USER MANUAL

11TUNER
Power Monitor with Needle

WARRANTY

The Standa 11TUNER Single Channel Laser Power/Energy Meter carries a one-year warranty (from date of shipment) against material and/or workmanship defects, when used under normal operating conditions. The warranty does not cover damages related to battery leakage or misuse.

Standa will repair or replace, optionally, any 11TUNER that proves to be defective during the warranty period, except in the case of product misuse.

Any attempt by an unauthorized person to alter or repair the product voids the warranty.

The manufacturer is not liable for consequential damages of any kind.

Customers must fill in and mail the warranty card in order to activate the warranty.

In case of malfunction, contact your local Standa distributor or Standa office to obtain a return authorization number. The material should be returned to:

Standa Ltd.
Svitrigailos 4-39
03222 Vilnius
Lithuania

Tel: +370-5-2651474
Fax: +370-5-2651483
e-mail: sales@standa.LT

Website: www.standa.LT

CLAIMS

To obtain warranty service, contact Standa or send the product, with a description of the problem, transportation and insurance prepaid, to the Standa. Standa assumes no risk for the damage in transit. Standa will, at its option, repair or replace the defective product free of charge or refund your purchase price. However, if Standa determines that the failure is caused by misuse, alterations, accident or abnormal condition of operation or handling, you will be billed for the repair and the repaired product will be returned to you, transportation prepaid.

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SAFETY INFORMATION

Do not use the 11TUNER if the device or the detector looks damaged, or if you suspect that the 11TUNER is not operating properly.

Appropriate installation must be done for water-cooled and fan-cooled detectors. Refer to the specific instructions for more information. The user must wait for a while before handling these detectors after power is applied. Surfaces of the detectors get very hot and there is a risk of injury if they are not allowed to cool down.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, it is suggested to try to correct the interference by taking one or more of the following steps:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and receiver.
- Connect the equipment to an outlet that is on a different circuit than the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved in writing by Standa may void the user's authority to operate this equipment.

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1 THE 11TUNER SINGLE CHANNEL LASER POWER METER

1.1 Introduction

To obtain full performance from the 11TUNER, we recommend that you read this manual carefully.

The 11TUNER is a numerical and digital needle LCD display laser power monitor that features outstanding efficiency, ease of use and long battery life.

Unpacking

Each Standa 11TUNER is thoroughly tested and calibrated prior to shipment.

Visually inspect every 11TUNER unit after removing it from the shipping containers. If you see any damage, retain all packaging materials and shipping receipts. Any damage claim should be made promptly to the shipping company. Notify the nearest Standa representative concerning the claim, so that any repair or replacement can be arranged as soon as possible.

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1.2 Specifications

The following specifications are based on a one-year calibration cycle, an operating temperature of 18 to 28ºC (64 to 82ºF) and a relative humidity not exceeding 80%.

Table 1-1 List of Specifications

	11TUNER POWER METER SPECIFICATIONS
Power Range	10 pW to 10 kW (detector dependent)
Power Scales (photodetector)	Autoscale
Power Scales (thermal head)	25 scales: 10nW, 30nW, 100nW, 300nW, 1uW, 3uW, 10uW, 30uW, 100uW, 300uW, 1mW, 3mW, 10mW, 30mW, 100mW, 300mW, 1W, 3W, 10W, 30W, 100W, 300W, 1kW, 3kW, 10kW
Compatible detector heads	11XLP12, all 11UP Series, 11PS 1.5k, PS 3k, PS 6k, all 11HP Series and all 11 PH series
Digital Resolution (11XLP-12 detector)	1 µW
Digital Resolution (11UP/11PS thermal detector)	1 mW
Digital Resolution (11HP detector)	Autoscale
Digital Resolution (photodetector)	10 pW
Monitor Accuracy	±1 % ±5 µV
Response Time (accelerated)[1]	< 1sec
Sampling Frequency	16.7 Hz
Analog out	0-1volt (±1%)
Digital Display	77 x 58 mm LCD
LCD segments	96 (55 segments for needle)
Needle accuracy	0.9%
Display Rate	4 Hz
Dimensions	210 mm(W) x 122 mm (H) x 44 mm (D)
Weight (including batteries)	0.47 kg
Batteries (included)	4 Alkaline AA batteries
Current consumption (without backlight)	5mA
Backlight current	60mA (with external 9 VDC power supply only)
Battery life (with passive	500 hours

[1] Varies with detector head.

