

The Impedance Meter

The most essential tool for the
Audio Installer!



We cannot overstate the importance of the humble Impedance meter when it comes to installing and commissioning public address systems. Every time an amplifier is connected to a loudspeaker line, the impedance of the line should be checked for short circuits, earth faults and load. Before fitting an amplifier, you must clarify that everything has been wired correctly and that the loudspeakers and line have no faults anywhere on the system.

Many faults can manifest themselves when installing a new line of loudspeakers, such as:

- Loudspeakers could be set to the incorrect tapping – e.g. if the low impedance setting is selected when fitting to a 100v/70v circuit this will overload the amplifier.
- The loudspeaker cable could have been snagged and its insulation broken, potentially shorting a leg of the cable to ground.
- A volume control may have been wired incorrectly somewhere in the circuit. Test it with the volume control on and off.
- If a loudspeaker transformer fails, this could produce a short circuit on the line.

Do not confuse an impedance meter with a multi-meter – A multi-meter is not sufficient to test a loudspeaker circuit as it does not give an impedance reading, it will only measure the DC resistance of the circuit and essentially the resistance of the of the transformers in the circuit, in the case of a 100v/70v system this will be a very low reading near to zero ohms. An impedance reading is basically the AC resistance of a circuit and can only be measured by inserting an AC signal (normally 1kHz, but other frequencies are used) into the speaker circuit.

An impedance meter could save you hours of work when checking for faults and will ensure amplifiers are not inadvertently damaged during installation. Furthermore, most manufacturers will not repair amplifiers under warranty if details of the loudspeaker impedance values cannot be given or are not known.

Checking a loudspeaker line with an impedance meter is very easy - simply remove the loudspeaker cable from the back of the amplifier (before switching the amplifier on) and connect a probe to each leg of the circuit. This will give you a reading in ohms enabling you to calculate the load on the line. You should also then check each leg of the loudspeaker circuit for earth faults (i.e. short or partial short to ground).

Here is a useful chart showing the relationship of various impedance readings and the load in watts that they represent.

This chart is for 100v line systems only.

Impedance meter reading in ohms	Load in watts
1000	10
500	20
300	33
200	50
100	100
60	167
40	250
20	500

We recommend the use of the TOA ZM-104a impedance meter which features a large analogue display and provides accurate impedance readings. It's a long-term favourite with audio installers.

If you require any further information, please contact us.



TOA ZM-104a

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