

Electric Rotary Actuators (motors)

- DC motors
- AC motors
 - stepper (2-phase synchronous)
 - brushless (3-phase synchronous)
 - induction

Step Motors

Figure 2. "One phase on" stepping sequence for two phase motor.

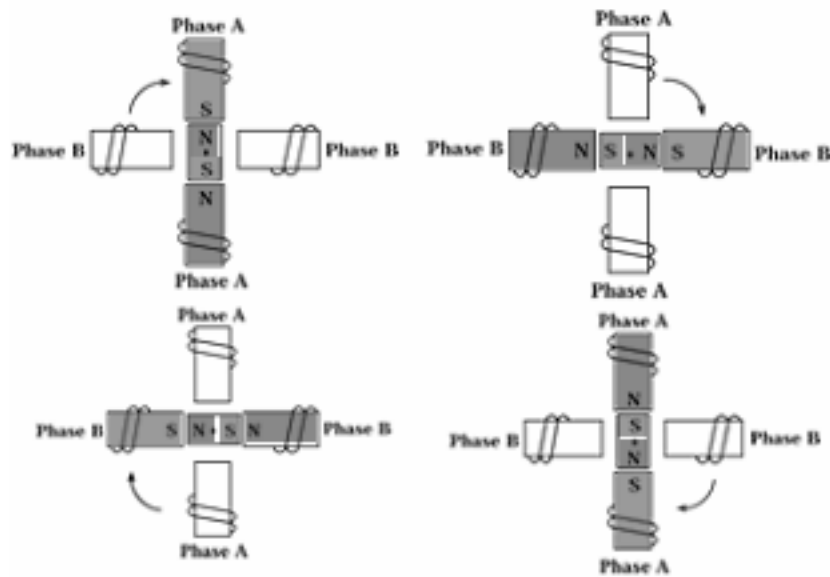
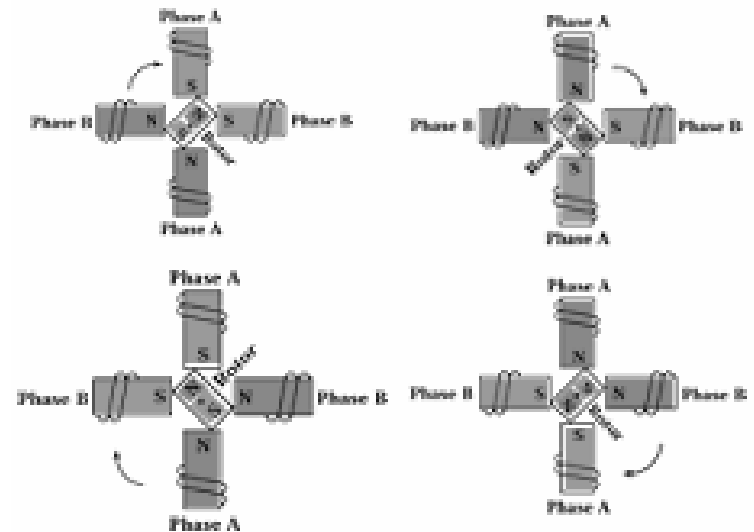
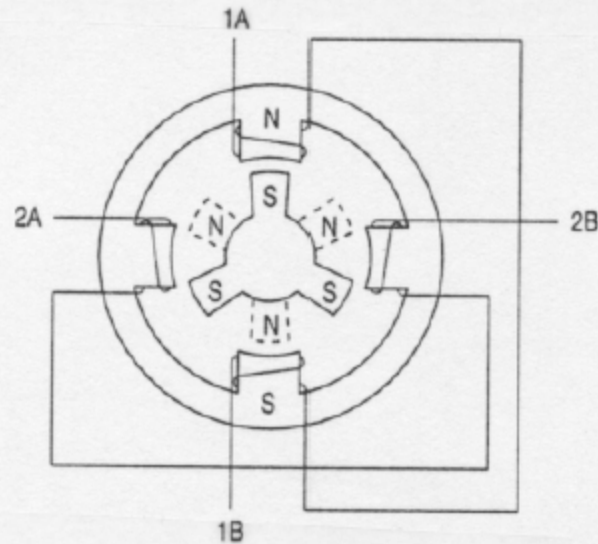


Figure 3. "Two phase on" stepping sequence for two phase motor.



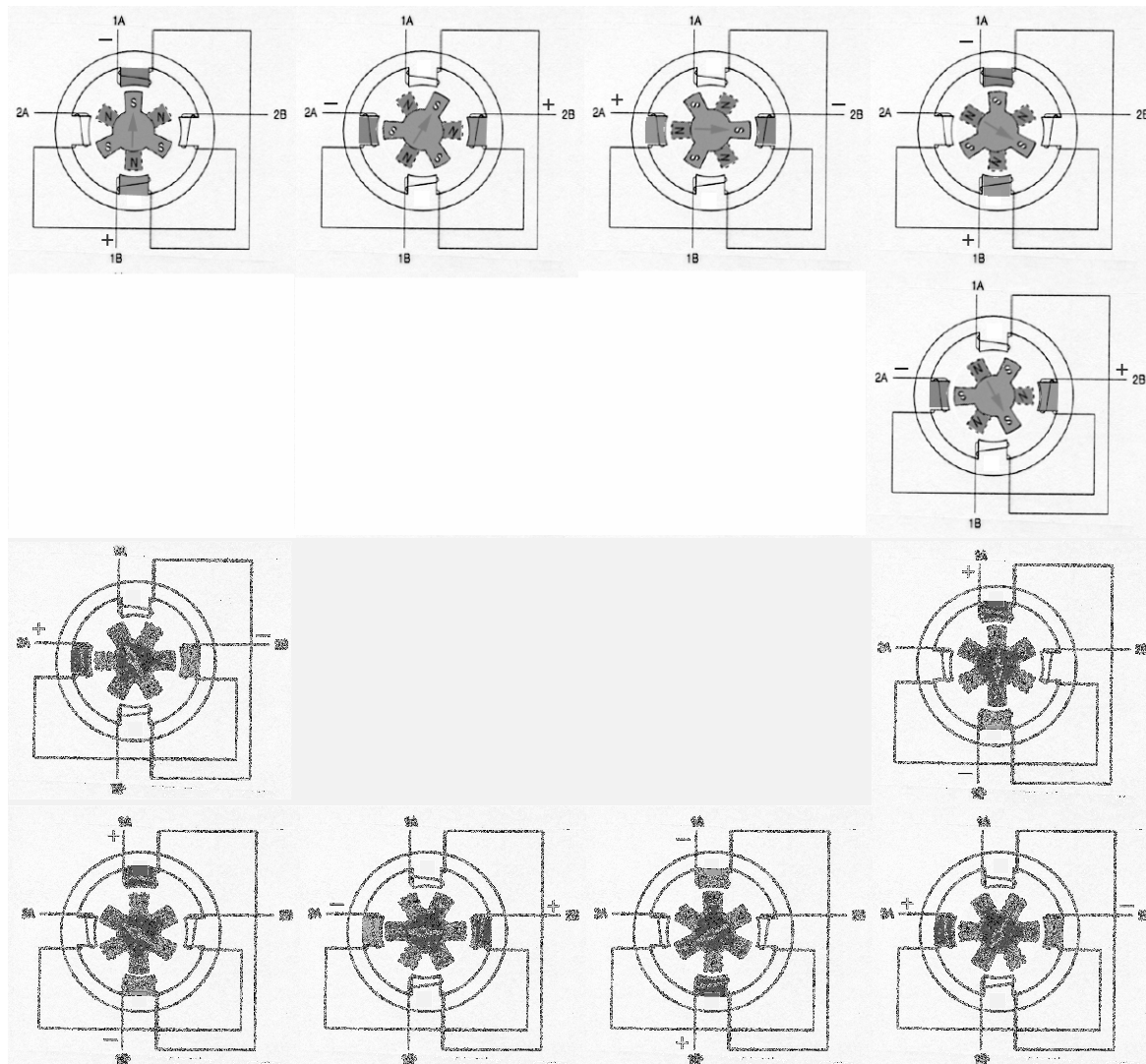
Step Motors

Fig. 1.4 Simple 12 step/rev hybrid motor



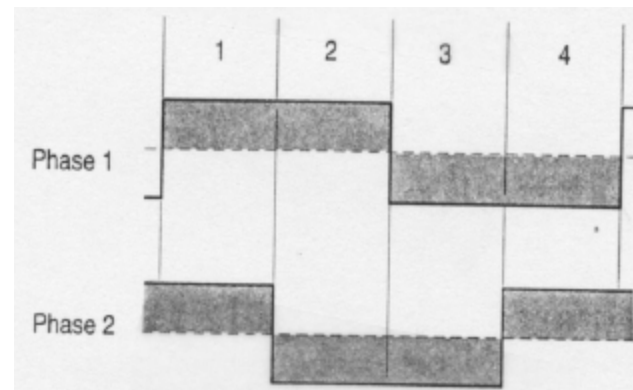
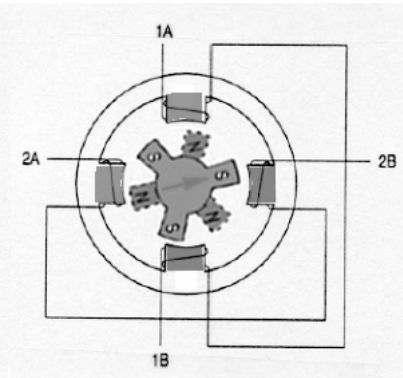
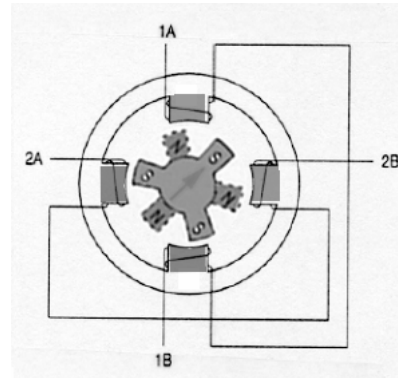
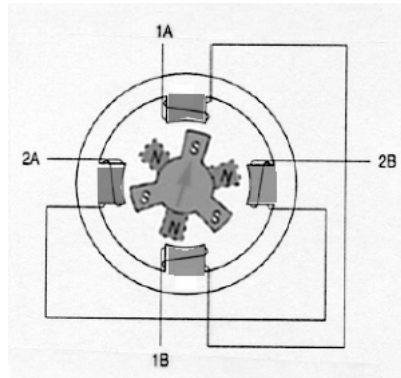
