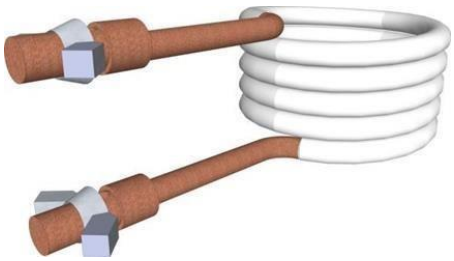
H26606 Induction accessories set NFU 370

Purpose

The Induction Accessory Set is designed to work with the Philip Harris Dissectible Transformer.

Typically these experiments are for demonstration only, due to hazards involved, and would not be carried out by students.

Apparatus details



Six turn copper coil

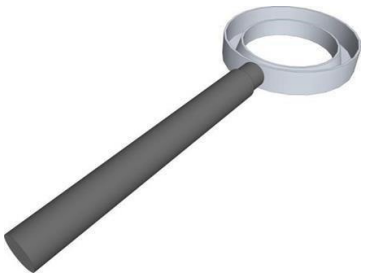
This is designed to show the production of a high current at low voltage – a dramatic demonstration by melting a nail.

A 600 to 800 turn mains coil is required for this accessory.

Inner diameter: 40mm

For the demonstration of the principle of an induction furnace, the solder trough allows a loop of solder to be melted without applying any direct heat.

The handle is plastic so it is safe to hold as the solder reaches melting temperatures (approx. 200°C).



Aluminium Rings

Two ‘solid’ rings are provided to demonstrate Thomson’s Ring Effect.

A third split ring is provided to demonstrate that a continuous conducting loop is required for levitation.

Inner diameter: 41mm

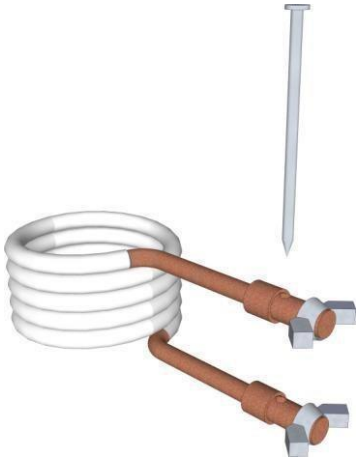
Experiments

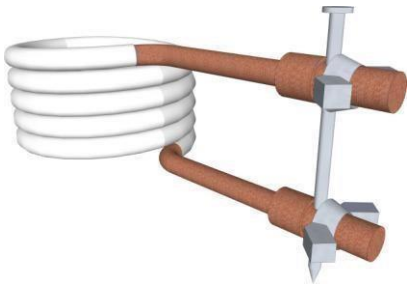
Producing a Low Voltage, High Current to Melt a Nail

This experiment requires a 600-800 turn mains coil.

Begin by inserting a nail into the holes in the end of the six turn copper coil, as illustrated on the right.

Wind the butterfly nuts towards the nail, until they are finger-tight, illustrated below. This improves the electrical contact between the arms of the coil and the nail, thus reducing losses through contact resistance.

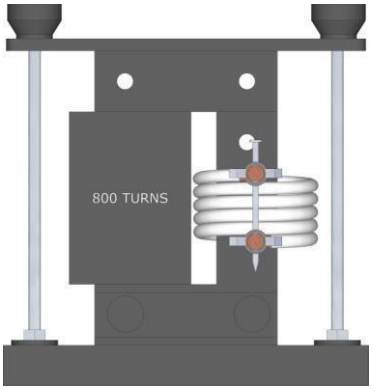




Remove the securing bar and yoke from the transformer.

Now, mount the six-turn copper coil with the nail onto one arm of the dissectible transformer. Mount the 600 turn mains coil onto the other, but DO NOT plug in or turn on the mains coil yet.

Place the yoke across the top of the transformer, replace the securing bar, and plug in the mains coil.

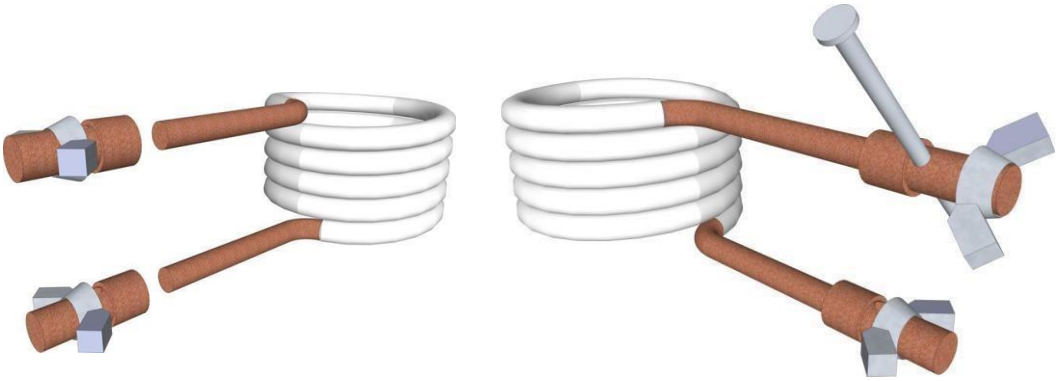


Turn on the power to the mains coil, and observe the nail. A current of 300-800A is flowing through it.

