Institut "Jožef Stefan", Ljubljana, Slovenija

center za prenos tehnologij in inovacij
na Institutu "Jožef Stefan"

Licensing opportunity

Passive hexapod positioner with innovative preloaded joints for accurate reconfigurable positioning of fixtures or jigs

Field of use
01001001 Automation, Robotics Control Systems
02002009 Machine Tools

Current state of technology
Stage of Development: Already on the market

Patent status
Patent(s) applied for but not yet granted

Publication
TBA

Developed by
Jožef Stefan Institute

Reference
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Background

A Slovenian company with a 40-year tradition in automatic systems for product assembly is offering a patent pending hexapod technology as a reconfigurable alternative to dedicated jigs and fixtures in automated production lines. The company is looking for automation integrators for technical cooperation under commercial agreement with technical assistance and an investment partner for collaboration under an investment agreement.

Description of the Invention

A Slovenian company with a 40-year tradition in automatic systems for product assembly is offering an innovative 6-axis hexapod positioner technology as a reconfigurable alternative to dedicated jigs and fixtures in production. The technology has been developed in collaboration with the leading Slovenian public research technological institute which is further providing its support to the company with its automation and robotics research and development competences and infrastructure. For the commercialization purposes the Slovenian SME cofounded the Institute's spin-out company in Denmark.

A 6-axis motion hexapod platform is a well-known Stewart hexapod concept for use in various industrial applications. For example, where motion in 6 degrees of freedom is needed for a freely-suspended body to move, e.g. in robotic assembly, welding and manufacturing. Such competitive hexapod platforms lack sufficient accuracy and rigidity of the flexible joints which enable the platform to move in 6 degrees of freedom and to accurately position the robotic arm to the desired position in the automated production process.

The proposed hexapod technology of the Slovenian company comprises an innovative solution of flexible joints which enable very accurate positioning by an external positioning device (e.g. robot) of the tool in the fixture or jig in the production process and fewer changes to dedicated fixtures e.g. in the precision welding, automated assembly and other manufacturing application. This is especially important in automation applications such as automotive white body assembly, automotive light assembly, personalized assembly of mechanical elements, etc., which have to be done automatically, fast, accurate and in an affordable way.

The Slovenian SME is seeking manufacturing systems developers and automation integrators who seek to offer clients an innovative method of improving the flexibility of their production lines.

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The partner sought develops and sells automation production lines for manufacturing industries which have ambition to reduce the costs of frequent reconfiguration of their production lines and would like to enable the use of the proposed hexapod technology in their commercial offer of the automated production lines for their customers. The preferential industries are automotive and aerospace industry, and also other industries where assembly processes need personalized features and are a big part of production, like semiconductors, plastic, rubber, metal and railways industries.

The Slovenian SME is offering the cooperation under commercial agreement with technical assistance. Services included in the offered cooperation are:

- assistance with the transfer of all technical know-how needed for integration of the technology in the specific application of the partner sought;

- assistance with the customization of the hexapods for specific applications – (e.g. different payloads of the platform) can be developed and produced;

- supply of the hexapods;

- the Slovenian SME will provide the support in the definition of the value of the proposed solution (Return of investment, yearly savings and reduce of work) for the end customers.

- the Slovenian SME will support the partner in the integration and maintenance activities.

Additionally, the Slovenian SME would like to establish a relationship with an investment partner. The investor should have an experience with projects in the area of industrial automation.

Main Advantages

Autonomous hydraulic system: the hexapod system requires no motors, no cables and no wires. A pressure intensifier, controlled by a single external pneumatic valve effectively releases and activates the hydraulic clamping system around the segment securing an accurate position.
Fixture configuration: several hexapods can be aligned – the number will depend on the fixture configuration. Beside automatic (robotic) reconfiguration, it can also be reconfigured manually.
Easy configurability: the hexapod system ensures flexible transition between batch productions, especially in production lines like automotive industry, while also assuring the ability to keep clamping position in case of power failure or disconnecting the fixture from external power when moving on the production line. The reconfiguration takes between 5-30 seconds, depending on degree of difficulty of the reconfiguration.
Short return on investment (ROI): because the hexapods are passive and use an already-present robot to reconfigure itself, it is significantly more cost-effective than existing solutions, including motorized hexapods available on the market today, motorized fixtures or regular dedicated fixtures / jigs. Replacing even a small number of dedicated fixtures will thus provide a short return on investment for the user.
As opposed to the well-known concepts of the 6-axis motion hexapod platforms, the proposed technology comprises a patent pending solution of preloaded cardan joints at the crossing over to six mounting points on

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a bottom plate and on a top plate of hexapod platform. The innovative joints enable very high and adjustable stiffness and thus accurate positioning by an external positioning device (e.g. robot) of the tool in the fixture of jig in the precision welding, automated assembly and other manufacturing application.

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