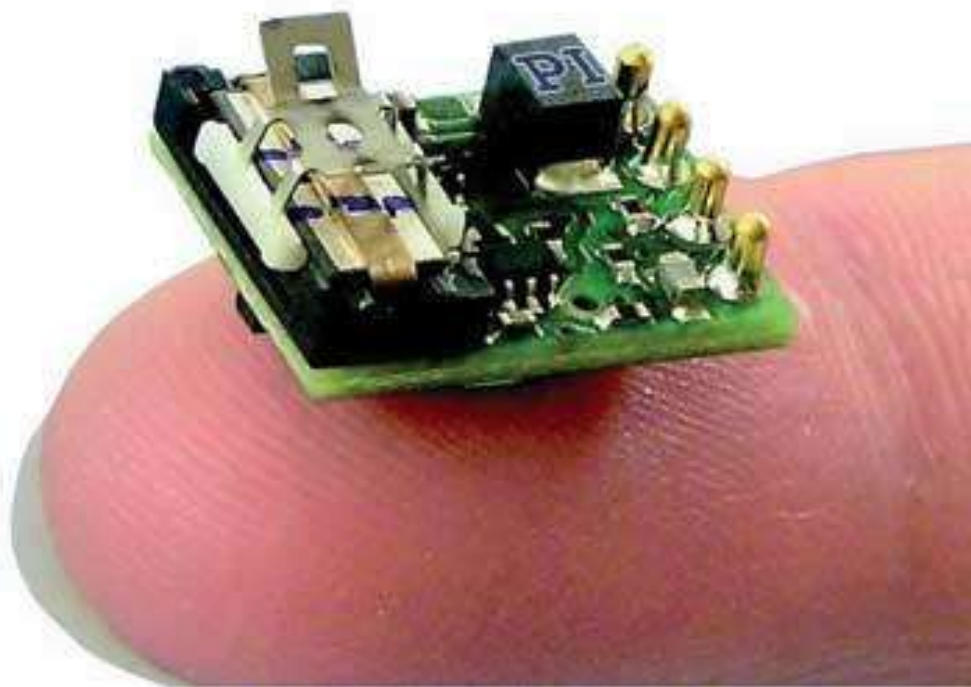




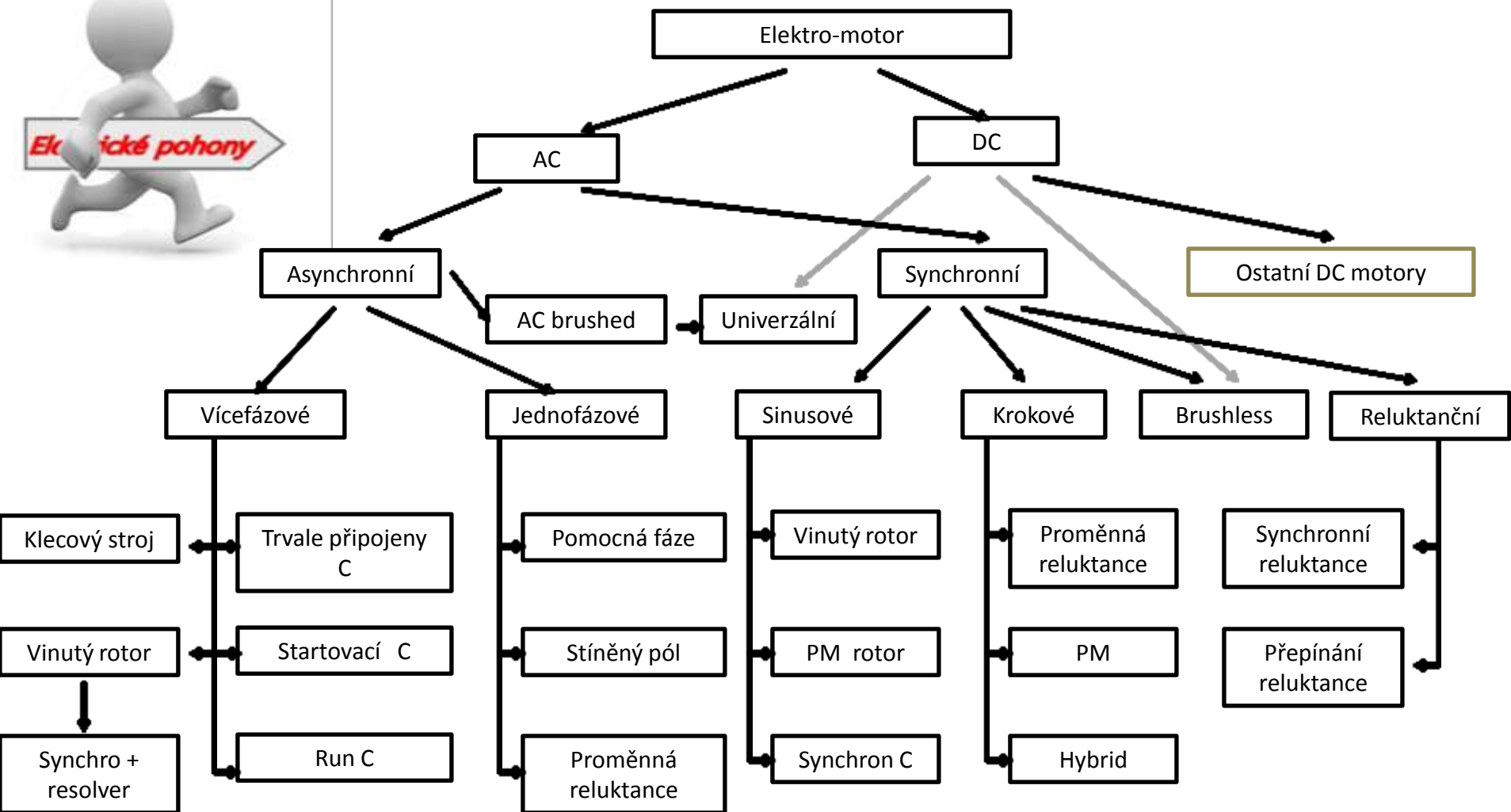
Mikro motory IX



Ing. Vít Hlinovský, CSc.
K13114 – T2:E1-107
hlinovsk@fel.cvut.cz

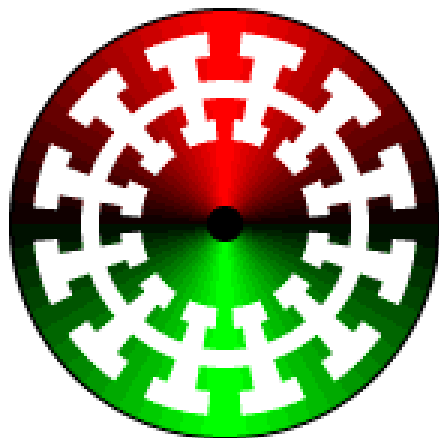


Třídění elektrických motorů

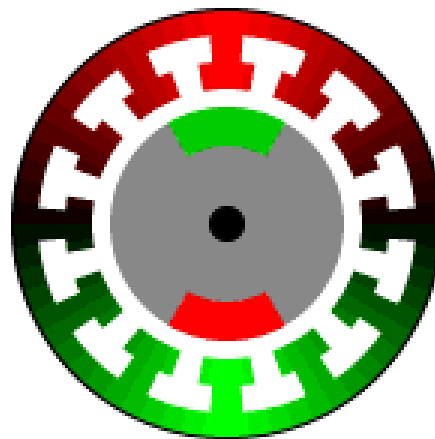




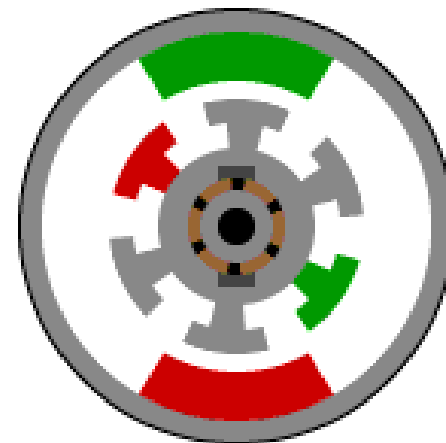
Asynchronní motor



Synchronní motor



Stejnoseměrný motor



Dva typy statoru a dva typy rotoru :

- drážkovaný obvod – vsypané vinutí
- vyniklé póly – buzení / permanentní magnety





