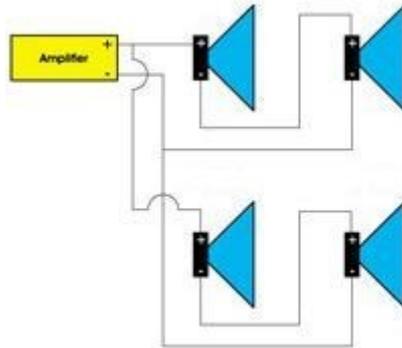


We do not suggest that non professionals attempt these procedures.

Use professional installation companies

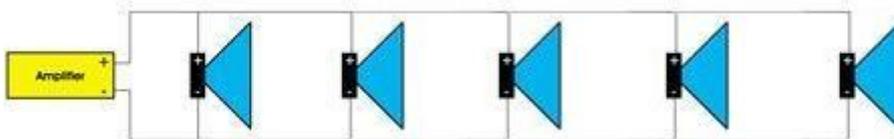
100V Line Loudspeakers

100V Line speaker systems are sometimes referred to as "constant-voltage system" it is the most economical way to install a multi-speaker sound system. The term 100V system relates to the maximum output voltage of the amplifier. To generate this high voltage the amplifier is equipped with a step-up transformer, which increases the normal output voltage of around 30 Volts, up to 100 Volts



Series Parallel connection of low impedance speakers

The main difference between a low-impedance speaker system (4 or 8 Ohms) is the way the individual loudspeakers are connected to the amplifier, with the conventional low-impedance system special care has to be taken to maintain the correct impedance for the amplifier.

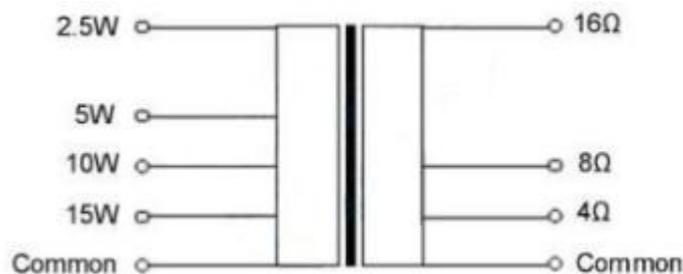


Parallel connection of 100V Line Speakers

In a 100V line system, a large number of single loudspeakers each equipped with a step-down transformer can be connected to one single speaker cable. With the 100V line installation, each speaker or speaker cabinet is equipped with a step-down transformer

Step-Down Transformer

A step-down transformer has a relatively high impedance at the primary side and the secondary side of the transformer matches the speaker impedance (typically 8 Ohms). The primary side of the transformer normally has several tapings, these are marked in watts and are used to enable each speaker to be set at different volume levels. The total primary wattage should not exceed 90% of the amplifiers output. A step-down transformer will be required for each loudspeaker cabinet connected to the amplifier.



100v line step-down transformer

100V Line Speaker Cable

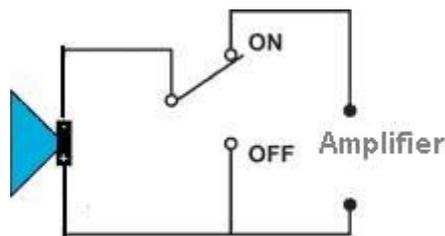
When installing a 100V line system, it is important that the correct size of cable is used. The following table gives an indication of the distance a particular cable can deliver the full power of the amplifier.

	Cable Size					
	0.75mm ²	1.0mm ²	1.5mm ²	2.5mm ²	4.0mm ²	6.0mm ²
30 Watt	800m	1066m	1600m	2666m	4266m	6400m
60 Watt	400m	533m	800m	1333m	2133m	3200m
120 Watt	200m	266m	400m	666m	1066m	1600m
240 Watt	100m	133m	200m	333m	533m	800m

As the voltages can approach 100 volts, a double insulated cable should be used at all times. The cable should be adequately secured and cable runs should be kept away from any potential source of interference. These include other cables: 3 phase mains, data, telecom cables etc.

Loudspeaker switching

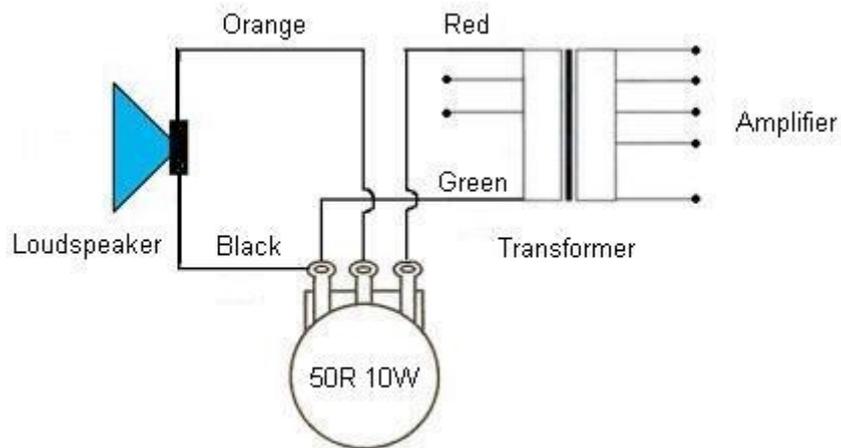
When switching 100 volt line loudspeakers "on" or "off", it is necessary to use the circuit indicated below. This circuit will ensure that the loudspeaker is not effected by inductive pick-up in the disconnected cable, this can happen when speakers are switched at the amplifier and leave long open ended cables. The loudspeaker is not only isolated from the line but also shorted to itself in the "off" position this ensures that there is no possibility of breakthrough.



