on, and long press to power off. 2. Short press this key in the power on state to turn the auto power off function on or off (on by default). The device automatically powers off after 10 minutes of no use.
2	☀	Short press to turn the red light on, short press in the red light state to flash it, and short press in the flash state to turn it off.
3	LIGHT	Press the "LIGHT" key once in the power on state to turn the LCD backlight on or off (on by default). If no keys have been pressed within 2 minutes, the LCD backlight will be automatically turned off. The backlight can be turned on again by pressing the "LIGHT" key once under this condition.
4	ZERO	Long press this key to automatically zero the optical power meter. At this time, the LCD displays "CLR" to indicate the success.
5	dB	Press the "dB" key to toggle the measurement mode between relative power (dB) and absolute power (dBm) to measure the optical power at the corresponding wavelength.
6	λ	Eight calibrated wavelengths (850, 980, 1300, 1310, 1490, 1550, 1625 and 1650 nm) can be selected by this key.
7	ZERO + LIGHT	Self-calibration mode: Press "ZERO" + "LIGHT" simultaneously (press again to exit the calibration mode) to enter the calibration mode. At this time, "CAL" is displayed on the LCD. Press the "LIGHT" key to add 0.05dB and "dB" key to decrease by 0.05dB at a time. This is used to calibrate the measurement error. After adjusting, press the power key to save the calibration data.
8	ZERO + ☀	Factory reset: Press "ZERO" + " ☀ " simultaneously to restore factory settings.

3.2.3 UT696

No.	Key	Description
1	⏻ AUTO OFF	Power (AUTO OFF) key 1. Short press to power on, and long press to power off. 2. Short press this key in the power on state to turn the auto power off function on or off (on by default). The LCD prompts " ⏻ " when the function is on.
2	LIGHT	Press the "LIGHT" key for 2s in the power on state to turn the flashlight on or off. Press the "LIGHT" key once in the power on state to turn the LCD backlight on or off. If no keys have been pressed within 2 minutes, the LCD backlight will be automatically turned off.
3	△	Short press to attenuate the light source by 2dB (-4dBm→-6dBm→ -8dBm → -10dBm)
4	▽	Short press to increase the light source by 2dB(-10dBm → -8dBm → -6dBm → -4dBm
5	λ	Select and turn on the corresponding wavelength light source (1310nm → 1550nm → 1310nm cycle by default).
6	MODE	Short press to switch the frequency (0Hz → 270 Hz → 1000 Hz → 2000 Hz → 0 Hz cycle by default)
7	△ + MODE	Factory reset: Press " △ " + "MODE" simultaneously to restore factory settings.

No.	Key	Description	Remark
Optical power meter mode	⏻ AUTO OFF	Power (AUTO OFF) key 1. Short press to power on, and long press to power off. 2. Short press this key in the power on state to turn the auto power off function on or off (on by default). The LCD prompts " ⏻ " when the function is on.	The device defaults to optical power meter mode when it is powered on.
	LIGHT	Short press to turn the LCD backlight on or off (on by default). If no keys have been pressed within 2 minutes, the LCD backlight will be automatically turned off.	
	ZERO STEP	Long press "ZERO" to automatically zero the optical power meter. At this time, the LCD flashes "CLR" twice to indicate the success.	
	dB FREQ	Press the "dB" key to toggle the measurement mode between relative power (dB) and absolute power (dBm).	The device defaults to absolute power when it is powered on. The relative power is shown as a ratio to the absolute power.
	λ	Eight calibrated wavelengths (850, 980, 1300, 1310, 1490, 1550, 1625 and 1650 nm) can be selected by this key.	The last used wavelength is selected by default when the device is powered on.
	MODE	Switch from optical power meter mode to light source mode.	
	ZERO STEP + LIGHT	Self-calibration mode: Press "ZERO" + "LIGHT" simultaneously (press again to exit the calibration mode) to enter the calibration mode. At this time, "CAL" is displayed on the LCD. Press the "LIGHT" key to add 0.05dB and "dB" key to decrease by 0.05dB at a time. This is used to calibrate the measurement error. After adjusting, press the power key to save the calibration data.	Only valid in the optical power meter mode
	ZERO STEP + MODE	Factory reset: Press "ZERO" + "MODE" simultaneously to restore factory settings.	Only valid in the optical power meter mode
Light source mode	⏻ AUTO OFF	Power (AUTO OFF) key 1. Short press to power on, and long press to power off. 2. Short press this key in the power on state to turn the auto power off function on or off (on by default). The LCD prompts " ⏻ " when the function is on.	The device defaults to optical power meter mode when it is powered on.
	LIGHT	Short press to turn the LCD backlight on or off (on by default). If no keys have been pressed within 2 minutes, the LCD backlight will be automatically turned off.	
	ZERO STEP	Short press "STEP" to attenuate the light source by 2dB(-4dBm → -6dBm → -8dBm → -10dBm)	When the light source and optical power are switched, the current power output state is maintained. After the device is rebooted and the wavelength is selected, the default output optical power is -4dBm (at 0Hz).
	dB FREQ	Short press "FREQ" to switch the frequency(0Hz → 270Hz → 1000Hz → 2000Hz cycle)	Default memory for last used frequency; 0Hz by default after rebooting
	λ	Select and turn on the corresponding wavelength light source (OFF → 1310nm → 1550nm → 1310nm cycle).	Default memory for last used wavelength; OFF by default after rebooting
	MODE	Switch from light source mode to optical power meter mode.	

