RENISHAW
apply innovation™

HS20 Troubleshooting

Overview

The HS20 laser system is supplied as an OEM fitment product. There are many issues which can affect the performance of HS20 compensated signals as received at the machine controller. The following “checklist” covers the most frequently seen installation and integration problems on HS20 laser system installations.

Optics

Fixings - The HS20 system provides an accurate measure of linear distance between a reference and a target optic. Check that all optics, mounting brackets, alignment plates and the HS20 laser are securely fastened to the machine structure. Any movement between the optics and the machine will result in measurement errors. Large movements (caused by loose optics) can cause signal strength and laser stability issues.

Cleanliness - when the system is not operated in a clean environment, surface contamination will accumulate on the optics over a period of time. This contamination will eventually affect the system performance by causing deterioration in the signal strength. Check that all optics are free from contamination and if necessary clean them as described in the HS20 Manual (Appendix B).

HS20 Laser Head

Shutter - Check that the shutter is in the correct position and is free of debris in the apertures.

Alignment - Re-align the HS20 using the procedure described in the HS20 Manual (Section 4), where possible check the alignment in several positions down the length of the axis. This can be achieved by placing the white target on the front of the target optic and observe the beam position and shape on the target. If the machine motion is “straight” and the beam is aligned then the beam should maintain a constant position throughout the axis travel. When the beam does not maintain a constant position, then the laser alignment and machine geometry should be checked, i.e. how straight/level are the rails/guide ways?

Is the signal strength consistent along the whole axis or just at longer distance? Does the signal strength reduce gradually, fluctuate or suddenly drop? These conditions can also indicate alignment issues.

Beam quality – Check the beam quality by holding a white card or target close to the laser output aperture:

i. Are there any dark patches or lines in the beam?
ii. Is there any clipping at the edge of the beam?

Any of these issues could indicate a fault with the laser unit itself.

RCU10 Compensator

Cables – The signals from the HS20 laser are high frequency and can be corrupted over long cable runs by electromagnetic noise when there are assembly errors with the cables. Check all cables (HS20 - RCU10 and RCU10 - Controller) for the following:

Correct cable type,
Screen connected to shells at both ends,
Soldering quality
Stray “whiskers” of wire
Security of connection into equipment; is it retained with jack screws?
Have any wires/signals been disconnected?
Is the cable in close proximity to power cables that could produce electrical interference?

Application note

DIP switches – The DIP switches set the system configuration for the HS20. Remove the dip switch cover panel and check that the HS20 switches are set appropriately. DIP switch settings are described in the HS20 manual (Section 3).

Signal quality - Check digital quadrature signals with an oscilloscope at the output of the HS20 and at the input to the RCU10, i.e. at each end of the interface cable. Is any noise being introduced? This would suggest a cabling issue or cables route near 'noisy' equipment.

Check analogue quadrature signals with an oscilloscope at the output of the RCU10 and at the input to the controller, i.e. at each end of cable. Is any noise being introduced? This would suggest a cabling issue or cables route near 'noisy' equipment.

This page is intentionally left blank

Renishaw plc

New Mills, Wotton-under-Edge,
Gloucestershire GL12 8JR
United Kingdom

T +44 (0) 1453 524524
F +44 (0) 1453 524901
E uk@renishaw.com

www.renishaw.com

RENISHAW
apply innovation™

About Renishaw

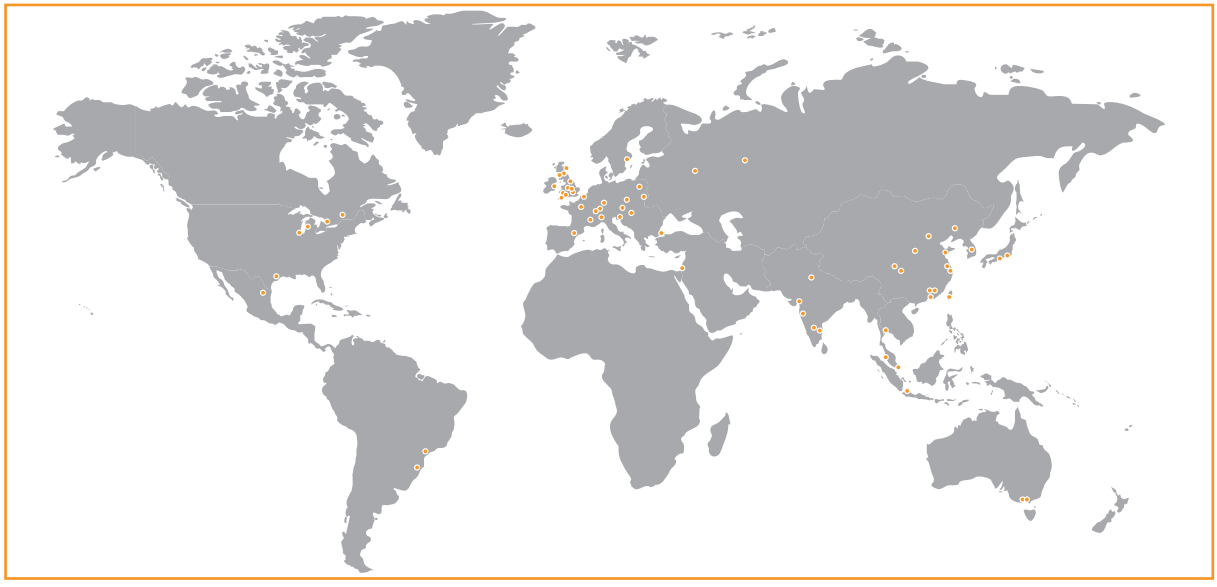
Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing, vacuum casting, and injection moulding technologies for design, prototyping, and production applications
- Advanced material technologies with a variety of applications in multiple fields
- Dental CAD/CAM scanning and milling systems and supply of dental structures
- Encoder systems for high accuracy linear, angle and rotary position feedback
- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
- High speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs
- Styli for CMM and machine tool probe applications

For worldwide contact details, please visit our main website at www.renishaw.com/contact



H-9923-9002-01

Issued 0513 Part no. H-9923-9002-01