After about 20 seconds, it should start to glow, and the iron burns producing sparks. Eventually, the nail will melt and a gap will form, breaking the circuit. The nail will stop glowing quickly but will remain very hot for a minute or two.

After the experiment, allow the apparatus to cool before removing and discarding the remaining parts of the melted nail.

Sometimes, particularly if there was significant contact resistance between the coil and nail, the nail may have become welded to the coil. The ends of the coil are removable so that the entire coil is not made useless.



Allow the apparatus to cool before attempting to remove the nail or ends of the coil.

To remove them, use a nail, or the remaining part of the nail, to apply torque to the ends. Rotate anticlockwise to remove.

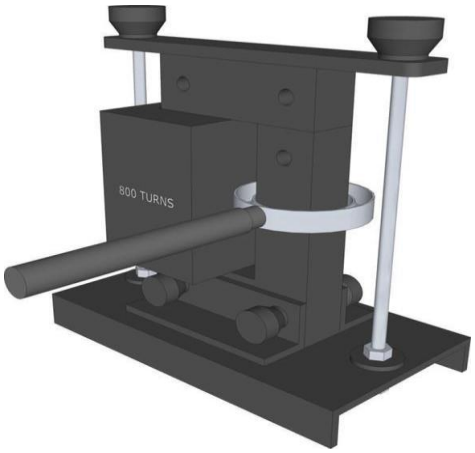
Please contact Philip Harris to obtain replacement terminals.

Induction Furnace

Place a 600-800 turn mains coil on one arm of the transformer. Do NOT plug in or turn on the coil yet.

Cut a length of solder, sufficient to make a complete loop that fits into the recess of the solder trough. Make the loop, closing the loop by twisting the ends of the solder together, and place it in the trough.

Place the solder trough over the other arm of the transformer, and place the yoke on the top with the securing bar.



Plug in the mains coil and turn on. Observe the solder; it should melt after a short time.

Turn the power to the coil off after a short time to prevent over heating of the solder and melting the plastic handle of the trough.

The solder and trough should cool and solidify very quickly, and the solder beads should be removed easily from the trough.

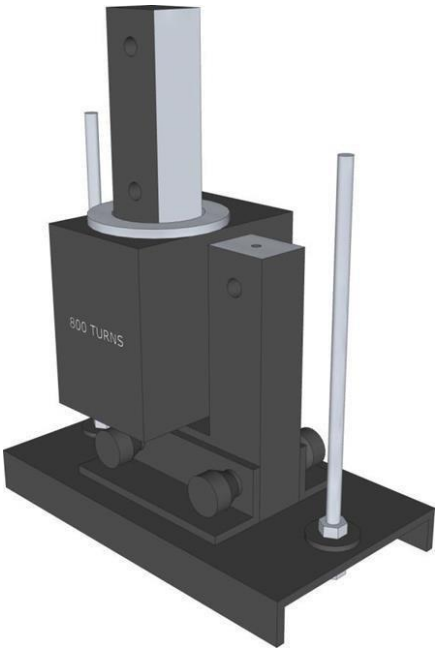
Repeat the experiment with a small amount of water in the trough. The water should boil within a few seconds as the crucible is heated by induction. This is similar to how induction hob works.

Thomson's Rings Experiment:

Place a 600-800 turn mains coil on one arm of the transformer. Do NOT plug in or turn on the coil yet.

Place the yoke vertically on top of the arm with the mains coil mounted on it.

As this is not a complete magnetic circuit, the load on the mains coil will be low, so it should be turned on for as short a time as possible. Be prepared, when carrying out this experiment, to turn the power to the coil off as soon as it is complete!



When the power to the coil is turned on, the eddy currents induced in the ring will cause it to jump off the yoke to a considerable height – approximately 1m.

Repeat the experiment with the split ring, and observe how, because no eddy currents are induced in an incomplete loop, the ring does not move.

The reduced load on the coil may cause it to overheat. It is protected by a self-resetting thermal trip. If the coil appears to stop working, leave it to cool for a few minutes, then try again.

Safety advice

For your safety, this product should be used in accordance with these instructions; otherwise, the protection provided may be impaired.

Disclaimer

If the equipment is used in a way not specified by Philip Harris, then the protection provided may be impaired.

Warranty, repairs and spare parts

The Induction accessory kit is guaranteed for a period of one year from the date of delivery to the customer. This warranty does not apply to defects resulting from the action of a user such as misuse, improper wiring, any operations outside of its specification, improper maintenance or repair, or unauthorized modification.

Our liability is limited to repair or replacement of the product. Any failure during the warranty period should be referred to Customer Services.

In the event of a fault, apart from replacing the instrument fuse in the IEC socket, the power supply should be referred to the Philip Harris recommended repair agent.

Disposal of Waste Electrical and Electronic Equipment (WEEE)

Do not dispose of this product with household waste

- For the proper treatment , recovery and recycling please take this product to an appropriate collection point.
- If you are unsure where this is, contact your Local Authority
- By disposing of this product correctly you will be providing positive help to the environment.

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