From the market leader in integrated motion control and the MDrive® platform comes

hybrid motion technology™

IMS
INTELLIGENT MOTION SYSTEMS, INC.

Schneider Electric

Servo and Stepper Technologies

Servo and Stepper — these two motion technologies have been very prominent in the motion control industry for decades. Traditionally, both systems have their advantages and disadvantages when applied to motion applications, including:

Servo technology —
Advantages
1. Capable of supplying peak torque
2. Can deliver significant torque at higher speeds
3. Continuous closed loop

Disadvantages
1. Need for PID tuning
2. Error driven
3. Higher complexity
4. Higher price point
5. