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.](image)

![Cross section of the micro motor.](image)
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: Sm\(_2\)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 0.1 mm, the wires are colour coded, resp. red, black, yellow and blue. Sinus voltage/current should be applied to red and yellow, and cosine voltage/current to black and blue. Maximum current is 500 mA (@0.3Vrms), and typical current is 250 mA (@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 (50 Hz)
- Max. speed at 250 mA is 12000 rpm (200 Hz)
- Max. speed at 500 mA is 50000 rpm (833 Hz)
- Max. speed at 700 mA is 100000 rpm (1667 Hz)
- Max. speed at 1 A is 200000 rpm (3333 Hz)

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