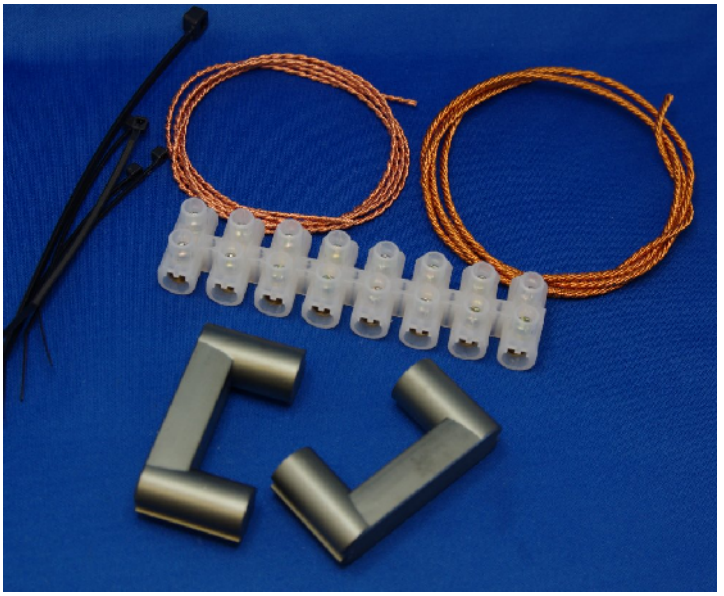
Impedance Matching Transformer Kit

TRF-IM-KIT



This kit allows you to build a custom transformer suitable for use at high power and high frequency. It is ideal for projects such as induction heaters, inverters and SMPS.

Supplied with the kit are two lengths of high quality Litz wire, a pair of 'C' cores which can carry high frequency currents efficiently.

KIT CONTENTS:
2 x Transformer 'C' cores
1m Litz Wire (24x0.25mm) - 20A
1m Litz Wire (12x0.25mm) - 10A
5 x Zip Ties
1 x Six Way Terminal Block

Building the Transformer

The wire can be wound either directly onto the core, or onto a coil former (not supplied). If you wind onto a coil former you should complete the windings before assembling the cores.

To assemble the cores, use the provided zip ties around the outer perimeter. They should be linked together in series so that each zip tie is the length of one side of the core. First fit them loosely so that you can adjust to get the right lengths. Once satisfied, pull them tightly and trim off the remaining parts.

Winding the coils

A basic transformer design consists of a primary winding (the input side) and a secondary winding (the output side). The ratio between the number of primary and secondary windings determines the output voltage and current.

You can configure the transformer in numerous ways depending on your application. Below you

can see some example winding configurations. When starting a winding, you can tuck the wire under the zip ties so that it is held in place. You can then do the same again at the other end so that the windings are all secured.

Centre Tapped Primary
For use with our CRO-1 Power Resonator, you will need a centre tapped primary coil. This is basically two identical windings wound in the same direction side by side on one side of the transformer. The two windings are then connected together at the middle point.

Choosing the number of turns to wind

If you intend to use high voltages, or step voltages up with the turns ratio, then it is important to consider adding extra insulation. You may need to use a suitable coil form to isolate the windings from the core, or at least add some insulation tape around the core before winding.

By using different numbers of turns, you will be able to choose what voltage and current the output will produce. More turns on the primary side will increase its impedance and will therefore limit the maximum current that will flow.

By having a larger number of turns on the secondary side than the primary side will mean that the output voltage is higher than that at the input side. The amount of voltage increase is proportional to the turns ratio. For example; with 10 primary turns and 20 secondary turns, the output voltage will be doubled relative to the voltage on the primary side. Note that when using our CRO-1, the primary voltage may be significantly higher than the voltage from your power supply due to the resonant nature of its operation.

Impedance matching is also achieved by selecting the right turns ratio. The example above (a step up transformer) also doubles the output impedance and makes it more suitable for driving a larger impedance load. If you wanted to drive an induction heater coil with a large number of turns from a low voltage system like our CRO-1, then it is important to get the right turns ratio so that power is transferred efficiently.

The examples below show some typical winding arrangements. The windings on the left are the primary winding while on the right are the secondary windings.

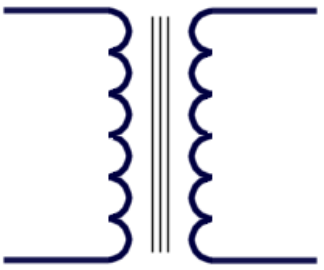


Figure 1: A typical 1:1 winding ratio

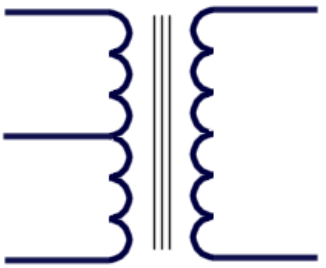


Figure 2: Typical centre tapped primary setup

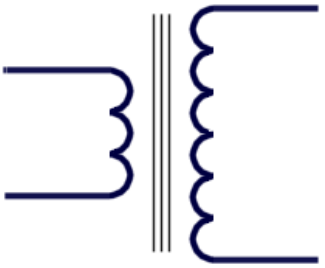


Figure 3: Step up transformer

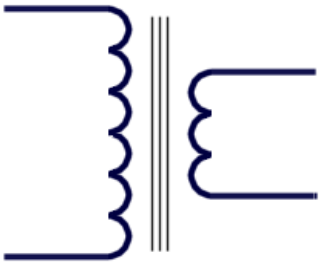


Figure 4: Step down transformer

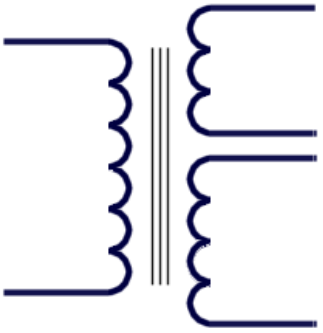


Figure 3: Multiple output voltages