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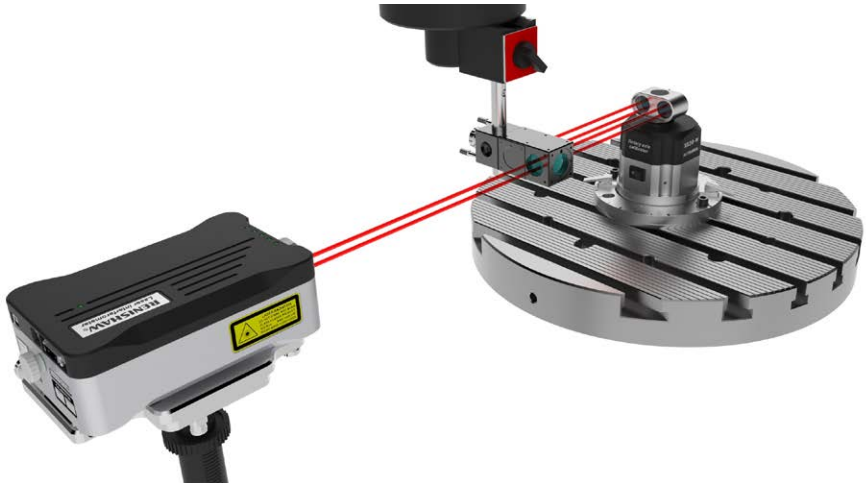
Principles of XR20-W measurement

Overview

The XR20-W system allows the angular measurement of rotary axes. The true angular position of the axis is calculated from a combination of the rotational position recorded by the XR20-W's internal encoder and measurements from a laser and angular optic mounted on the XR20-W axis. The XR20-W communicates wirelessly with a PC using a Bluetooth® connection and the PC is connected by USB to the laser. Captured data is displayed in CARTO software and can be used to record performance of the axis and errors when compared to intended axis position.

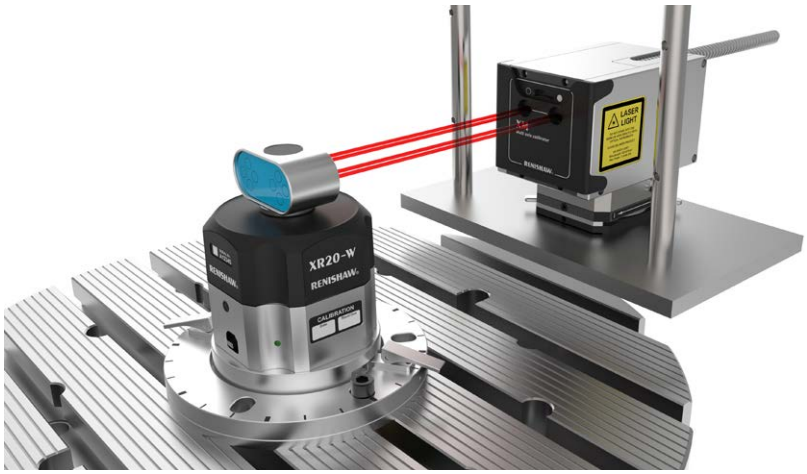
Basic configuration when using XL-80 laser

An XL-80 laser, mounted on a tripod, is aligned with an angular interferometer from the machine spindle housing and an angular reflector, which is an integral part of the XR20-W assembly.



Basic configuration when using XM system

Ideally, the launch unit should be mounted to the spindle housing of the machine tool rather than a tripod. The beams from the launch unit are aligned directly to the XR20-W with no external interferometer being used as it is built into the launch unit assembly.



