

HOT STUFF

Induction heating looms large in manufacturing industries and in domestic cookers. So, what's it about, and can it help in the automotive workshop? GYS explains what it has to offer to the independent workshop and gives you the chance to win a Powerduction 10R for yourself.

Oxy-fuel gases have warmed up steel in workshops since we can remember. With good reason: if the equipment is properly maintained and if the operator follows well-defined procedures, oxy-acetylene in particular is a safe and effective way to heat a wide range of material thicknesses. Plus, you can cut and weld with it. While the equipment itself is relatively cheap, cylinder rental and gas aren't. Moreover, the two safety-related 'ifs' above generate enough concern that, in these risk-averse days, some companies have banished gas from their workshops.

Yet things still seize up and get bent. So, what's the alternative? Induction heating heads a very short list. Heating without a flame or physical contact, it is a controlled, safe and efficient process.

What's going on?

Electronics are behind the magic. An induction heating set first changes single- or three-phase electrical power to high-frequency alternating current; that is, one which reverses flow direction rapidly and endlessly. This current goes to an electromagnet which, in response, produces a strong magnetic field which also flips direction rapidly.

If you then put a conductive object, typically a metal, in that alternating magnetic field, the alternating electric currents appear in the object – despite it having no contact with the electromagnet. These strong, constantly flick-flacking currents lose some energy as heat as they overcome resistance to their flow, so the whole object heats up.

How hot things get, how quickly they heat, and how far that heat penetrates is decided by two main things: the material's resistance and the intensity/frequency of the magnetic field it's sitting in.

Now, induction heating technology has drifted to workshop level. The GYS Heat Induction range consists of eight models of varying power levels available, from the entry level 10R through to the range-topping 220LG. We shall focus on two models here. Offered through its Rugby-based UK arm and independent dealers, the Powerduction 10R is a single-phase portable multi-application spiral inductor. The Powerduction 39 LG is liquid-cooled, which extends its duty cycle compared with cheaper air-cooled alternatives.



Ends of a spectrum

The most popular of the Powerduction range for use in automotive applications is the 39 LG. It needs a 13A single-phase supply to produce its rated 3.7kW heating power. It can run from a generator, but only if the power supplied is frequency-stable and spike-free. The unit weighs 50 kg (including 7 litres of coolant) and its 2m-long mains and 3m output leads allow reasonable reach. Heating is adjustable in 250W steps; duty cycle is generous, i.e. the unit can operate at full output for 15 minutes before shutting down. This is good performance: for example, at full power the 39LG can bring a 10mm bar to red heat in 15 seconds, or heat to red one flat of a M12 nut in just 1 second.

At the top end of GYS' range sits the 220 LG. Hooked up to a 32 A, three-phase supply the 220 produces 22 kW at 100 per cent duty cycle. It's certainly heavy duty, weighing 130 kg and carrying 30 litres of coolant. Supply and output leads are 4 m and 6 m long respectively, with the latter gantried to take cable weight from the user. Performance is impressive: 2 seconds to red-heat a M45 nut, 12 seconds to spot-heat 8mm plate, 4 seconds to heat 10mm bar.



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Each unit's output lead finishes in a lance, tipped with an interchangeable inductor. While the lances differ in size and design according to the power they must handle, both are liquid-cooled; the temperature is helpfully flagged on the control panel. Various sizes and types of inductor are on offer. Most are copper blocks surrounding an exposed and potentially fragile ferrite core, the latter used to direct and amplify the magnetic field, while others are loops or pads. Variations of inductor angle, shape, and size lets the user match a tip to the job, whether it's spot-heating an item or full-depth, all-round heating a bar or tube. When changing inductors, a button isolates the coolant supply.

The extent and penetration of heat depends on the frequency and size of the magnetic field coming from the inductor. Lower frequencies heat deeper, higher frequencies more shallowly. The 39 LG and the 220 LG run at 20kHz-60kHz. The impressive thing is that both units adapt their output frequency on the fly, the aim being to generate as much heat as possible as deeply as possible.

How do you enter?

To be in with a chance of winning one of GYS' Powerduction 10R units, all you have to do is

GO TO WWW.RDR.LINK/AAN028

and answer the following question:

Q. The Powerduction 39 LG can produce up to how many kilowatts of heating power?

- A) 35kW
- B) 37kW
- C) 39kW

Deadline for entries is 10/09/2022

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