PRECISION MICRODRIVES™

Model No. D07-100

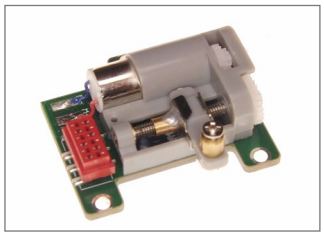
Precision Microdrives Motor Case Study

Micro Linear Actuator Servo For Swarm Robot Research

THE APPLICATION & SOLUTION

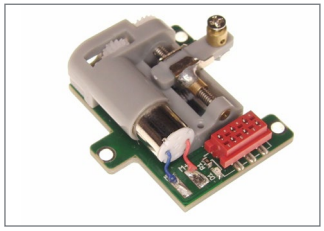
Current robotics research is generating some very unique applications, and one particularly interesting field is 'swarm robotics'. These applications seek to mimic the behaviour of simple creatures such as ants, where the 'intelligence' is observable at the swarm / group level. Our customer for this project was a European research institute that required a mass producible, highly cost-effective, miniature linear actuator with absolute positional feedback. The linear actuator had to be able to produce 0.25N of dynamic force, and would be used to open and close the grabbing jaws built into the front of each robot.

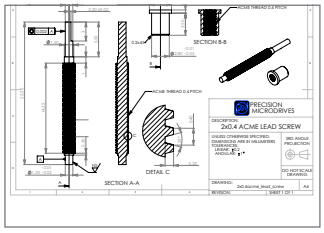
The customer's earlier prototypes had used an alternative unit from a German supplier, but this was not suitable for the final build of 5000 swarm robots, due to cost and manufacturing lead-time. We designed-in a replacement, though we were constrained by the awkward securing footprint of the previous actuator. The application required us to push / pull a 1mm shaft and there was a requirement for manual adjustment / alignment during the final robot assembly.



TECHNICAL SPECIFICS

We developed our actuator in Solidworks, and based the design around a 7mm coreless 3v motor, with a custom D-shaft to take the pinion gear. The chassis, output arm, and pinion gears were injection moulded in engineering plastics. The lead-screw was based on a M2 thread, and further machined to produce a trapezoid profile to prevent sticking when higher forces were applied. The lead-screw was supported in brass bearings at either end of the chassis. To offer absolute positional feedback in this package and budget was a real challenge. But we solved this by creating a linear potentiometer on the PCB, which also acted as a mounting base for the injection moulded chassis. We also designed a driving algorithm to prevent lead-screw lockup, and created an end-of-line testing station to 100% test and characterise the device for positional calibration.



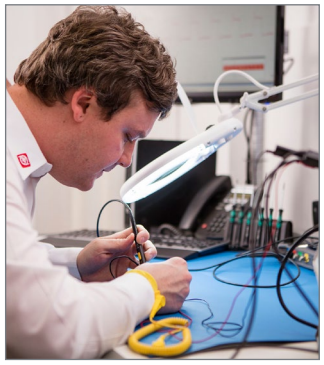


HOW PRECISION MICRODRIVES CAN HELP YOU

Modern motor / mechanism design and manufacturing, is a highly challenging multi-discipline engineering activity.

Precision Microdrives can save you time, money and stress. With so many applications engineered successfully, we have a huge amount of experience and know-how. We also have a first class manufacturing infrastructure, and an industry leading testing and validation capability.

Call or email today and our engineers will set-up a call to review your application.



FIND OUT HOW WE CAN SUPPORT YOUR APPLICATION

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