



WRD 130/150 DUO TWIN-TYPE MACHINE MUTUAL POSITION CORRECTION



A basic prerequisite for productive and high-precision machining on the WRD 130/150 twin-type machine is the precise positioning of the two machines against one another, especially when machining flat surfaces and axially aligned holes.

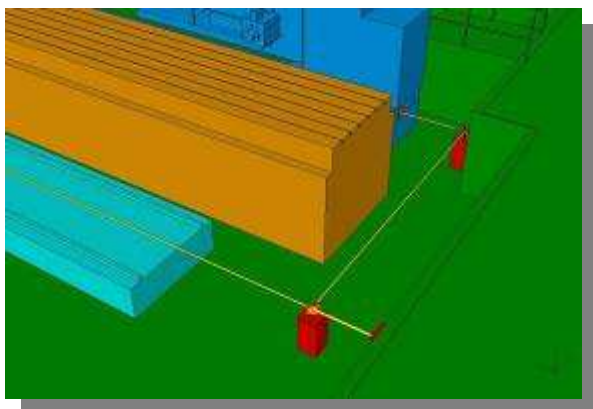
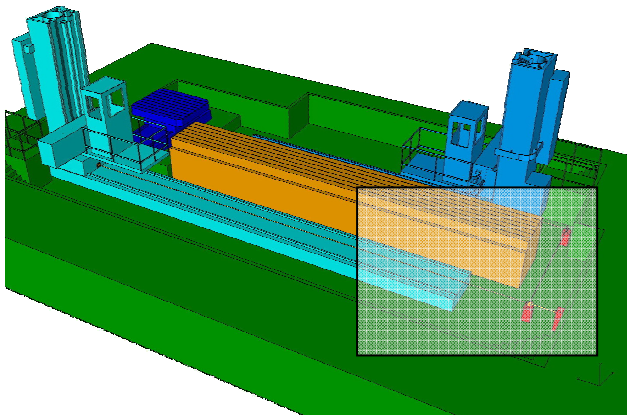
Conventional techniques for measuring and controlling machines normally do not allow the online correction of each of their positions, which leads to increased errors with the machine's lift, as well as increased machining working time. It is therefore typical to see big machine cross-positioning inaccuracy in the order of 0.1 mm per 10 m lift.

Because of this, TOS VARNSDORF designed its machines to have additional admeasurements, which allow both the direct and indirect measurement of the relative position of two machines, thus improving the accuracy of their cross-positioning without the need for service interventions in a longer time period.

Additional procedures for measurement and correction of the cross-positioning of the twin-type machine are based on the following principles:

1) INTERFEROMETRIC MEASURING OF RELATIVE POSITION

The method uses the principle of direct measurement of the relative position of motion axis of two machines, using the laser interferometers principle, where the appropriate axes of the two machines are compared with laser interferometers. When the movement of both machines is perfectly aligned, the laser interferometer does not indicate any value. However, if one of the machines deflects against the other, the deviation is registered and used for compensation. In such an arrangement, one machine is the "master" against which the other "slave" machine is aligned. Measuring of the two machines' relative positions takes place using the given interferometer resolution of 0.08 μm .



Visualization of the twin-type WRD150 duo machine with the Laser Interferometer in the X axis

Connection diagram of the laser interferometer for measuring the relative positions of the machines

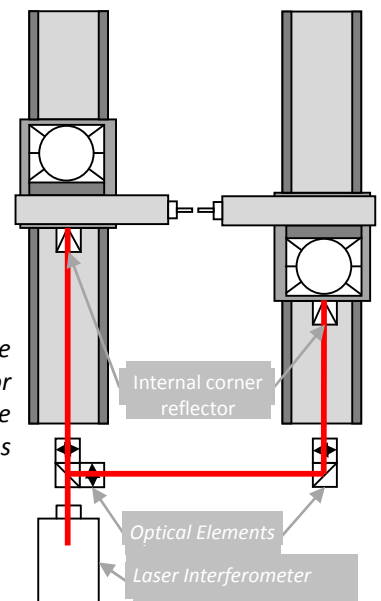
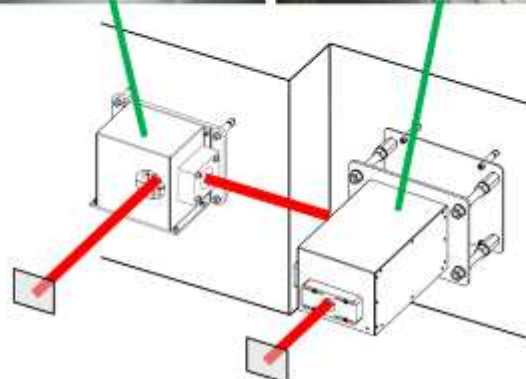


Photo of the use of the Laser Interferometer on the twin-type WRD150 duo

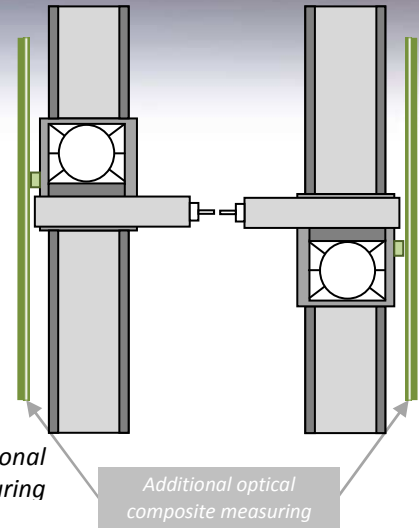




Mechatronics Concept

2) THERMALLY STABLE OPTICAL ADMEASUREMENT SEPARATED FROM MACHINE

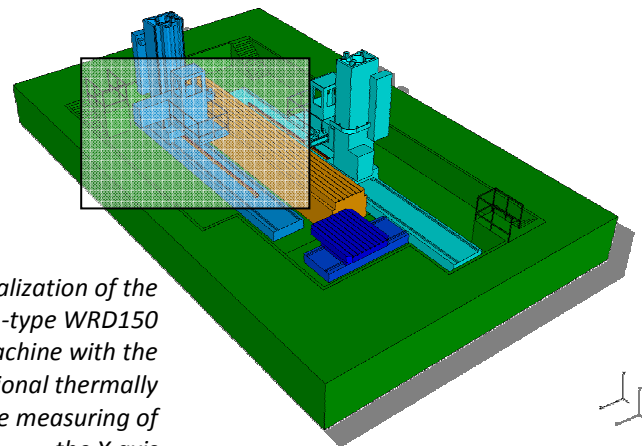
The method is based on the same principle as conventional linear measuring with the only difference being that the lines of the linear measurements are glued on the composite thermally inert base, which, in addition, is not connected to the construction of the machine (unloaded by force). This fact is very important especially for large machines, where vastly different working conditions may exist in different positions of the total lift. The structure of the base is made up of carbon fiber with a thin profile with measuring graduations (thickness 0.2 mm), which transfers thermal expansion. Information on the cross-positioning of the machines is obtained by comparing information from these linear measurements of each machine, which is more accurate than information obtained with traditional linear measuring using steel tape. Such information is then used by the control system to compensate for the relative positions of the machine.



Connection diagram of the additional thermally stable measuring



Photo showing use of composite thermally stable measuring on the WRD150 duo machine, combined with a concrete base for the machine through openings in the machine bed



Visualization of the twin-type WRD150 duo machine with the additional thermally stable measuring of the X axis