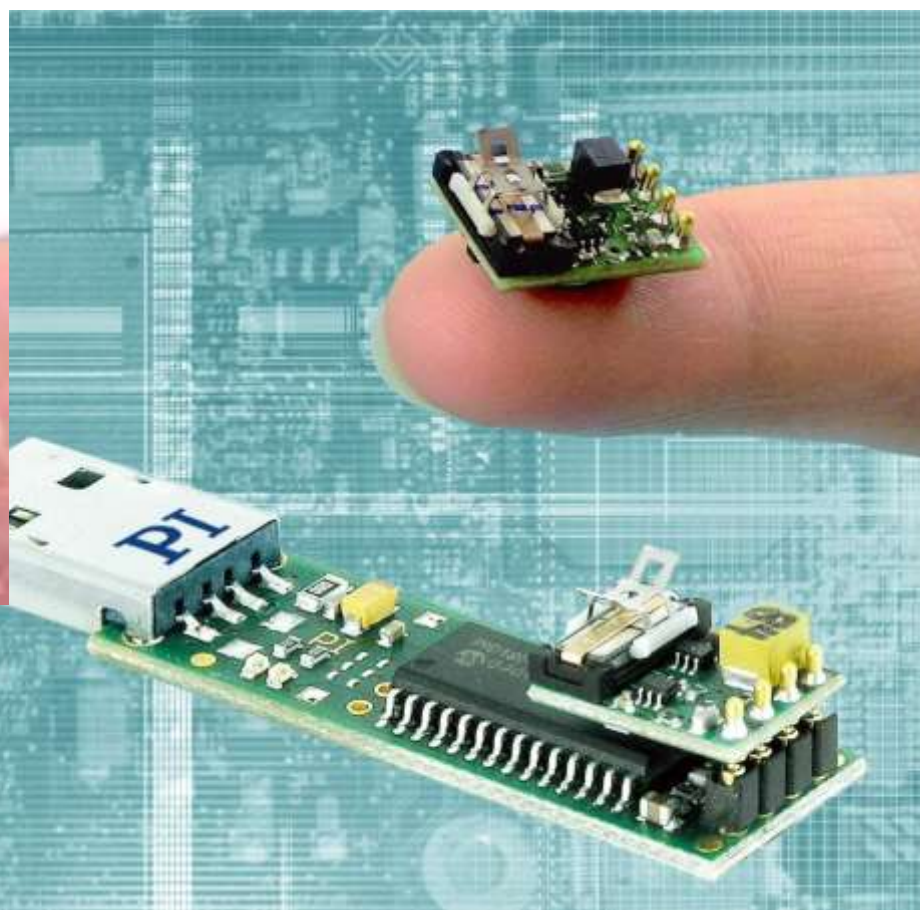
Mikro stroje



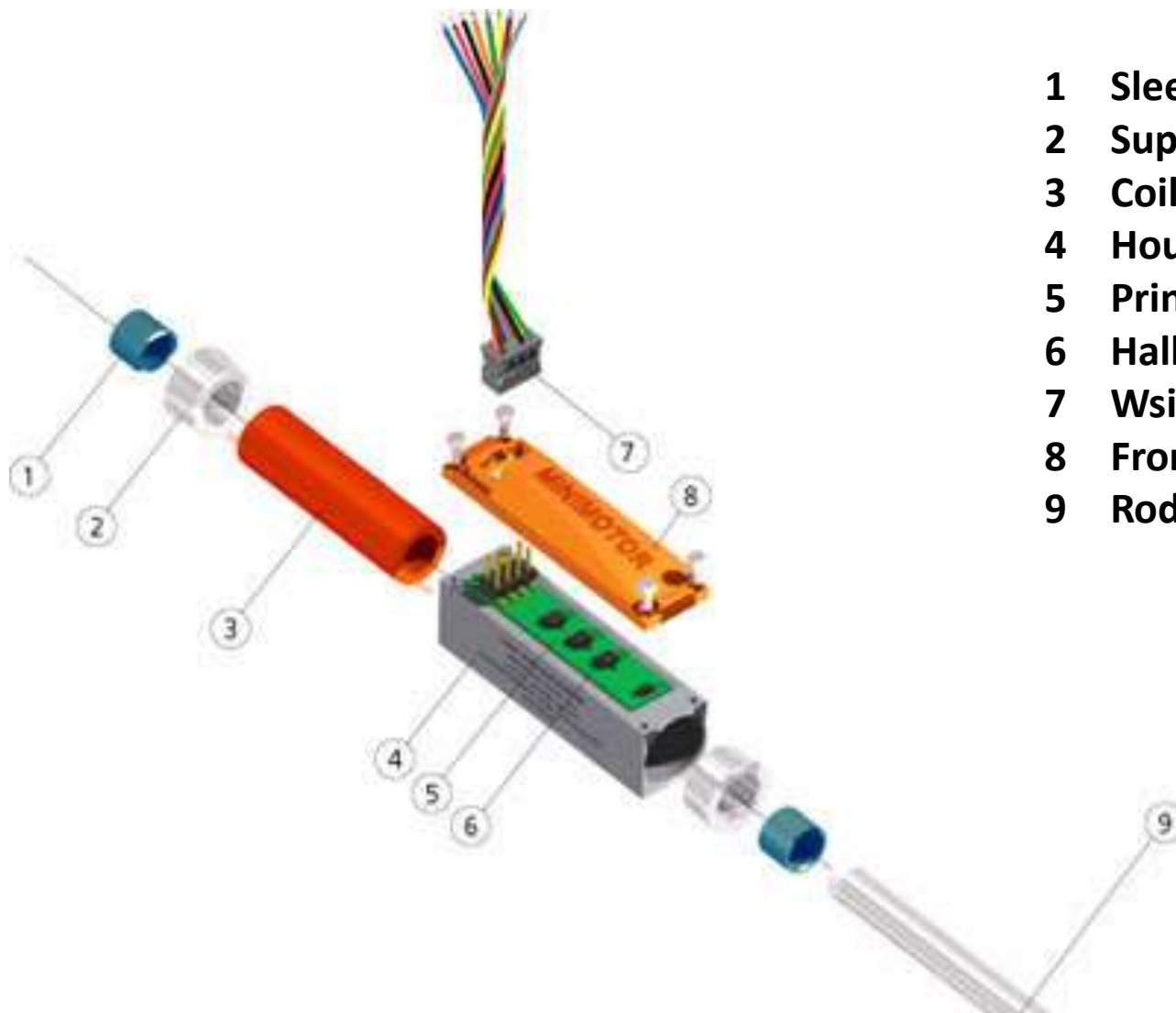
<http://www.youtube.com/watch?v=ZnWjD675s4M>



Piezomotor - „nanopositioning“



<http://www.youtube.com/watch?v=MnC04jluBGA>



- 1 Sleeve bearing
