	Brushed DC Motor			BLDC	
	Permanent Magnet	**Series Wound Electromagnet**	**Shunt Wound Electromagnet**	**Inrunner**	**Outrunner**
Torque	Moderate	High	Moderate	Moderate	High
Speed	Variable	Variable	Constant	High	Moderate
Phase	Single phase			Three phases	
Commutation	Using carbon brushes			Contactless electric commutation	
Rotor	Current conducting coil			Permanent magnets inside the stator	Permanent magnets outside the stator
Stator	Permanent magnets	Electromagnetic winding		Current carrying windings	
Terminals	Two - positive and negative voltages			Three - one each for each coil	
Mmagnetic Field Generation	Using permanent magnets	Using electromagnets		Using permanent magnets and electromagnets	
Angular Resolution	N/A			N/A	
Motor Complexity	Low			Moderate	
Control Mechanism	Speed controlled by the current through the motor			Energizing the windings in order. Switching frequency determines motor speed	
Control Complexity	Low - can be easily controlled by H bridge driver and PWM control for speed			High - winding energizing order and frequency must be maintained precisely	

<table>
<tr><th></th><th colspan="3">Brushed DC Motor</th><th colspan="2">BLDC</th></tr>
<tr><th></th><th>Permanent Magnet</th><th>Series Wound Electromagnet</th><th>Shunt Wound Electromagnet</th><th>Inrunner</th><th>Outrunner</th></tr>
<tr><td>Use of H-bridge</td><td colspan="3">To change the direction of rotation</td><td colspan="2">To switch between three phases</td></tr>
<tr><td>Driving Mode</td><td colspan="3">N/A</td><td colspan="2">N/A</td></tr>
<tr><td>Cost</td><td colspan="3">Low</td><td colspan="2">High</td></tr>
<tr><td rowspan="2">Advantages</td><td rowspan="2">Easy to control the speed</td><td rowspan="2">High torque</td><td rowspan="2">Self speed regulation</td><td>High speed</td><td>High torque</td></tr>
<tr><td colspan="2">No periodic maintainance</td></tr>
<tr><td rowspan="3">Disadvantages</td><td>Permanent magnets demagnetize with time</td><td rowspan="2">Poor speed regulation</td><td rowspan="2">Difficult to control the speed</td><td colspan="2" rowspan="2">Difficult to control - requires ESCs with high complexity and power</td></tr>
<tr><td>Less torque and speed over time</td></tr>
<tr><td colspan="3">Maintainance due to mechanical commutators</td><td colspan="2">Expensive</td></tr>
<tr><td>Commercialy Available Products</td><td>HANPOSE 775 80ZYT 150W 24V CL-RS380SH</td><td>ZDY113 ECA0-series</td><td>AP231001 by ABB Motor and Mechanical Inc.</td><td>LBA2435</td><td>MTO2830-1300-S</td></tr>
</table>

	Stepper Motor			Servo Motor		
	Permanent Magnet	**Variable Reluctance**	**Hybrid**	**Hobby**	**Winch**	**Industrial**
Torque	High	Low	High	High	High variable	Very High
Speed	Low speeds generally used to maintain the high torque			Low constant	Moderate constant	High constant
Phase	Two phases	Many	Two phases	N/A		DC(1) or AC(1,3) phase
Commutation	Contactless electric commutation			N/A		
Rotor	Set of permenet magnets	Iron disk with teeth	Two magnetized disks with opposite poles			
Stator	Slots with windings					
Terminals	Bipolar - 4 wires Unipolar - 5/6 wires	Depends on number of phases	Bipolar - 4 wires Unipolar - 5/6 wires	Three - two for power and one for signal		Vary with manufacturer
Mmagnetic Field Generation	Using permanent magnets and electromagnets	Using electromagnets	Using permanent magnets and electromagnets	N/A		
Angular Resolution	Low	High		High		Very High
Motor Complexity	Moderate		High	N/A		High
Control Mechanism	Controller energize one or two phases at a time. Rotation is done by alligning the poles	Rotation is done by energizing the poles. Teeth of the iron disk are attracted to them.		Negative feedback loop control with a reference signal	Reference signal	Negative feedback loop control with a reference signal
Control Complexity	High			Low - internal controller circuit included		

	Stepper Motor			Servo Motor		
	Permanent Magnet	**Variable Reluctance**	**Hybrid**	**Hobby**	**Winch**	**Industrial**
Use of H-bridge	To energize windings in	N/A	To energize windings in	Not needed - internal circuit includes a H-bridge		
Driving Mode	Full step(one phase on) mode, Full step(two phase) mode, Half step mode, Micro step mode			N/A		
Cost	High		Very high	Low	Moderate	Very High
Advantages	High torque	Very high angular resolution	High torque and angular resolution	High resolution, easy control, light-weight	Continuous rotation	High precision, high torque, high speed
Disadvantages	Low angular resolution	Very low torque	Larger	Limited rotation angle	Less angular resolution	High cost
			Heavier	Less robust		Heavy
			More expensive	Plastic parts wear quickly		High power dissipation
Commercialy Available Products	NEMA 34 gearbox stepper motor 24BYJ48	Tb6560 SG-PM35	28BYGE112-A-86L 57hs76 3004	SG90	Hitech HS-785HB	RMD-L-9010 (12-30V 150W)