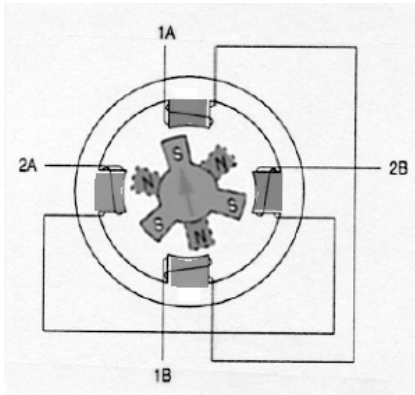
Step Motor

12 step / rev, 1 phase on



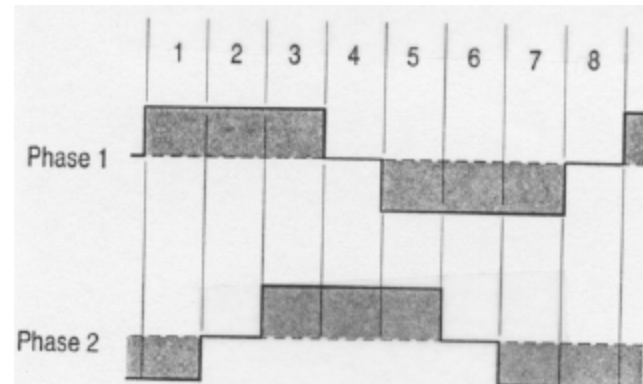
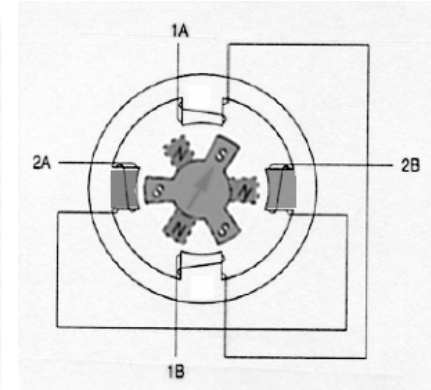
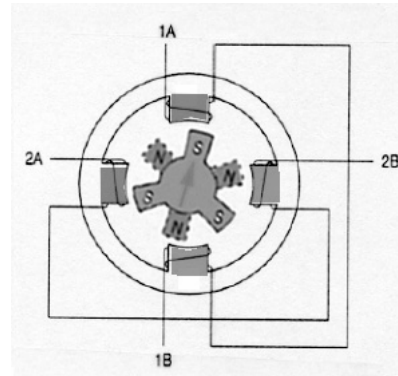
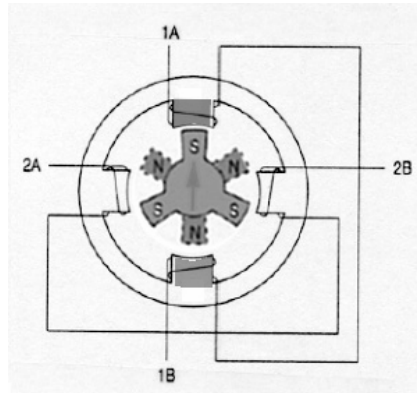
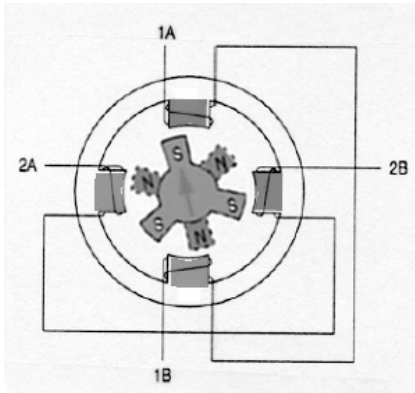
Step Motor

