

# Types of Drives

# Drives

- The most important aspect of automation is energy transfer.
- In a motion system, we recognise these drives:

1) Mechanical		<b>3%</b>
2) Fluid	- hydraulic	<b>26%</b>
	- pneumatic	<b>16%</b>
3) Electric		<b>55%</b>
4) Combined		

# Drive requirements

- Maximal speed
  - minimising material handling time
  - 5m/s, 3rad/s ( limit value 8m/s )
- smooth running
- High accuracy,
  - depends on the whole kinematic chain, with feedback, without feedback
- Positional rigidity
- Minimum weight
- Minimum sizes

# Drive characteristics

Property	Mechanical drive	Pneumatic drive	Hydraulic drive	Electric drive
Energy transformation method	mechanical	mechanical	mechanical	mechanical
Possibility of driving	low	average	high	high
Drive efficiency	high	high	high	lower
Performance (power)	low	mean	high	mean
Temperature dependence	∅	high	high	low
Tightness	∅	problem	big problem	∅

# Comparison of drives for linear mechanical motion

Characteristics	Pneumatic	Hydraulic	Electric
<b>Complexity</b>	Simple	Medium	Medium/High
<b>Peak power</b>	High	Very high	High
<b>Size</b>	Low size/force	Very low size/force	Medium size/force
<b>Control</b>	Simple valves	Simple valves	Electronic controller
<b>Position accuracy</b>	Good	Good	Better
<b>Speed</b>	Fast	Slow	Fast
<b>Purchase cost</b>	Low	High	High
<b>Operating cost</b>	Medium	High	Low
<b>Maintenance cost</b>	Low	High	Low
<b>Utilities</b>	Compressor/power/pipes	Pump/power/pipes	Power only
<b>Efficiency</b>	Low	Low	High
<b>Reliability</b>	Excellent	Good	Good
<b>Maintenance</b>	Low	Medium	Medium

Phillips Pat. *Pneumatics for Mechanical Motion*. Tech Briers.

<https://www.techbriefs.com/component/content/article/tb/supplements/md/features/articles/34574>