Application note

Angular measurement method

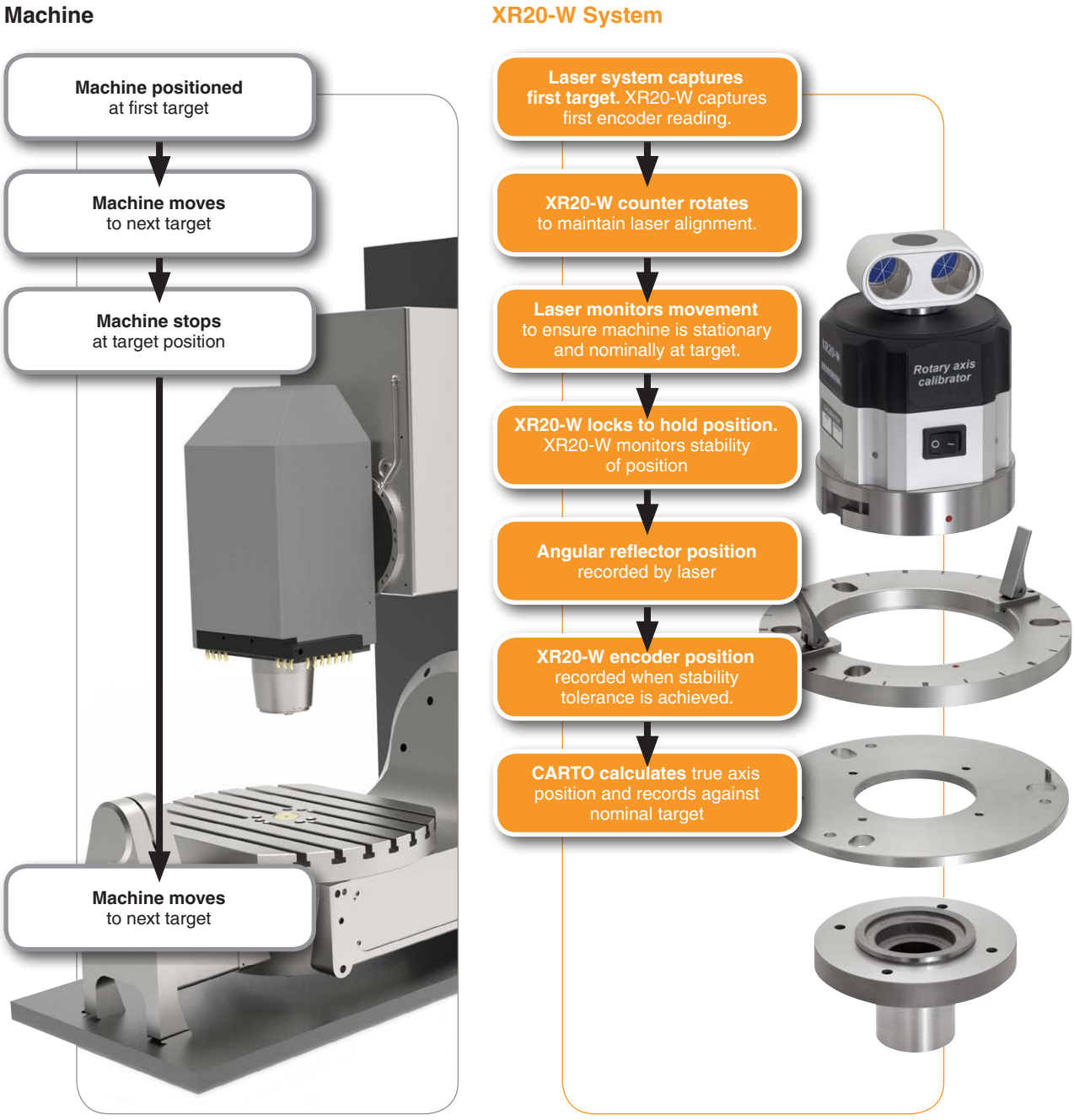
The XR20-W system can perform a number of automatic movements to optimise the measurement setup and reduce the inputs from the user. Following connection of the XR20-W the following steps are performed

1. Reference of the XR20-W to discover its reference mark and position the optic back to its original location.

2. Automatic optical calibration cycle to find the angular position of the optic, and define the direction sense relative to the laser measurement.

3. During the overun move.
   - Automatic direction sense relative to the machine
   - Automatic detection of the machine feedrate

Following the steps above the XR20-W is ready to start the axis calibration. The machine is positioned at the first target location.



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Summary

In practice rotary axes are subject to errors. The XR20-W system combines an accurate measure of rotation of the XR20-W with the laser measurement of the angular optic. This results in a measurement of the true position of the axis. CARTO software shows the true axis position and records the error compared against the intended target position.

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