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thermaldetector)	
External Power Supply (included)	Input: 100/240 VAC 50-60 Hz, Output 9 VDC 1.66 A

1.3 Front Panel Description

Fig. 1-1 11TUNER Front Panel

1- Backlight / On-Off

Switches the 11TUNER on and off (press for at least 2 seconds to turn off the 11TUNER) and toggles backlight on and off when the 11TUNER is on (backlighting is available only when the 11TUNER is powered by the external 9 VDC power supply). Backlight status is memorized by the 11TUNER.

If no detector head is connected when the 11TUNER is powered on, the message "No Detector" will be displayed. Turn off the 11TUNER; connect the detector to the Probe Input Jack (see section 1.4) and turn the 11TUNER on again.

If the detector is not recognized by the 11TUNER, the message "Bad Detector" will be displayed. Make sure you use a detector head that is compatible with the 11TUNER (see section 1.2 for the list of compatible detector heads).

2- Speed / Zero

Press and release this key to toggle between fast and slow modes. The fast mode enables anticipation, which shortens the natural response time of the detector. The slow mode disables anticipation. By default, the 11TUNER will always power-up in fast mode.

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Press this key for at least 2 seconds for zeroing. This cancels electronic offset, detector offset and ambient light on the detector. The 11TUNER should be zeroed before taking measurements. Refer to p.11, **adjusting the zero (steps 8 to 11)**. The 11TUNER will redo the zero every time you press the zero button for two seconds, reboot the 11TUNER if you wish to remove the zero cancellation.

3- Needle low-high / Att Control Key

This key enables memorization of the minimum and maximum readings. When enabled, two blinking needles will continuously mark the current minimum and maximum values since the memorization function has been enabled. (See point 6 and 7) for digital display of minimum and maximum values). The minimum and maximum values for both the needles and the digital high and low can be reset to the current measured value by pressing this key 2 times quickly (like a mouse double click).

The blinking needles can be toggled on and off by pressing this key again, but once activated, the minimum and maximum values are continuously updated, as long as the 11TUNER is on.

When pressed for at least 2 seconds, Att is activated. Standa's photodetectors are calibrated with and without attenuator, with both responsitivity data captured in the detector EEPROM and downloaded into the instrument upon start-up. This key allows the user to select the proper configuration. The "ATT ON" LCD annunciator message indicates whether the attenuator setting is activated. Press again for at least 2 seconds to deactivate ATT, the message "ATT OFF" will scroll in the LCD to confirm button press action.

4- Display / Needle style

Toggles the display between measurement, wavelength selection and range selection modes. (See point 5 below for wavelength and range selection).

When pressed for at least 2 seconds, toggles the needle display between the following four modes: single needle, tail needle (displays a short tail and a long tail following the needle movement) and bar graph (displays a permanent, continuous trail between zero and the current needle position).

5- Range ▲ / Range ▼ Control Keys

Allows the user to select the wavelength in wavelength display mode, or the range in range display mode and in measurement mode. When selected by the user, the wavelength and the range are automatically stored in non-volatile memory. The 11TUNER returns to this same wavelength and/or range when it is turned on again with the same detector head.

As the measured power varies upward, the range is automatically adjusted to provide the most efficient reading There will be no automatic scale down as the power varies downward.

The 11TUNER has 3 physical gains and it will always auto-scale the physical gain. The 11TUNER will display a little variation during a physical gain change.

Range down can be manually selected using the range down button.

6 - Digital high Control Keys

Displays the maximum recorded values. To return to measurement display mode, press the key again.

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7 - Digital low / W/dBm Control Keys

Displays the maximum recorded values. To return to measurement display mode, press the key again.

The dBm function is available by pressing more than 2 seconds on the Digital-Low control key. The 11TUNER will convert the displayed number in dBm (dB referenced to 1mW) and will display "dBm" message unit and then no units. To get back to the previous display in Watt, press again more than 2 seconds on the Zero control key. The ranges are also displayed in dBm.

8 - Display

Two parts digital/analog display LCD screen. Refer to section 1.5 for a detailed description.

1.4 Connectors Description

Fig. 1-2 11TUNER Connectors

1- EXTERNAL POWER SUPPLY INPUT JACK.

Input voltage required: 9 VDC/100 mA. The external power supply does not charge the batteries; it allows the use of the monitor without batteries, with dead batteries or simply to avoid discharging the batteries inside the monitor.