- 2 Support
- 3 Coil
- 4 Housing
- 5 Printer circuit
- 6 Hall sensor
- 7 Wsires – connector
- 8 Front cover
- 9 Rod with magnets

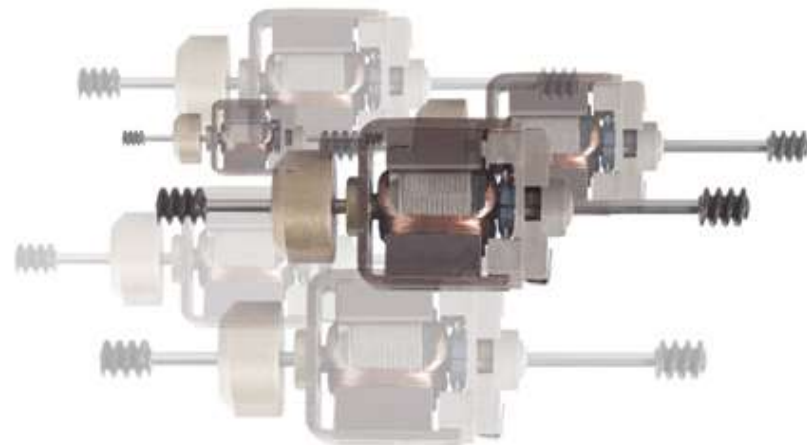
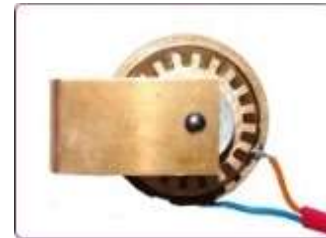
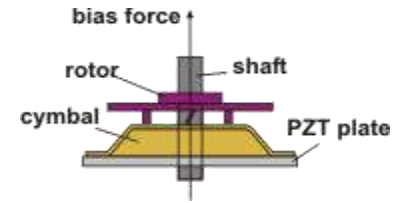




