# The assembly detection of linear transmission mechanism for a five-axis machine tool


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**ABSTRACT**

According to the general specifications, a machine constructive standard for technicians hands-on shop is established in this paper. Considering the future manufacturing process model portability and precision, the development of reassembly or decomposibility small Precision Machine (DPMT, decomposibility precision machine tool) is build to cope with the demand for small parts precision machining. This DPMT combine with two major machine modules: two axes of rotating mechanism and three axes of linear mechanism. The linear drive mechanism with the advantages of high rigidity and high precision can be easily retained after the reassembly of DPMT; with the advantages of rotating flexibility with complex geometries, cutting ability, so will constitute a precision five-axis machine tool. Machining parts will up to satisfactory surface roughness and also by reducing the number of replacement fixtures and improve its accuracy. The TRIZ contradiction matrix to create new ideas. We first analyze the origins of machine tool geometric errors, and in the assembly process, during each assembly step in the development of rigorous inspection of installation operations and standards to effectively reduce the possible accumulation of errors. For all machine equipments, no matter what processes there will be, all the participating engineers will face the challenge of errors. Those processes include the initial design, component production and assembly， servo motion control and even machine operation. No matter when and how a problem will occur, when it comes to the final precision requirement for the machine application, there must be someone to investigate the reason for the error of every stage and the measure about how to avoid or eliminate. In particular five-axis machine tools, its geometric relation of machinery movement is much more complicated than a normal 3-axis machine. Thus, a deeper understanding is required to win the leading advantage of the equipment performance and quality in the assembly stage. In this study, base on ISO230 specification, combine with three-axis machine tools assembly detection experience, summarize a procedure standard to construct small precision CNC machine tools for unskillful technicians.



Keywords : Geometric error、CNC machine tools、Linear transmission


**Table of Contents**

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