



XPlanar transports workpiece during plasma surface treatment process

Floating planar mover simplifies transportation of sensitive workpieces

Plasmatreat GmbH, a Steinhagen, Germany, based manufacturer of plasma systems for high-efficiency surface treatment and environment-friendly production processes, unveiled a new plasma treatment unit at the K 2019 trade show. A key innovation with this treatment unit is that it uses XPlanar, a planar motor system from Beckhoff, to transport workpieces with precision and flexibility. XPlanar replaces prior systems used to move often sensitive workpieces such as PCBs and eliminates the need to install complex 6-axis robots and linear motors.



Jochen Stichling, Head of Design at Plasmatreat:

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No need to move the plasma jet: A floating planar mover carries the workpiece exactly into position for surface treatment.



At a glance

Solutions for surface treatment

- workpiece x-y positioning in a plasma treatment unit

Customer benefit

- precise workpiece movement, fixed installation of plasma jets
- replaces 6-axis robots and linear motors
- easier integration of additional processing stations
- custom-programmable mover travel

Applied PC control

- XPlanar system with six planar tiles and one planar mover

The new plasma treatment unit is highly compact as it no longer requires a 6-axis robot or additional linear axes.

The plasma treatment unit can surface-treat a variety of material samples in a two-stage process, as Jochen Stichling, Head of Design at Plasmamatreat, explains: "During the first stage, the substrate is moved under a nozzle for cleaning and activation. During the second, a separate nozzle applies a functional coating." This, he explains, is where the company focused its innovation efforts: "We wanted a fast, fully programmable, wear-free system to transport the workpieces. And when it came to custom-programming tracks and travel there was no real alternative to XPlanar."

Planar motor system with floating movers

The XPlanar system consists of planar tiles that can be arranged in any pattern, combined with contactless movers that float over them and can be positioned exceptionally fast, flexibly and precisely. The movers operate jerk-free and are capable of traveling at speeds of up to 4 m/s; they can also accelerate at 2 g, and be positioned with a repeatability of 50 µm – silently, and without wear or abrasion. The system not only supports movement within the x-y space, it provides additional functions to allow movers to be positioned with up to six degrees of freedom when necessary:

- raising and lowering by up to 5 mm (unloaded), with weighing capabilities available as an option
- tilting by up to 5° when transporting and handling liquids
- rotation by up to ±15° or 360° over special planar tiles

The XPlanar system in the Plasmamatreat machine consists of six 240 x 240 mm planar tiles and a single planar mover.

Greater flexibility, lower mechanical complexity

A major advantage with XPlanar is that the plasma jets used to treat surfaces no longer need to be moved and, as a result, can now be installed in fixed mountings. The jets are complex, both mechanically and electrically, and the ability to move the workpieces rather than the plasma jets themselves reduces wear to the feed lines. For Jochen Stichling, there are additional benefits from the increased flexibility too: "We can attach a variety of material samples to the mover for treatment using just simple adapters. We can easily add processing stations alongside the plasma jets – markers for good parts, for instance, or optical sensing heads to conduct full part inspections – and carry workpieces



Christian Buske (right), CEO of Plasmatreat, and Hans Beckhoff (left), owner and Managing Director of Beckhoff Automation, were delighted by the successful unveiling of the XPlanar-based plasma treatment unit at the K 2019 trade show in Düsseldorf.

to them flexibly as needed. And XPlanar's rapid acceleration also lets us move material samples at high speeds; with thin samples, for instance, this helps minimize treatment time with the fixed jet."

According to Stichling, XPlanar's functional benefits are proving valuable in a range of applications: "Conventional setups use a 6-axis robot or linear motors to move a plasma jet around a stationary workpiece. From a cost perspective, XPlanar comes in somewhere between linear-axis and robotic systems. With flat parts that don't require much vertical travel on the z-axis, where robotic systems are usually ideal, XPlanar offers an excellent alternative to gantry-type systems. XPlanar's advantages in terms of lack of wear, easy cleaning, and clean-room compatibility also play out here."

For Stichling, XPlanar has the potential to optimize plasma surface treatment in two key areas, going forward: direct integration of in-line testing for full inspections during the treatment process, and custom-programmable mover travel routes for end customers.

Another advantage for Plasmatreat was that it took less than two months to integrate the XPlanar system into its machine – not least because Beckhoff was quick to supply the 3D data and the electrical connection information that enabled the company to rapidly incorporate the XPlanar starter kit into its machine design. XPlanar, according to Jochen Stichling, has proved to be both robust and reliable. And another advantage, he points out, is that the entire plasma treatment cell has now been fully automated using PC-based control, making it a system solution from a single source.

More information:

www.plasmatreat.com

www.beckhoff.com/xplanar