TECHNOLOGY

FLEXMOTORS use the radial ultrasonic vibrations of a thin piezoelectric disk, which have excellent coupling. This forces vertical vibrations of the attached amplifier structure. These vibrations convert into a rotary motion via the ratchetting along of elastic legs. All using pressed or etched metal parts. The combination of materials and simplicity of the innovative piezoelectric motor design give:

High power delivery (breathing mode) Driving 1-2 micrometers at 50-80kHz A simple friction drive Simple assembly Scalable size without loss of performance Motor is reconfigurable for linear and bidirectional motoring, optical pass-throughs & integrat
Patented designs -wholly owned

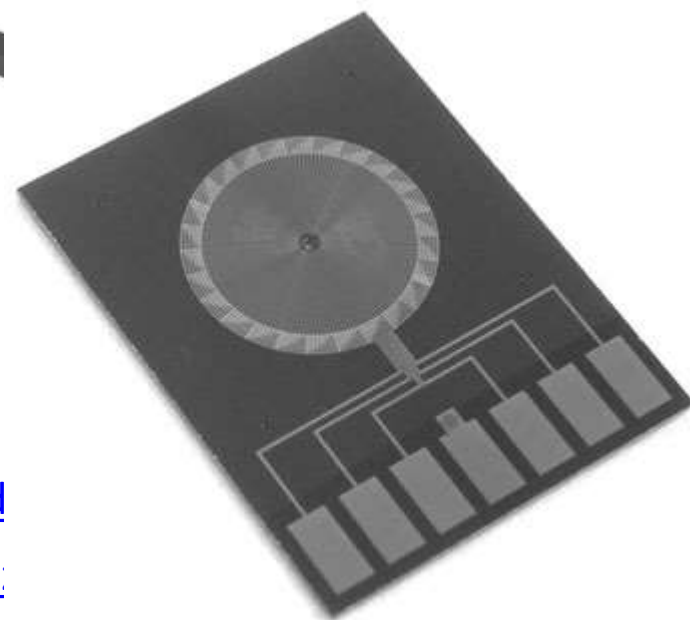
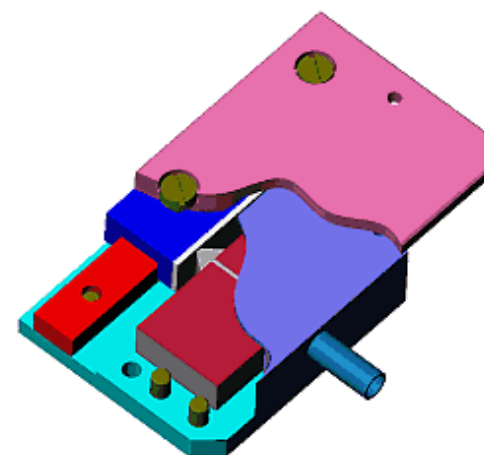
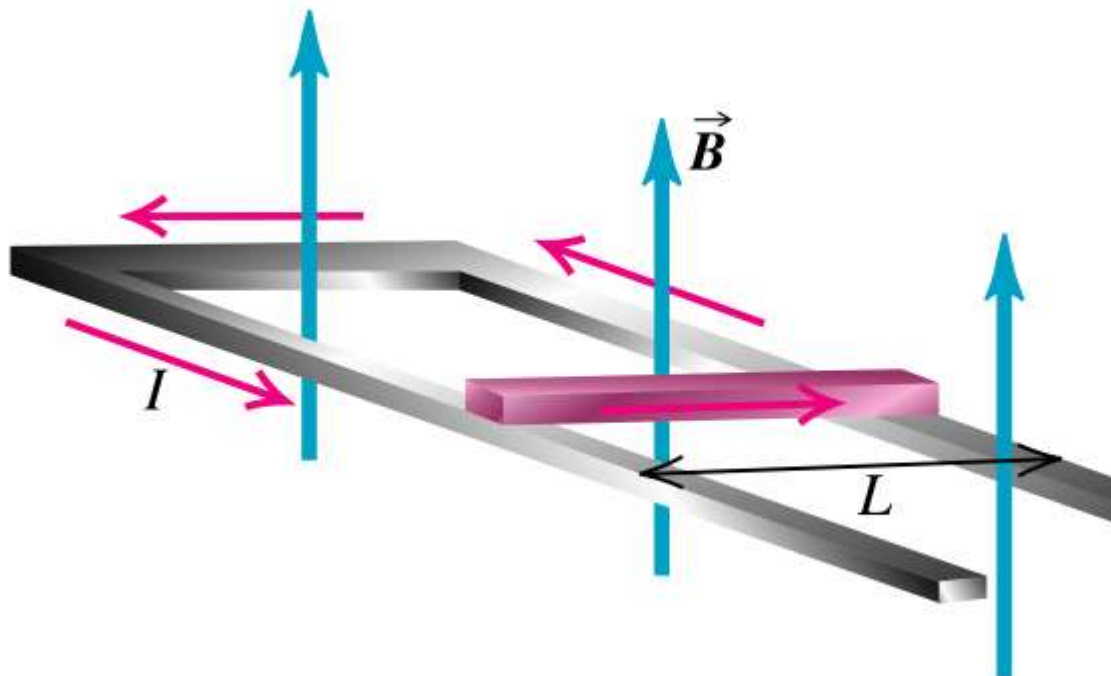


