

LAP-TEQ

Line Array Positioning Tool

Userguide



Sensor Module



Display Module

Table of contents

Copyright	Page 2
Safety Instructions	Page 3
Overview	Page 4
Preparation	Page 4
Install the 9V battery	Page 4
Mount the sensor module	Page 5
Operation	Page 7
Calibration	Page 8

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Safety Instructions

You must read all safety instructions before using the LAP TEQ components. The following information contains concepts that you must fully understand in order to avoid property damage or body injury.

CAUTION!

- The use of other operating or adjusting equipment or the application of other processing methods than those mentioned here, can lead to dangerous radiation exposure.
- The LAP TEQ Sensor Module produces laser radiation according to IEC60825, CLASS II: **“Caution”**, visible laser light less than 1.0mW. Considered eye safe, normal exposure to this type of beam will not cause permanent damage to the retina. Do not direct the laser beam at persons or animals and do not stare into the laser beam yourself (not even from a distance). This can lead to other persons being unintentionally blinded.
- Have the LAP TEQ components repaired only through qualified specialists using original spare parts. This ensures that the safety of the LAP TEQ components are maintained. Always contact an authorized service provider for assistance if any repair or adjustment is required.
- Always use standard 9V batteries. Other batteries may have different specifications and cause damages to the device.
- Do not expose the batteries to other metal objects.
- Do not use or place the LAP TEQ Display Module near sources of heat or expose it to direct sunlight for an extended period of time. Store it in a cool and dry place.
- Do not push or apply force to the LCD-display.

WARNING!

- Be sure to secure the LAP TEQ sensor modules from falling down the object of measurement.
- Do not allow children to use the LAP TEQ sensor modules laser without supervision. They could unintentionally blind other persons.
- Always contact an authorized service provider for assistance if any repair or adjustment is required.

Overview

The LAP-TEQ Clinometer is designed to measure the inclination of a line-array or a cluster of loudspeakers. It consists of the following components: The LAP-TEQ display module and two or more LAP-TEQ sensor modules.

The LAP-TEQ sensor module is attached to the top cabinet of the array. Its diecast aluminum enclosure is designed to meet IP65. The LAP-TEQ display module shows the horizontal inclination of the top cabinet with a resolution of $0,1^\circ$ on a dot matrix LCD-display. It powers off after 20 minutes to save battery power. The last metered value is stored and appears in the displays second row after the module is turned on again. This helps you to compare several arrays.

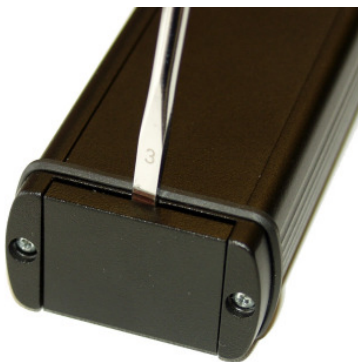
The LAP-TEQ display module is connected to the LAP-TEQ sensor module via a normal balanced NF-connection (XLR microphone cable). The sensor module is powered by the display module via this connection which can be up to 50 meters long.

Additionally a red laser pointer diode (0,9mW, 635nm) is attached to the LAP-TEQ sensor module to show the elevation angle. This will help you to aim your line array to the last row of the audience.

A standard LAP-TEQ set consists of one LAP-TEQ display module and two LAP-TEQ sensor modules. LAP-TEQ sensor modules and LAP-TEQ display modules are available as single units if you i. e. wish to supply more than two line array bumpers with sensor modules permanently.

Preparation

Install the 9 Volt battery



A 9 Volt battery has to be installed into the LAP-TEQ display module to power the LAP-TEQ system.

Use a screwdriver fitting the notch on the back side of the LAP-TEQ display unit to lift the bottom lid.



After detaching the lid you can see the battery case. Now open the battery case using the screwdriver again.

Connect the battery to the clip connector. Insert the battery into the battery case.



Now reassemble the unit in reversed order.

Mount the sensor module

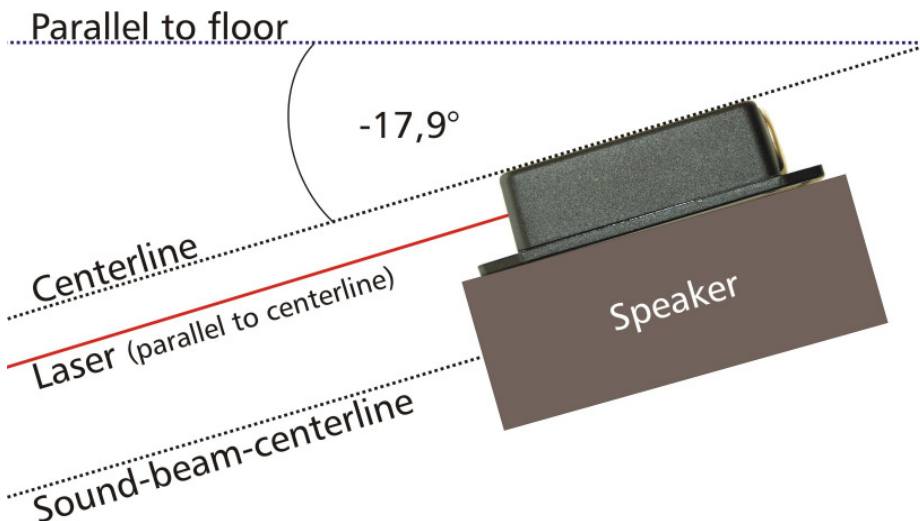
Mount the LAP-TEQ sensor module at the top cabinet or the bumper of the speaker array. The center line of the sensor modules body has to be installed horizontally parallel to your speakers sound-beam-centerline. In most cases the sensors bottom should be parallel to the upper surface of the top cabinet. But it can also be mounted horizontally aligned on the speakers side panel. (See drawing on page 6.)

