Technological accessories for machine tools with wireless power supply

Development status

Phase 3

Technology validation and implementing it in real environment. Testing the technology outside of the laboratory and its adjustment to external conditions.

IP protection status

1 x utility model – A device for wireless transmission of electrical energy to a rotating part 31 222 1 x patent – A device for wireless transmission of electrical energy to a rotating part 308 445

Partnering strategy

Collaboration, licensing

Institution

ZÁPADOČESKÁ UNIVERZITA V PLZNI

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Challenge

Technological accessories (high speed spindle, angle head etc.) commonly used with machine tools can be powered in several ways. If the spindle speed of the machine itself is used, it is necessary to secure the accessories against rotation. This, for example, considerably limits the positioning possibilities of the angle heads. Likewise, the maximum speed is limited when using accelerating spindles. In the case of the external power supply of accessories (most often with an electric cable), the automatic tool change is significantly reduced; accessories often require manual replacement and manual connection of cabling. Some accessories also use the energy of the pressure medium (coolant/air) to spin the tool using a turbine or hydraulic motor. Then the disadvantage is the limited performance of the accessories. For this reason, there is an effort to create a functional prototype of an accessory, where the electric motor will be powered wirelessly.

Description

The technological accessories are powered wirelessly; the transmission of electrical energy takes place between two antennas. One of the antennas is fixed and is attached to the front of the machine head. This fixed antenna is powered by a cable. The nature of the voltage, i.e., the supply current affects the rotating speed of the tool fastened to the technological accessory. The second antenna is located on the technological accessory itself. This antenna is fastened together with the accessory to the machine spindle. With this solution, an automatic tool change can be used for fastening accessories and the accessories can then be freely positioned on the spindle.

Commercial opportunity

Manufacturers of various types of technological accessories, such as accelerating spindles, angle heads, etc., can use the proposed solution commercially. Using a wireless power supply enables them to take

advantage of the above-mentioned benefits, most importantly the possibility of automatic tool change and, at the same time, the possibility of positioning the technological accessories.