<http://www.youtube.com/watch?v=M7tr-nMQRpA>





Ultrasonic Piezo Motor Driven Stage, Animation



Copyright © Addison Wesley Longman, Inc.

http://www.physics.sjsu.edu/becker/physics51/mag_field

<http://www.physikinstrumente.de/products/section7/pie>





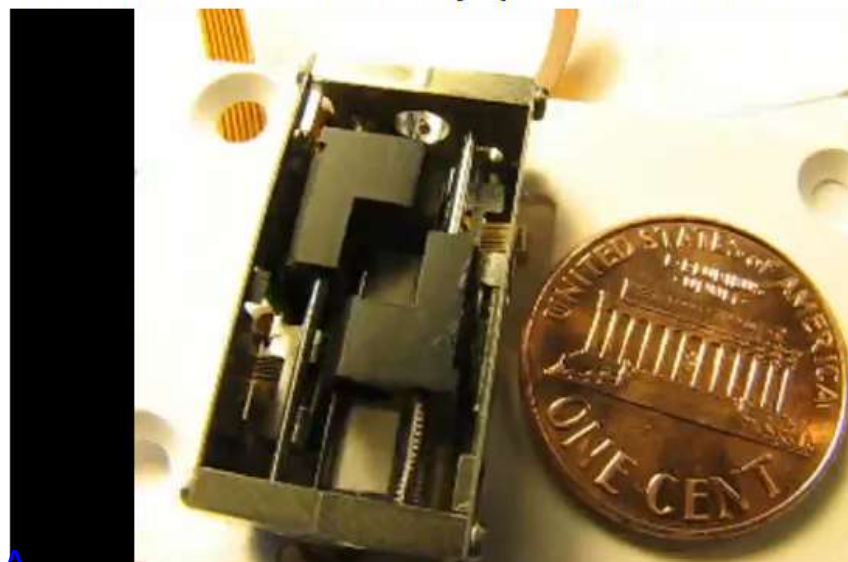
Piezo micro motors create a tiny optical zoom module



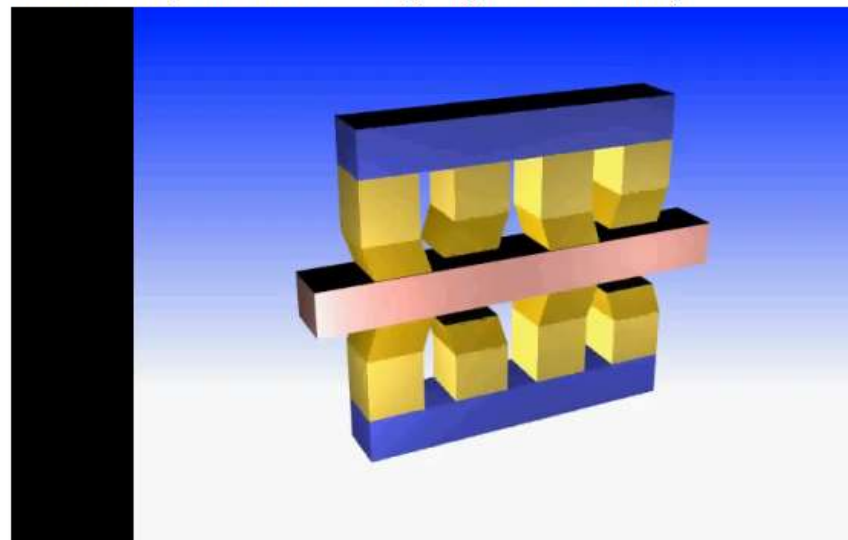
<http://www.youtube.com/watch?v=4vFn7nRgG>



<http://www.youtube.com/watch?v=CYcVT1yFv7A>



Nexline step Piezo Walk Stepping Linear motor, PI





Precision Gearheads

Spur Gearhead

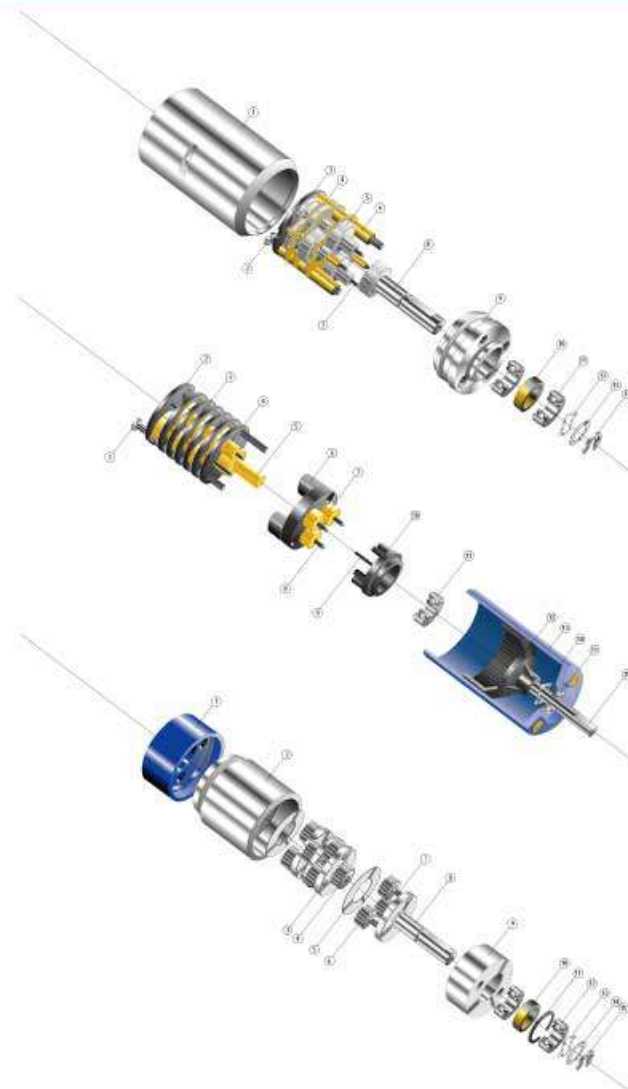
1. Housing
2. Screw
3. End plate
4. Intermediate plate
5. Gearwheel
6. Spacer sleeve
7. Dowel pin
8. Output shaft
9. Front cover
10. Spacer
11. Ball bearing
12. Spring washer
13. Washer
14. Circlip