Be sure to attach the LAP-TEQ sensor module firmly to avoid it from falling down. This could cause serious injury to people that are located below the array and may damage the LAP-TEQ sensor module!

Connect the LAP-TEQ display module to the LAP-TEQ sensor module via a normal balanced NF-connection (XLR microphone cable). This cable can be up to 50 meters long. The LAP-TEQ display module powers the sensor module via this cable.



The LAP-TEQ sensor module detects the horizontal angle between its centre line and the earth's surface.



Operation

The System is powered on by pushing the button on the front of the LAP-TEQ display module for four seconds. The laser diode lights up. After four more seconds the momentary angle is shown in the upper row of the display with a resolution of 0.1° . The reading is updated every two seconds from now on. The measurements while these two seconds are integrated to avoid a jumping of the last digit in the display which could be caused by wind or other outside influences that make the array swing.

The metering range is limited to $\pm 45^\circ$ as the sensor offers the accuracy of 0.1° only in this angular range. This range is more than enough in the practical application and means no limitation in usage.

The build in laser of the LAP-TEQ sensor module provides the visual inspection of the top line array cabinets orientation. So it is easy to see if the elevation of the line array is right to expose for example a balcony to sound.

Pushing the button of the LAP-TEQ display module for another 4 seconds will turn off the system. This procedure saves the last measured angle in the internal memory of the LAP-TEQ display module. After turning on the system, this value is shown in the second row of the display. This will help you to aim several speaker systems identically. The system also powers off independently after 20 minutes to save battery power.

As a matter of course it is possible to provide as many speaker systems with LAP-TEQ sensor modules as you want. They can also be permanently installed on all of your line array bumpers. You simply connect the LAP-TEQ display module to one LAP-TEQ sensor module after another to adjust a complete speaker system with multiple arrays.

Calibration

You will need:

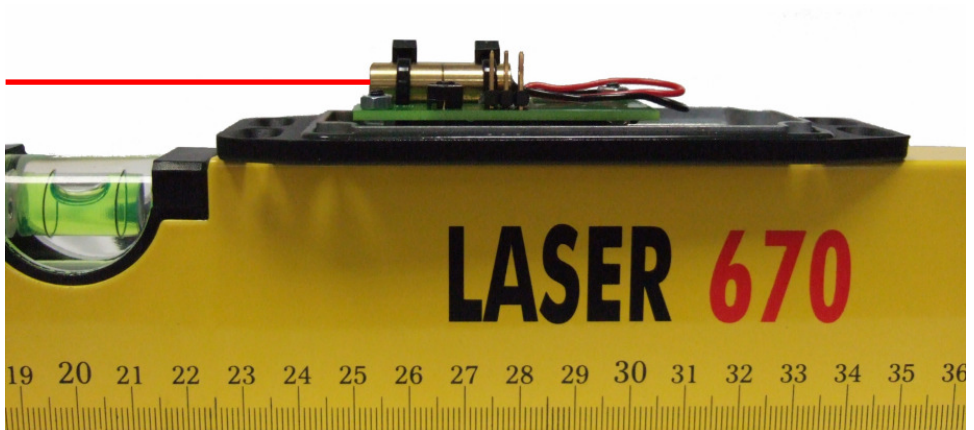
- set square
- water-level
- crosstip-screwdriver

Step 1

Remove the top of the sensor module and connect the sensor module to the display unit by a 3pin XLR-cable.

Step 2

Use the water-level to get sure your position is flush to the surface. Place the sensor-module at this flush position, laser shining to the left.

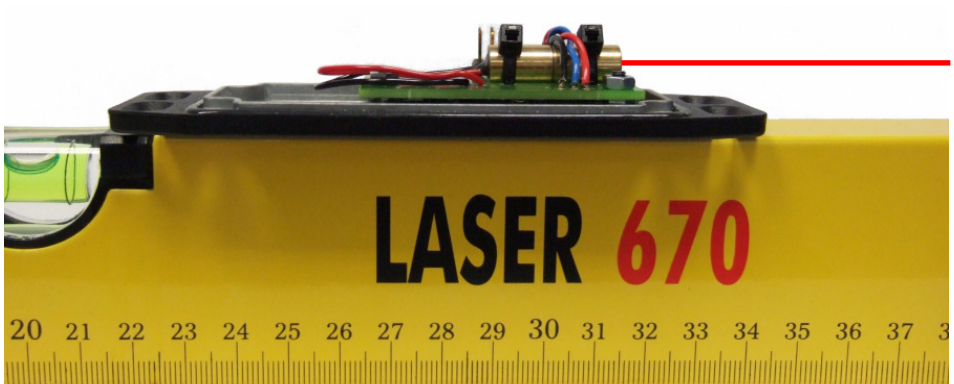


Press the small button on the sensor module while switching on the system by the pushbutton at the display unit. Release the pushbutton of the sensor module when the display shows: "dontmove".
Now the sensor calibrates "0.0° A".