Speaker isolation switch

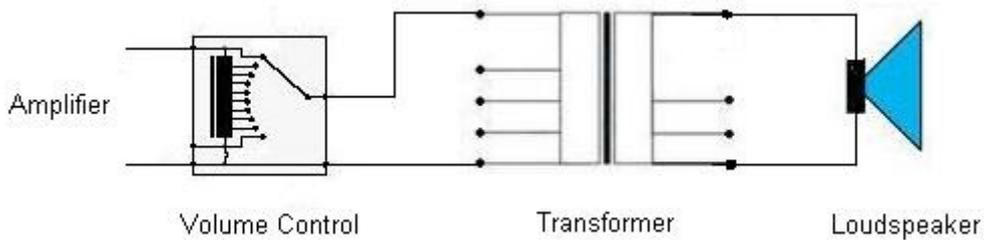
Volume Controls

There are two ways to adjust the volume of individual 100V line loudspeakers. Some cabinets can be fitted with a wire wound potentiometer which absorbs power so reducing the volume of the speaker. This is a very inefficient way of reducing the volume and only works with low wattage cabinets.



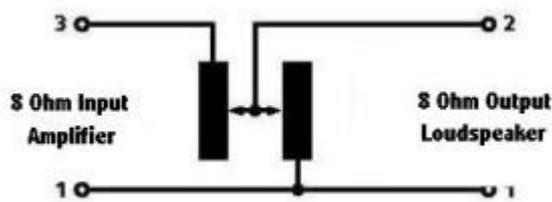
10 Watt Potentiometer Volume Control

The preferred method use controls which are specially designed for 100V line operation (attenuators) and simply wired between the amplifier and the loudspeaker. The maximum power rating of the volume control must be observed and not exceeded, otherwise damage to both control attenuator and amplifier can occur.



Inductive Attenuator Control

L Pad attenuators are designed to be used with low impedance (8Ω) loudspeakers. The L Pad is fitted after the amplifier and before the speaker to be attenuated. The L Pad will always give a constant load of (8Ω) to the amplifier.



L Pad Attenuator

Installing 100v line PA sound systems

- Please read this first
- Plan your loudspeaker layout and locations together with your cable routes
- Use cable with a minimum specification of 6a twin sheathed two core flex for the loudspeakers – it is at least the size of cable on your table lamp or TV etc.
- Install the loudspeaker cable – remember with 100v line PA sound systems all loudspeakers are connected in parallel – this means that the cable starts at the amplifier and goes to the first loudspeaker, from there to the second loudspeaker and from there to the third loudspeaker etc.
- Remember that the total wattage of all of your loudspeakers added together must NOT be higher than the rated wattage of your amplifier
- Prepare your loudspeakers for installation – each 100v line loudspeaker will have a number of wattage tapings – it is best to start off by using the middle wattage (ie: if you have 1, 2, 4, & 8 watts you could use the 4w tapping) – this allows you to increase or lower the volume of each loudspeaker later. Please be aware that some loudspeakers (especially ceiling types) are often supplied with this setting disconnected from the built in transformer on each loudspeaker – it is often left to the purchaser to fit or connect the tag to the transformer etc.
- On some loudspeakers you connect your cable to 'com' (or 'common') and to the chosen wattage connection and on others you connect a tag to the chosen wattage connection (or select via a switch) and connect your cable to the short fly leads
- All loudspeakers MUST be connected in the same phase – it is likely that your cable and your loudspeakers do not have the same coloured wires – choose an obvious convention such as brown cable to red on loudspeaker and blue cable to black (for instance) and stick to it throughout your installation
- Once you have installed and connected all of your loudspeakers and you are happy that there are no short circuits or other problems with the installation you can connect the other end of your cable to your amplifier
- Your amplifier will probably have both low impedance (8 ohm) and 100v line connections – you must NEVER use both at the same time
- Connect your wires to the 100v and 'com' (or on some amplifiers to the pair of terminals marked 100v line)
- Your amplifier should ideally sit on top of your CD player, cassette deck etc. so that there is adequate ventilation and airflow to keep the amplifier cool.
- Turn all volume controls to minimum and set all bass and treble controls to midway
- Connect your microphone to the amplifier and switch your amplifier on
- Turn your master volume to around midway and gradually turn the microphone volume (or input volume) up while speaking into the microphone
- Adjust to the volume level that is required

Courtesy of Sound Services: www.soundservices.co.uk