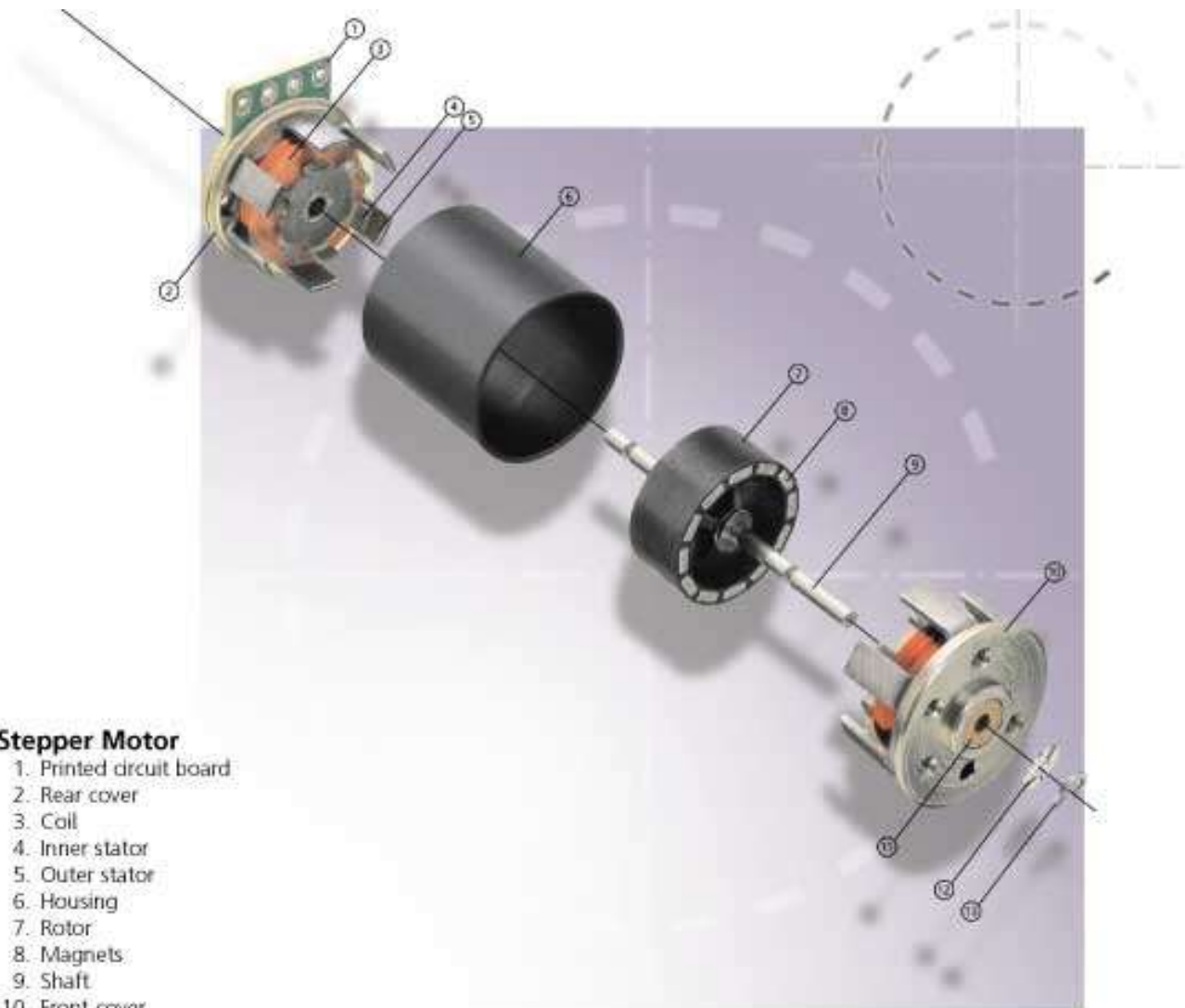
Hybrid Gearhead

1. Screw
2. End plate
3. Intermediate plate
4. Gearwheel
5. Sun gear
6. Satellite carrier
7. Satellite gear
8. Pin
9. Dowel pin
10. Support
11. Ball bearing
12. Crown gear
13. Housing
14. Spring washer
15. Output shaft