4. Specifications

4.1 Technical Indexes

Item		Description	OPTICAL POWER METER	OPTICAL MULTIMETER	OPTICAL LIGHT SOURCE	OPTICAL MULTIMETER
			UT692D/UT692G	UT693D	UT696	UT697
Optical power meter	Wavelength range	800nm~1700nm	√	√	X	√
	Calibrated wavelength	850nm, 980nm, 1300nm, 1310nm, 1490nm, 1550nm, 1625nm, 1650nm				
	Measurement range	-70dBm~+10dBm (UT692D,UT693D,UT697), -50dBm~+26dBm (UT692G)				
	Uncertainty	±5%				
	Display resolution	Linear: 0.1%, logarithmic: 0.01dBm				
	Connector	Universal connector FC/SC/ST				
	Detector type	InGaAs				
Visual fault locator	Wavelength	650nm±10nm	X	√	X	X
	Power	10mW (measurable optical fiber length: 8~10km)				
	Mode	Continuous/Pulse mode				
	Connector	Universal connector FC/SC/ST				
Light source	Wavelength	Dual wavelength: 1310nm, 1550nm	X	X	√	√
	Typical output optical power	-4dBm				
	Adjustable output optical power	-4dBm、-6dBm、-8dBm、-10dBm				
	Internal modulation	0Hz/270Hz/1000Hz/2000Hz				
	Luminescent device	FP-LD				
	Optical interface	FC/PC				
	Applicable optical fiber	SM, MM				
Flashlight	Flashlight function		√	X	√	X

Remarks:
1) Wavelength range: the calibrated operating wavelength range from 800nm to 1700nm, in which the optical power meter can work under specified index.
2) Measurement range: the range in which the maximum power can be measured according to the specified index.
3) Uncertainty: the error between the measurement results of a given optical power and a standard optical power.

4.2 General Parameters

Item	Description
Power supply	1. 5V AA alkaline battery (3 pcs)
Low battery indication	Low battery indication at around 3.5V, auto power off at around 3.3V
Auto power off	Auto power off after 10 minutes of inactivity
Dimensions	189mm×87mm×45mm
Drop height	2m
Operating temperature	0°C~40°C
Storage temperature	-10°C~50°C
Operating humidity	20~75% RH
Storage humidity	10~90% RH
Altitude	≤2000m
Certification	CE, RoHS, IP65

5. Operating Instructions

5.1 Measurement of Absolute and Relative Power (UT692D, UT692G, UT693D, UT697)

5.1.1 Absolute Power Measurement
Set the test wavelength and access the test optical signal. Then the screen will display the measured linear value (in mw, nw, pw) and nonlinear value (in dBm) of the absolute optical power.

5.1.2 Relative Power (Loss) Measurement (used in conjunction with light source)
Relative power measurement is mainly used to measure insertion loss or fiber link loss.
a) Use a standard test jumper to connect the output port of the light source to the detection port of the optical power meter.
b) Set the test wavelength and access the test optical signal. Then the screen will display the measured linear value (in mw, nw, pw) and nonlinear value (in dBm) of the absolute optical power.
c) Press the "dB" key. The absolute optical power measured by the optical power meter will be saved as the reference power value and displayed as xx.xx dBm on the second line of the screen.
d) Connect the jumper to be tested to the light source and the optical power meter. The difference between the current optical power value and the reference power value will be calculated by the optical power meter and displayed as y.yy dB on the third line of the screen, which is approximately insertion loss of the jumper.

⚠ **Note:**
① P (Reference power value) (dBm) = p (Light source output power) (dBm) − L (Insertion loss of the standard test jumper) (dB)
② L (Insertion loss of the jumper to be tested) (dB) = [P (reference power value) (dBm) − p (current power value) (dBm)] − L (Insertion loss of the standard test jumper) (dB)

5.1.3 Frequency identification function (UT692D UT692G, UT693D, UT697)
When connected to the light source with 270Hz, 1000Hz or 2000Hz signal, the optical power meter will automatically recognize the frequency and display XXXX Hz on the LCD.

5.2 Visual Fault Locator Function Test (UT693D)
1) Open the dust cap and insert the optical fiber under test into the interface of the visual fault locator.
2) Press the " ⊞ " key in the power on state, and select the continuous red light or pulse mode to test.
3) After the test, pull out the optical fiber, cover the dust cap, and then turn off the device.

5.3 Light Source Function Test (UT696, UT697)
⚠ **Note:** The light source needs to be used with an optical power meter.
1) Open the dust cap and tighten the fiber jumper to the light source output port.
2) Connect the other end of the fiber jumper to the test device (such as an optical power meter).
3) Turn on the light source, and select the corresponding output wavelength and frequency (UT697 needs to be switched to the light source mode first).
4) Turn on the test device, and select the same wavelength as the light source. The information such as the optical power output by the light source will be displayed on the test device.
5) After the test, pull out the optical fiber, cover the dust cap, and then turn off the device.

6. Standard Configuration
Host device --- 1 pc
User manual --- 1 pc
1. 5V AA alkaline battery ------------------------------ 3 pcs
Cloth bag --- 1 pc
SC connector for light source--------------------------1pcs (UT696, UT697 only)

7. Common Troubleshooting

Fault Prompt	Possible Cause	Solution
LCD displays weakly	Low battery	Replace the battery
Booting up cannot be displayed	Low battery or other causes	Reboot or replace the battery
LCD displays abnormal data	The connector is faulty, dirty or locked	Reconnect the connector and clean the sensor

8. Daily Maintenance
- Please keep the end face of the sensor clean, free from grease and contamination. Do not use unclean or non-standard adapter connectors. Do not insert the end face with poor polishing.
- Please stick to a kind of adapter as far as possible.
- Once the equipment is not in use, please cover it with a dust cap immediately.
- Please insert and remove the optical adapter connector carefully to avoid scratches on the port.
- Please wipe the sensor surface with a special cleaning swab in the circumferential direction gently and regularly.
- When the device is not in use for a long time, please remove the battery to prevent the battery from rot and the device from damage.

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