12 step / rev, 2 phase on



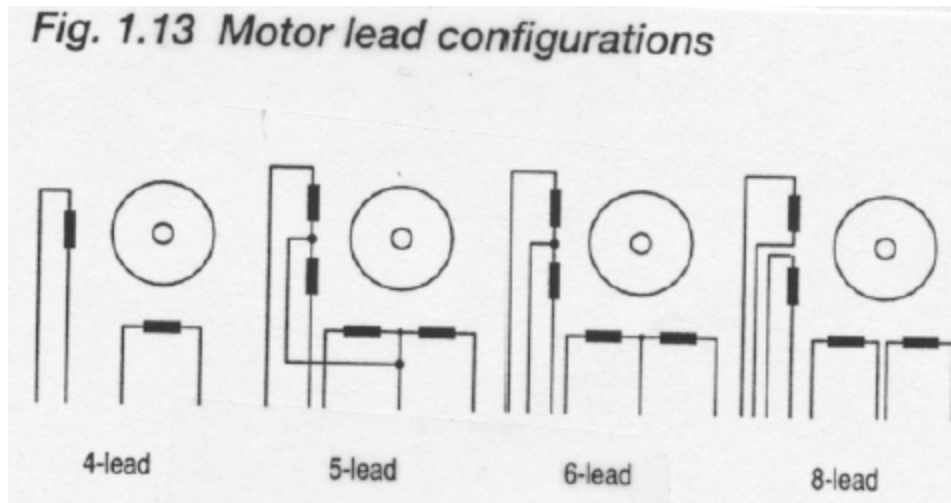
Step Motor

12 step / rev, half-stepping



Step Motors

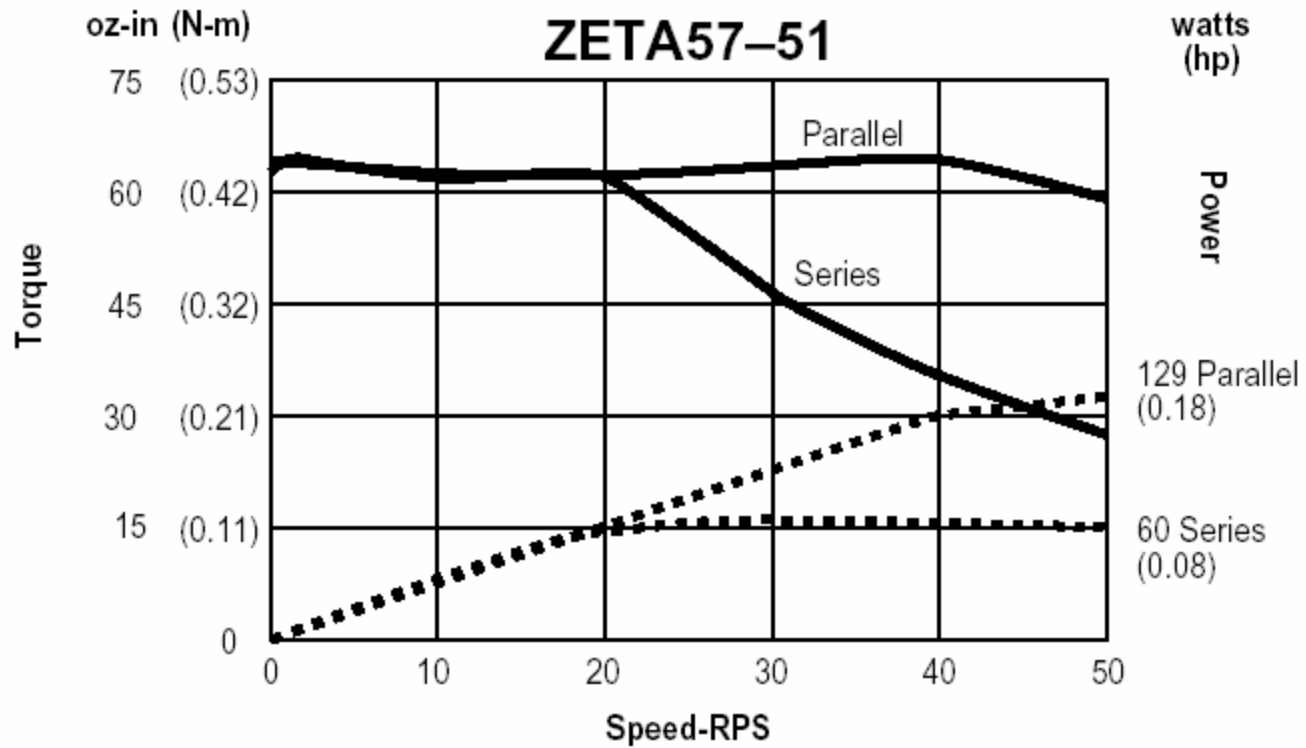
Fig. 1.13 Motor lead configurations



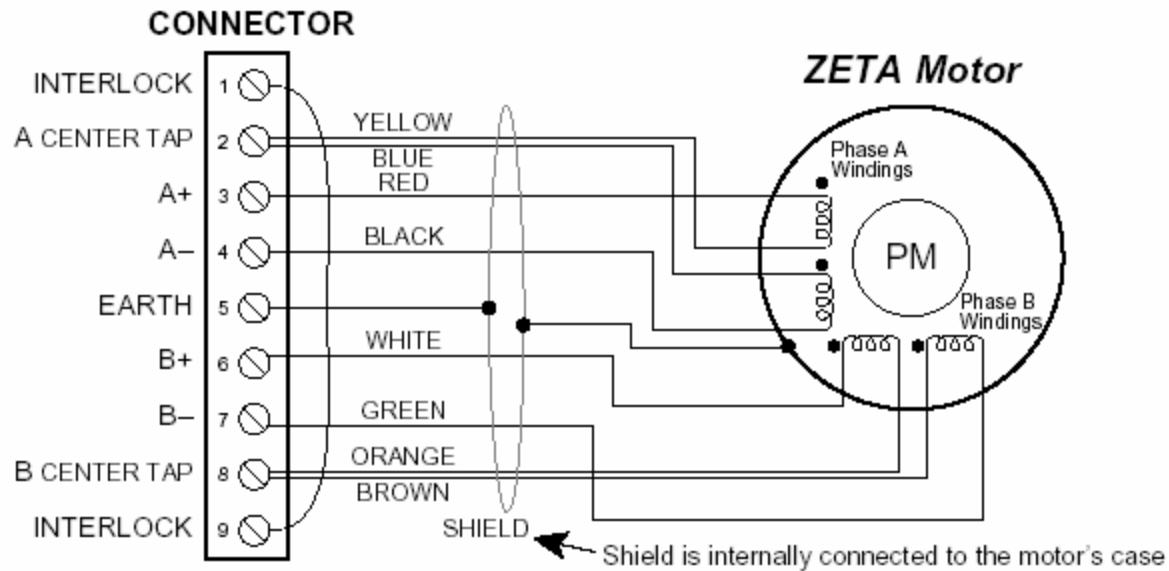
Selecting Step Motors

- Torque
- Speed
- Current
- Lead configuration

Torque / Speed



Series / Parallel Wiring



Step Motor Drives

- Resolution (full, half, microstepping)
- Current Limit (resistor or digital)
- AC powered or DC powered
- Pulse/Direction or Indexing

Resolution

- Full step/Half step
- Microstepping
 - x2,x4,x5,x8,x10,x16,x25,x32,x50,x64,x125,x128,x250,x256 common choices
- Max step frequency
 - PLC: 7kHz pulse rate => 2100 RPM at x1, 8.2RPM at x256 (1.8deg motor)
 - Compumotor 6104: 2MHz pulse rate => 2300RPM at x256
- Resonance problems