Planetary Gearhead

1. Motor flange
2. Housing
3. Satellite carrier
4. Sun gear
5. Washer
6. Satellite gear
7. Pin
8. Output shaft
9. Front cover
10. Spacer
11. Retaining ring
12. Ball bearing
13. Spring washer
14. Washer
15. Circlip





Stepper Motor

1. Printed circuit board
2. Rear cover
3. Coil
4. Inner stator
5. Outer stator
6. Housing
7. Rotor
8. Magnets
9. Shaft
10. Front cover
11. Sleeve bearing
12. Washer
13. Circlip



Lineární motor

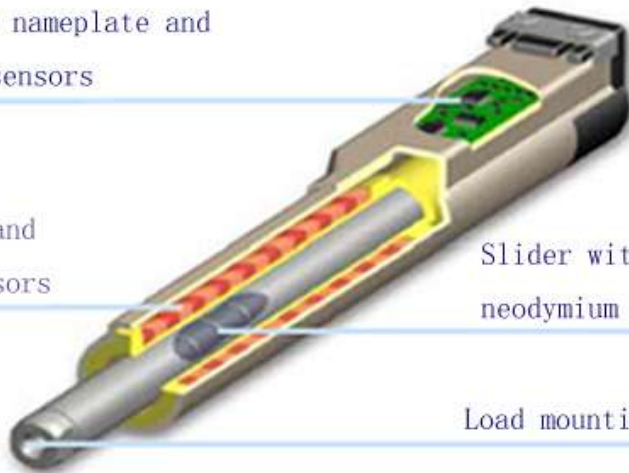


Electronic nameplate and position sensors

Stator winding and temperature sensors

Slider with neodymium magnets

Load mounting



Servo tube's internal permanent magnets establish powerful magnetic field

Load mounts onto forcer's surface

Forcer Travel



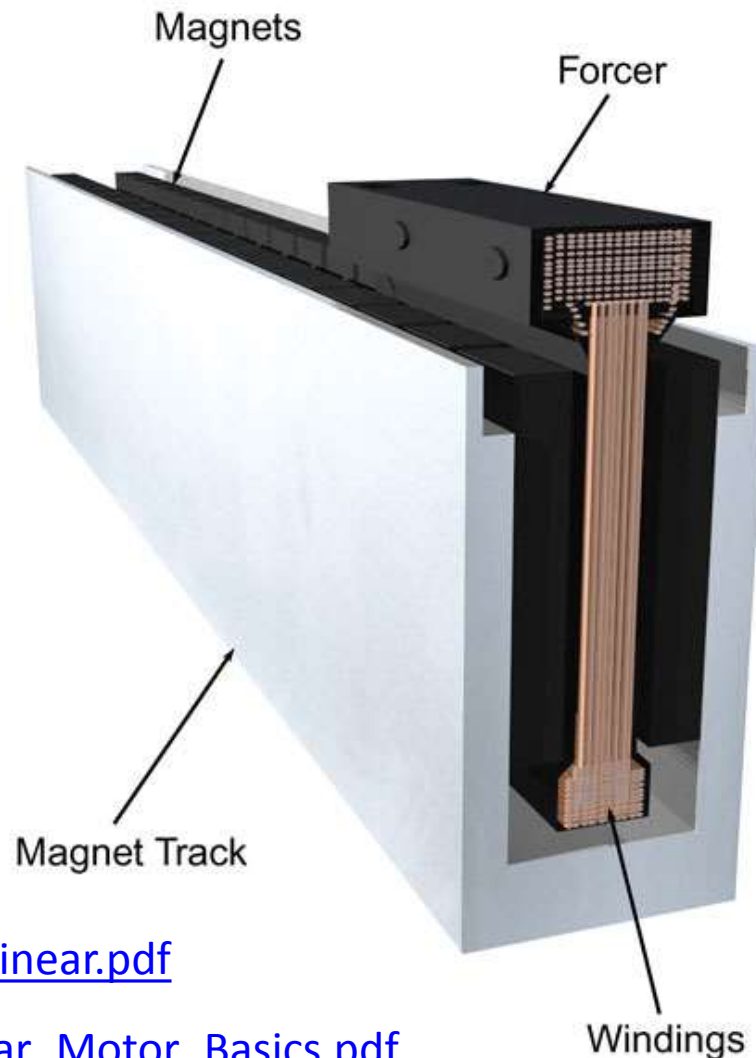
Large air gap simplifies alignment issues when building motor into automation systems

Hall sensor measures Forcer position with 12-micron repeatability

Forcer's drive coils set up traveling magnetic field that interacts with ServoTube's permanent-field to create propulsion force