This step is finished when display shows: "calibrte 0.0° B?"

Step 3

Reverse the sensor-module: Laser is shining to the right now.

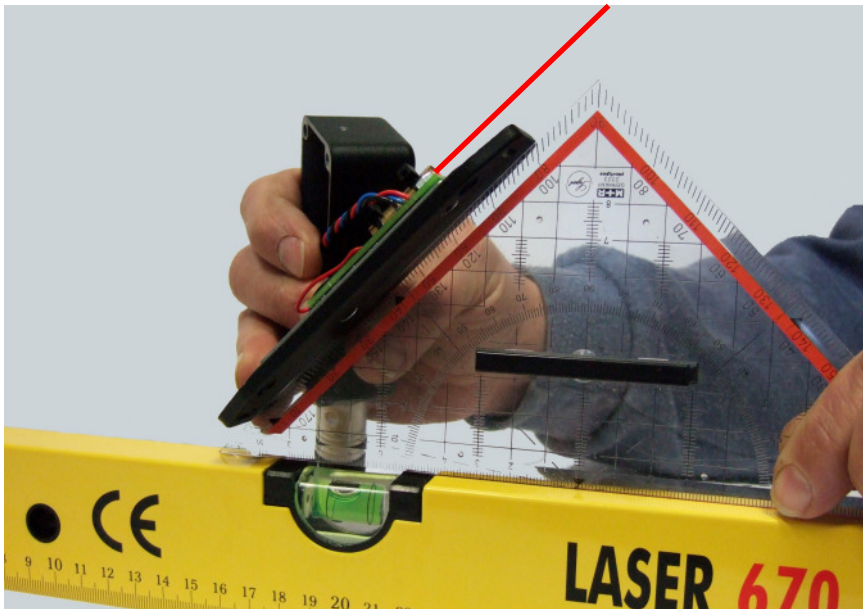


Tip the pushbutton on the sensor-module for one second,
and the calibration for "0.0° B" will start.
The display shows: "dontmove".

Wait until the display shows: "calibrte +45° ?"

Step 4

Adjust the sensor module at the 45° slant of the set square, laser is shining to cover.
(The "long" side of your set square is placed on the flat surface)



Tip the pushbutton on the sensor module for one second.
The display shows: "dontmove".

Wait until the display shows: "calibrte -45° ?"

Step 5

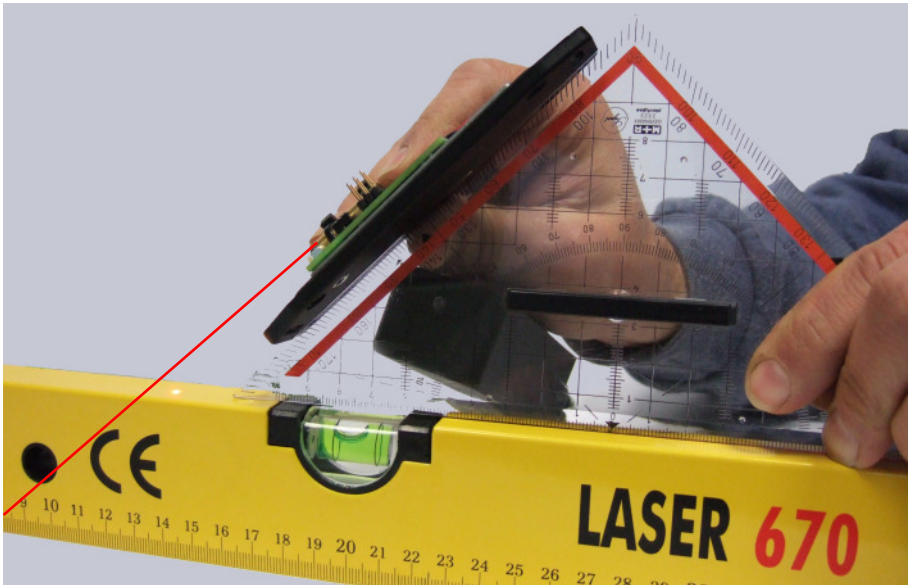
Adjust the sensor module at the 45° slant of the set square, laser is shining to bottom.

(The "long" side of your set square is still placed on the flat surface)

Tip the pushbutton on the sensor module for one second.

The display shows: "dontmove"

Wait until the display shows: "calibrte complete"



Tip the pushbutton on the sensor module for one second.

The display shows: "dontmove"

Wait until the display shows: "calibrte complete"

Step 6

Fix the top of the sensor module.

End!

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This manual is valid from April 2010 until a new manual version is released!

