

The Micro Motor (MM001)

The micro motor has a diameter of only 1mm and functions as a two phase synchronous motor with 4 coils and a 2 pole magnet. The rotational speed follows the frequency of the supplied current and because of its very small inertia, the micro motor can reach a speed of 200,000 rpm.

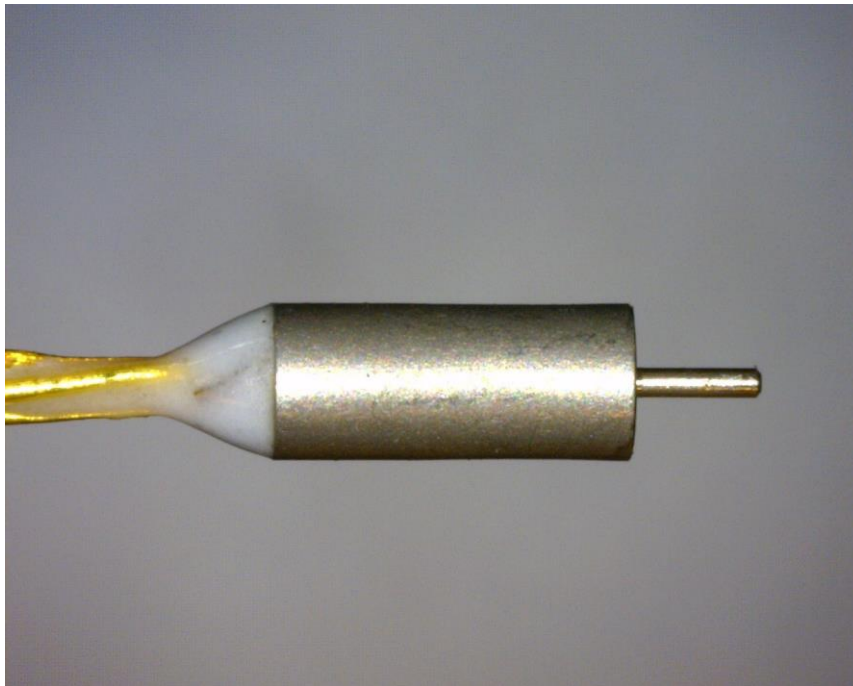
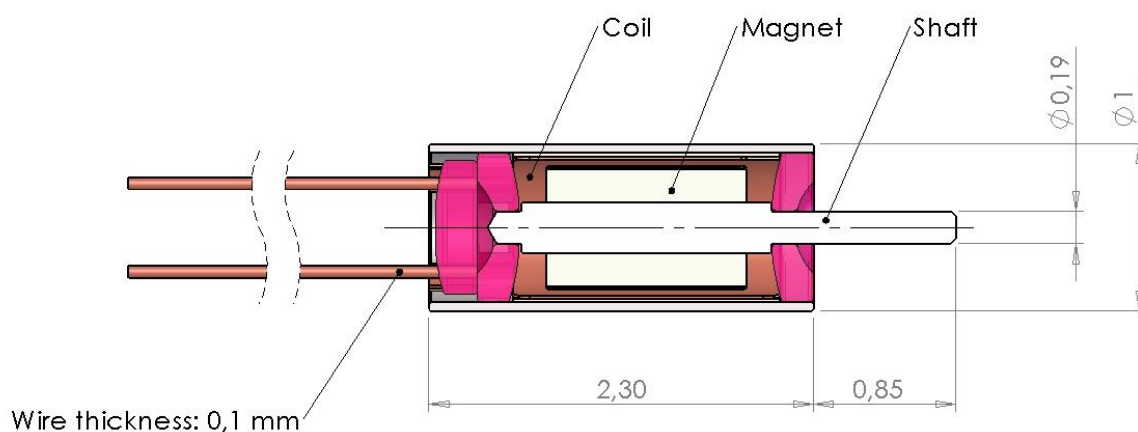


Photo of the micro motor.



Cross section of the micro motor.

Specifications:

Motor: 2 phase synchronous motor with 4 coils and a 2 pole magnet.

Housing:

Material: RVS 316
Dimensions: Diameter = 1.0 mm
Length = 2.3 mm

Magnet:

Material: $\text{Sm}_2\text{Co}_{17}$
Dimensions: Diameter = 0.7 mm
Length = 1.2 mm
Magnetizing direction: radial
Pole pairs: $p = 1$

Coil:

Windings: $N = 1$
Resistance: $R = 0.6 \Omega$

Wires:

4 copper wires (1 to each winding), diameter is 0.1mm, the wires are colour coded, resp. red, black, yellow and blue. Sinus voltage/current should be applied to red and yellow, and cosinus voltage/current to black and blue. Maximum current is 500mA (@0.3Vrms), and typical current is 250mA (@0.15Vrms). Maximum current during max. 10 seconds is 1A.

Shaft:

Material: RVS 316
Dimensions: Diameter = 0.2 mm
Length = 2.8 mm

Accuracy:

Rotation angle: $+10^\circ/-10^\circ$ at 3000 rpm

Speed:

Startup speed is 3000 rpm (50Hz)
Max. speed at 250mA is 12000 rpm (200 Hz)
Max. speed at 500mA is 50000 rpm (833 Hz)
Max. speed at 700mA is 100000 rpm (1667 Hz)
Max. speed at 1A is 200000 rpm (3333 Hz)

Torque: $T = 1 \mu\text{Nm}$ at 3000 rpm and at $I=250 \text{ mA}$