LG MOTION UK MOTION TECHNOLOGY SPECIALISTS

SCHNEEBERGER LINEAR TECHNOLOGY

TECHNICAL BRIEF

Seven Things Your Device's Distance Measurement System Should Deliver

INTRODUCTION

OEMs in industries from machine tools and automation to metrology, solar, and semiconductors must frequently build linear distance measurement capabilities into their machines. Suppose a system is destined for a less-than-pristine environment, and stroke lengths from 25 millimetres to several metres, or even more. Given competing technologies and confusing claims, how can a designer, engineer, or purchaser choose the system that's right for their unique device?

Here are seven deliverables to look for that will help your chosen system measure up.

1. Integrated Design

Instead of a component approach — where you buy a linear scale from one source, a guideway from another, and spend time, cost, and effort on do-it-yourself assembly — consider an integrated distance measuring system design.

An advanced model might combine a high-precision magneto-resistive linear encoder with a guideway rail in a single package. Besides easing procurement and assembly, it can substantially reduce complexity for multiple machine axes, position measurement close to the process, decrease thermal variations, save precious space, and stand up to challenging machine environments.

2. Direct Measurement

Many users prefer systems that use direct measurement. That is, the sensor, optical read head, and LED light sources are mounted directly on the machine's moving part.
(As opposed to glass scales or rotary encoders, which are sited on the non-moving mass of the machine: an indirect measurement approach.)

The direct method ensures that you're measuring precisely where the movement of the assembly occurs. So you suffer no loss of windup in the ballscrew, motor, or coupling.

Finally, watch out for proprietary restrictions: favour systems that let you work with any controller you choose.

3. Absolute Positioning

Distance measuring systems that offer absolute positioning capability have gained increasing favor with users worldwide. Where traditional incremental systems force users to move the assembly to read a positional value, absolute systems make positioning data available immediately. And even if your machine loses power, the last position is safely maintained until power is restored.

4. Ensured Protection

Consider your machine's operating environment. For example, it may challenge glass-scale-encoder measuring systems. These often require a complicated (and expensive) compressed air supply to furnish overpressure versus contamination. Alternatives such as integrated magneto-resistive models avoid these requirements, standing up to vibration and shock as well as "dirty" surroundings.

In any case, evaluate sealing provisions with care. You want industrial-strength protection of the sensing system against rust, corrosion, oils, grease, cooling media, solid particle residue, and other likely contaminants.

5. Ease Of Maintenance

A superior supplier should offer a mature system design. That design should deliver sustained measurement accuracy over the longest possible service life — with the lowest levels of maintenance and downtime throughout.

Look for benefits such as simple installation, minimal adjustments or alignments, and easy replacement. The latter can be ensured with easily fitted, interchangeable spare parts, using low-wear components wherever possible.

6. Cost Savings

Glass-scale-encoder-based systems are a well established technology, with many currently operating installations. However, they are relatively expensive to purchase, and require multiple components to assemble. They demand expenditures for compressed air, and considerable ongoing maintenance. Their service lives may be somewhat short, especially where the machine environment presents unacceptable vibration or contaminants exposure.

On a comparative basis, an integrated magneto-resistive distance measuring system like the one described above avoids many of these problems. In total, it may achieve cost savings of 50% or more for operation in many applications.

Cost of Ownership

Measuring System	Glass Scale	Glass Scale	AMSABS 3B
Industry Application	Automotive (3 shifts)	Semiconductor (2 shifts)	
One Off Costs (Design)	1503	1503	423
Cost per axis	668	668	75
Ongoing Costs (per year)	276	142	3
Replacement Costs	1603	1593	607

A STUDY IN SAVINGS. One recent study compared ownership expenses of a glass-scale encoder system versus an integrated magneto-resistive system, for 3-shift and 2-shift operations. (All costs in euros.) The integrated system (AMSABS 3B) was easier and thus less pricey to design. Its integrated assembly installed easily, whereas the glass scale system incurred higher costs for hardware and mounting, alignment, and hooking up compressed air. The integrated system on an ongoing basis required much less for maintenance, and nothing for air supply. And where a glass scale system needed wholesale replacement, an integrated system replacement took only a new scan head and a few screws.

7. A Proven Solution

Be cautious about suppliers that are new to this area of the market. Creating designs that deliver the most reliable, high-precision performance takes years of fine-tuning to meet evolving customer requirements for technology, quality, and support.

Your chosen supplier should show a proven record of successfull installations and satisfied customers.

Take delivery of a linear distance measurement system with all the advantages above and you'll ensure years of industrial-strength performance and reliability.

SCHNEEBERGER integrates a high-precision measuring head and scale onto its MONORAIL profiled linear guideway to create the magneto-resistive MONORAIL AMS integrated linear distance measuring system. It provides long life, low cost of ownership, and direct distance measurement for up to 6m or more.

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