Synchronní motor



http://www.sodick.jp/tech/img/core_linear.pdf

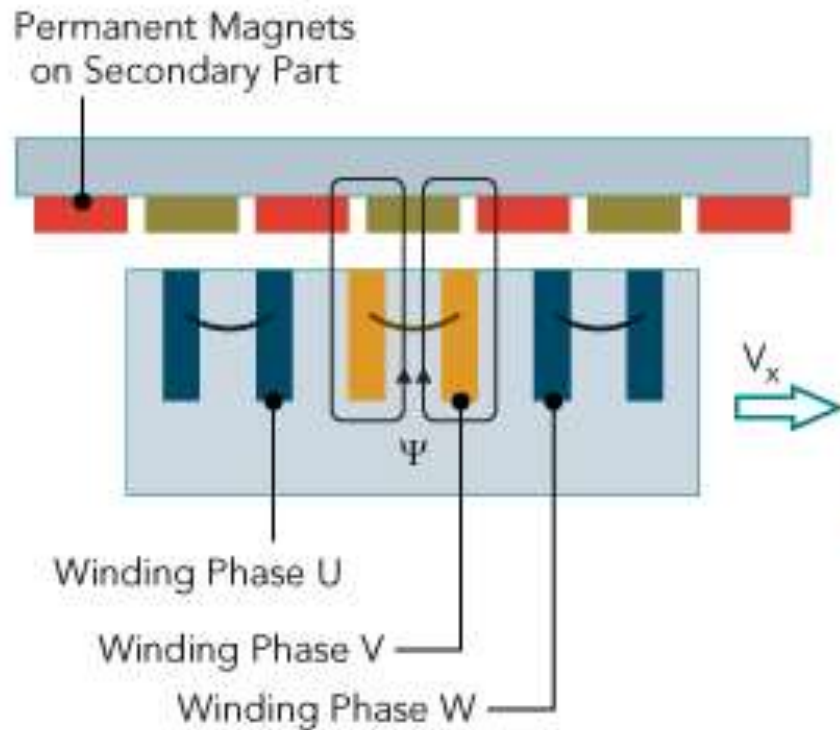


http://www.grp6.com/documents/Linear_Motor_Basics.pdf

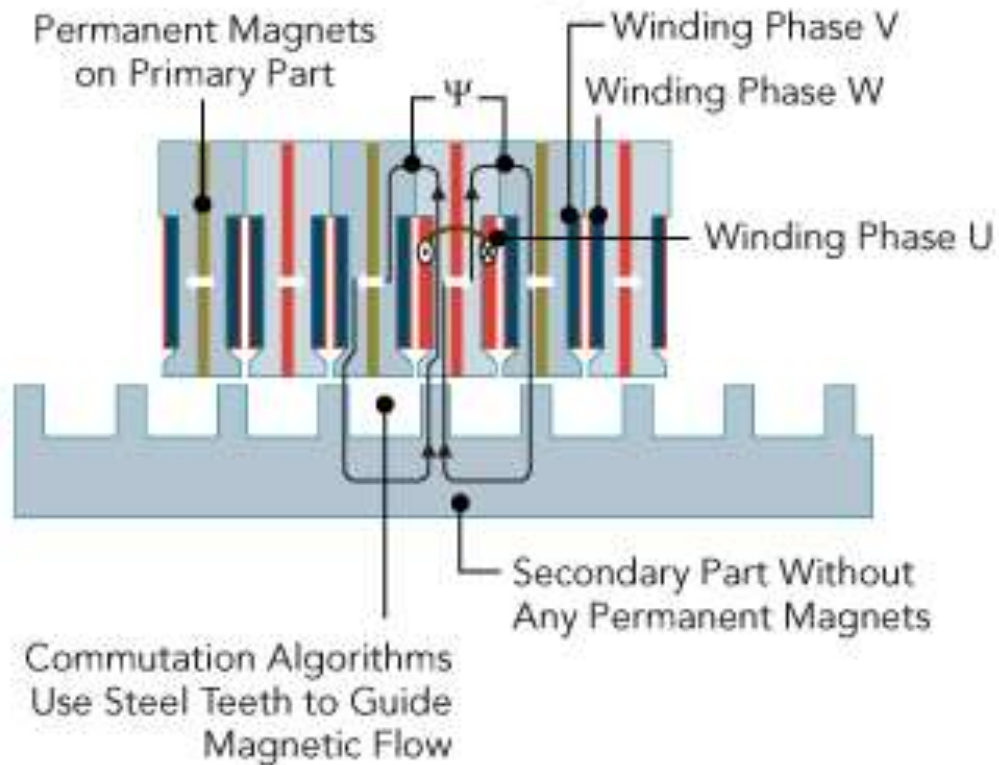


Linear Motor Design Comparison

Traditional Synchronous Linear Motor



New 1FN6 Design





Linear Motors

MOOG



Brushless DC Rotor



Cut the Rotor



Lay the Rotor Flat as in a Conventional Linear Actuator



Curl the Rotor into a Tube



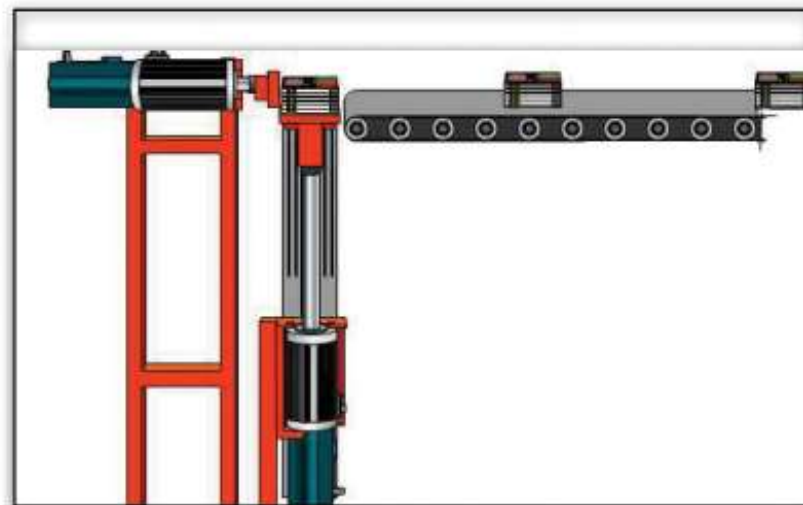
The Result:



Shaft



Stator



<http://www.moog.com/products/motors-servomotors/linear-motors/>



Lineární pohony



<http://www.wgh.ltd.uk/prt.php>



LinMot®

Industrial Linear Motors