⚠	**CAUTION** **Permanent damage to the optical meter may occur if an external power supply other than Standa's provided is used. Please call Standa or your local distributor if extra power supplies are needed.**

2- 0 to 1 VOLT ANALOG OUTPUT:

For monitoring laser average power by using external equipment such as a chart recorder, a computer with an analog interface, a voltmeter, etc.

The output signal is the amplified power detector response, in fast or slow mode.

The 1 V value corresponds to the full scale reading of the selected range. That provides the best signal-to-noise ratio. The measured power is then related to the output voltage and to the selected range according to the following equations:

$$Power = V_{output} \times \text{Max of Range selected}$$

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For example:

0.25 V corresponds to 2.5 Watts on the 10 W range
0.10 V corresponds to 30 milliwatts on the 300 mW range

Specifications:

Maximum output voltage:	1 V
Output impedance:	2.5 kΩ
Connector type:	Female 1/8" jack

3- PROBE INPUT JACK.

The 11TUNER uses a DB-15 female connector to mate with the detector heads (probes).

The 11TUNER works with all Standa thermal power detectors currently sold. It automatically recognizes every power detector head, which ensures accurate auto-calibration. More importantly, it can take advantage of our *Personal wavelength correction*™. It reads the memory in the *Smart Interface* connector to provide a wavelength correction that is based on spectral data measured from that specific detector.

1.5 Display description

Fig. 1-3 11TUNER LCD Display

The LCD provides measurement information, wavelength information, range information and other useful messages.

The upper part of the screen displays 11TUNER setting information and digital values from the measurements. The numeric display minimum resolution is 0.1% of the full scale. The smallest value that can be displayed is 0.001 μW.

The lower part of the screen displays values from the measurements by showing a needle over an analogue scale. The two following pictures show the needle in the "Tail" and "Bar Graph" display modes, respectively.

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Fig. 1-4 Needle Display in Tail mode

Fig. 1-5 Needle Display in Bar Graph mode

When the batteries are discharged enough to compromise the measurement, the 11TUNER displays "LO BATT" instead of the measurement. Refer to section 3 to replace the batteries.

If the voltage supplied by the external power supply is lower than 7 Volts, the 11TUNER displays "LO JACK".

If no detector head is connected when the 11TUNER is powered on, the message "No Detector" will be displayed. Turn off the 11TUNER; connect the detector to the Probe Input Jack (see section 1.4) and turn the 11TUNER on again.

If the detector is not recognized by the 11TUNER, the message "Bad Detector" will be displayed. Make sure you use a detector head that is compatible with the 11TUNER (see section 1.2 for the list of compatible detector heads).

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2 Getting Started

This section contains important information concerning the installation and operation of the 11TUNER. The 11TUNER is delivered ready to use. Just install the 4 AA batteries, insert a compatible detector head in the Probe Input Jack (#3 in Figure 1-2) and press the **I/O** key.

2.1 Power measurement procedure

1- Install the power detector on its optical stand.

2- First, slide the connector latch to the right to unlock the connector.

3- **Turn the 11TUNER off** and connect a power detector head to the 11TUNER using the **PROBE INPUT JACK** (see Fig. 1-2). It is recommended to turn the 11TUNER off before connecting a new head in order to prevent any loss of information from the detector head's EEPROM.

4- Slide the latch to the left to lock the connector into place.

5- Switch the 11TUNER ON using the **I/O** key. The 11TUNER displays the current wavelength for a moment before displaying measurements. If this wavelength is not the wavelength of the laser, go to step 6, otherwise proceed to step 8.

6- Select the proper wavelength using the **Display** control key to go to the wavelength display mode, then the Range ▲ / Range ▼ control keys to select the wavelength**.** The 11TUNER automatically stores the wavelength selection in non-volatile memory when the 11TUNER is set back to the measurement display mode, so it returns to this same wavelength when it is turned on again.

7- Return to the measurement mode by pressing the **Display** control key twice.

Adjusting the zero (steps 8 to 11)

8- Remove the detector's protective cover.

9- Put the detector into the laser beam path. The entire laser beam must be within the sensor aperture. Do not exceed maximum specified power densities. For the most accurate measurement, spread the beam across 60% to 80% of the sensor area. Leave it there until the detector has reached its equilibrium temperature.

10- Block off laser radiation to the detector.

