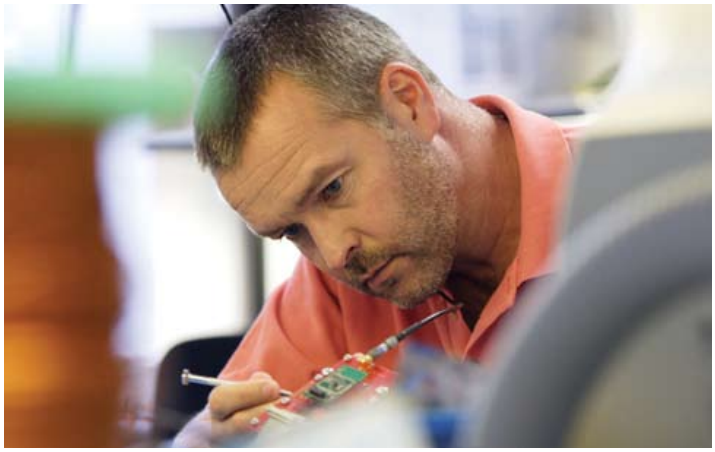
Mu-Track points to step change in sensing technology



Position sensing technology plays an important role in today's highly automated industrial environment. It finds particular use in pneumatic cylinders which are key actuators in many processes, from car assembly lines, through consumer durables production to food processing plants. Without them, industry would, quite literally, grind to a halt.

A pneumatic cylinder comprises a cylinder, piston, sensors and control system. Pressurised air causes movement of the piston which in turn drives the device it is attached to. A point sensor at either end of the cylinder detects the piston as it approaches, then at the critical moment switches off the air supply to stop the piston. Although low cost, the disadvantage of this approach is that the sensor has to be physically moved to change the stop position. Changing the manufacturing line to make a different product can thus be time consuming and expensive.

Sagentia's latest position sensing development, Mu-Track, overcomes this problem by measuring the position of the piston continuously over a large range of displacements. An advantage is that it can do this through thick barriers of non-magnetic material such as aluminium and non-magnetic steel. The cylinder control system can now be programmed to change the end stop position of the piston in the cylinder without any manual intervention on the manufacturing line.

Mu-Track has already created interest in the market place and further development of the technology is under way with a major cylinder manufacturer. Although the principal focus to date has been pneumatic cylinders, Sagentia expects that the technology will also find applications in the automotive sector for linear position sensing.

The science

Mu-Track comprises four elements: a printed circuit board (PCB) with transmit and receive conductive tracks, the 'ruler' of the measuring device; a thin sheet of magnetic material located above the PCB; a magnet or 'target', in this case the piston inside the cylinder; and signal processing electronics.

When a signal is transmitted from the PCB it is reflected back by the magnetic material and picked up by the PCB's receive track. In the absence of the target, this signal is 'balanced' and the output is zero, but when the target is present the balance is broken. By processing the receive signal, Mu-Track is able to work out where the target is along the scale of the PCB.

For this to work, one major problem had to be overcome: while the target transmits a DC magnetic field through the cylinder wall, the PCB can only transmit an AC electric field. The two fields are incompatible, they cannot 'talk' to each other. The crucial part of Mu-Track is the thin magnetic sheet sitting on top of the PCB. This component acts as a 'translator', taking the DC signal and converting it into something the PCB can respond to.

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