

The right recipe for advanced plasma surface treatment

A new multi-function plasma surface treatment system uses a powerful, yet compact automation package from Mitsubishi Electric.

Control for Henniker Plasma's most advanced surface treatment system yet – the Nebula – is based on a compact MELSEC-L series PLC used to accurately control the demanding and complex plasma processes. The end result is a UK designed and manufactured machine that offers customers the ability to develop and manufacture new products with innovative and attractive material surface properties..

By combining different plasma treatments such as surface cleaning, activation, etching and coating into one fully automated machine, the Nebula provides benefits for research centres and manufacturing facilities alike. Thanks to a highly flexible recipe driven control system, it is possible to batch manufacture and develop bespoke plasma methods for pioneering products for wide range of sectors such as aerospace, automotive, semiconductors, industrial printing and medical devices.



In effect, the low-pressure machine provides a comprehensive solution and empowers users to have full control over the plasma process. Gill Bolton, Marketing and Communications Manager at Henniker Plasma explains, "The Nebula is one of the most advanced compact plasma surface treatment machines available on the market today. It is able to perform unique processes based on customer's independently developed recipes. For example, users can use a selection of gasses for coating treatments in order to produce homogenous and reproducible advanced surfaces."

A partnership borne out of advanced technology and local support



A complex low-pressure plasma surface treatment system like the Nebula requires advanced control to make sure each process recipe is actioned with extreme precision and repeatability. Gill Bolton adds: "Due to the level of sophistication offered by the Nebula the system required a PLC; unlike other plasma treatment machines that use simpler controllers the Nebula needed to provide more treatment process options and a much wider scope of adjustability."

The quality of the control system was also important: "Selecting a PLC provider renowned for the quality of its products was crucial for Henniker Plasma, as this helps us ensure the Nebula's performance and reliability in the field. It also demonstrates a commitment to deliver excellence to our customers. This is why Mitsubishi Electric was the obvious choice for us.

"Another element that Henniker Plasma was looking for in an automation supplier was global brand acceptance, combined with the ability to offer responsive, localised support to us and our UK-based customers. Mitsubishi Electric was able to address this requirement through a combination of support from the Hatfield UK base and specialist technical distributor, LC Automation."

Achieving powerful control in a small footprint

Following an in-depth discussion on the Nebula's system requirements, Mitsubishi Electric, LC Automation and Henniker Plasma agreed that the ideal controller would be the MELSEC-L series PLC. While the diminutive size of the L series would fit perfectly within the machine, its high-end performance would support the advanced plasma treatment functions offered by the machine.

Steve Eckersley, Senior Sales Engineer at LC Automation, explained: "While Nebula is larger than other, simpler plasma treatment units, Henniker Plasma required the control panel to be as compact as possible to minimise the machine's overall footprint for customers."

The PLC connects to the Nebula's HMI operator terminal, where users can create, modify and test new recipes. The PLC then communicates with the vacuum system's different valves. These are responsible for the release of one or multiple gases in the correct amount in order to create the most suitable mix for the selected process. In addition, the PLC controls an optional rotary drum mechanism to treat high volumes of small parts and the monomer dosing inlet for plasma polymerisation. The control system is also able to record and store process data to ensure full visibility and traceability.



Ensuring customer satisfaction

The resulting fully automated, advanced plasma treatment unit also offers the Henniker design team room for continuous improvement, delivering more state-of-the-art solutions based on the same control system components and architecture.

Gill Bolton commented: "We believe that the Nebula will have a significant impact on a number of research projects and manufacturing processes. The creation of such a sophisticated system with this level of flexibility would not have been possible without the support from Mitsubishi Electric and LC Automation. We are extremely pleased with their expertise and round-the-clock availability, as well as with the quality of the controller.

"We look forward to working together on future projects developing cutting-edge plasma treatment systems."

Chris Booth, Key Account Manager at Mitsubishi Electric, concluded: "It was exciting to work with Henniker Plasma and LC Automation on such an interesting and innovative application. We are delighted to know that Henniker Plasma is happy with our products and support and we look forward to collaborating with them in the future."

Image captions:

Image 1: Henniker Plasma's multi-function plasma surface treatment system the Nebula provides benefits for research centres and manufacturing facilities alike.

[Source: Henniker Plasma]

Image 2: The MELSEC-L series PLC controls an optional rotary drum mechanism to treat high volumes of small parts and the monomer dosing inlet for plasma polymerisation.
[Source: Henniker Plasma]

Image 3: Due to the level of sophistication offered by the Nebula the system required a powerful but compact PLC – Mitsubishi Electric's MELSEC-L series was the perfect fit.
[Source: Henniker Plasma]

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Note to Editor: If you would like the text in another language please contact Carolin Heel at DMA Europa – carolin@dmaeuropa.com.

About Henniker Plasma

As a leading UK developer and manufacturer of plasma surface treatment equipment and processes, Henniker Plasma is at the forefront of plasma system development with high-performance solutions that deliver reliability and flexibility for quality results. The Nebula is the latest product of the company's continuous commitment to provide its customers with a competitive advantage in surface treatment.

About Mitsubishi Electric

With nearly 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded consolidated group sales of approximately 40.7 billion dollars* in the fiscal year that ended on March 31, 2019.

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The role of Industrial Automation – UK Branch is to manage sales, service and support across its network of local branches and distributors throughout the United Kingdom.

**At an exchange rate of 111 Yen = 1 US Dollars, last updated 31.03.2019 (Source: Tokyo Foreign Exchange Market)*

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