The power read by the 11TUNER when no laser beam is incident on the detector may not be exactly zero. This is because the detector is not thermally stabilized OR there was a heat source in the detector's field of view when you turned on the 11TUNER, OR the internal electronic offset of the 11TUNER is not zero.

11- To reset the zero, wait until the reading has stabilized and press the **Zero** control key on the front panel for at least 2 seconds. The 11TUNER will display "----" for a moment and then return to the normal measurement display. You are now ready to make an accurate measurement.

12- Apply the laser beam to the detector.

Notes:

- Refer to the specific power detector documentation for complete installation and operating instructions.
- The power detectors are thermal sensors sensitive to temperature variations.

For high-precision measurements, it is recommended to:

- Allow the power detector's temperature to stabilize before zeroing the 11TUNER.
- Do not touch the detector itself when handling the power detector. Touch only the stand.

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- Avoid forced airflow or drafts around the detector.

3 BATTERIES

3.1 Battery selection

To avoid leakage and poor autonomy, it is highly recommended that only good quality, new and identical alkaline batteries be put into the 11TUNER. Good quality rechargeable batteries can also be used with the 11TUNER and recharged with an external charger.

The batteries need to be replaced if the 11TUNER displays "LO Batt" on its digital display or if it does not power-up when the I/O control key is pressed.

3.2 Battery installation

- Put the 11TUNER face down on a flat surface.

- Lift the kickstand.

- Open and remove the battery door.

- Insert one battery in the nylon strap (to ease later removal) and insert it at one extremity of the 11TUNER battery compartment with the right polarity. To avoid intermittent contact and involuntary disconnection, firmly insert the batteries. Insert the other batteries over the nylon strap with the right polarity so that pulling on the strap will pull every battery out of the 11TUNER.

- Put the battery door back in place.

3.3 Battery removal

- Put the 11TUNER face down on a flat surface.

- Lift the kickstand.

- Open and remove the battery door.

- Hold down the 11TUNER and slowly pull on the nylon strap to remove the batteries. Do not use a pointed tool to remove the batteries, since that could puncture them. The batteries need a firm pull to be removed.

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4 DECLARATION OF CONFORMITY

Application of Council Directive(s): 2004/108/EC EMC Directive

Type of Equipment: Laser Power Meter
Model No.: 11TUNER
Year of test & manufacture: 2011
Standard(s) to which Conformity is declared:
EN 61326-1: 2006 Emission generic standard

Standard	Description	Performance Criteria
CISPR 11 :2009 A1 :2010	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement	Class A
EN 61000-3-2:2006 +A1:2009	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)	Class A
EN 61000-4-2 2009	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques- Electrostatic discharge.	Class B
EN61000-4-3 2006+A2:2010	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques- Radiated, Radio Frequency, electromagnetic field immunity test	Class A
EN61000-4-4 2004+A1:2010	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques- Electrical fast transient/burst immunity test.	Class B
EN 61000-4-5 2006	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques- Surge immunity test.	Class B
EN 61000-4-6 2009	Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurements techniques- Immunity to conducted Radio Frequency.	Class A
EN61000-4-11 2004	Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques- Voltage dips, short interruptions and voltage variations immunity tests	Class B Class B Class C Class C

We hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

4.1 Immunity limitations

The 11TUNER will have small measurement deviation (< 60 uV) when a cellular phone is within 15 cm of the 11TUNER and detector cable.

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5 APPENDIX

5.1 Recycling and separation procedure

This section is used by the recycling center when the monitor reaches its end of life. Breaking the calibration seal or opening the monitor will void the 11TUNER warranty.

The complete Monitor contains

1 Monitor

1 9 volt AC/DC adaptor (not manufactured by Standa)

4 AA Alkaline Batteries

1 CD Instruction manual

1 Calibration certificate

5.2 Separation

Paper : certificate.

Plastic: stand, connector plate, battery door, monitor enclosure, keypad.

Wires.

AA batteries: inside battery compartment.

Metal battery clips.

Printed circuit board: inside the monitor featuring a liquid crystal display less than 100 cm^2.

5.3 Dismantling procedure

- Remove batteries.

- Remove the posts on each side of the DB15 connector using pliers.

- Open monitor by removing the Phillips head screws in the 4 corners.

- Cut the wires on the PCB side and battery clips side with cutters.

- Remove battery clips with pliers.

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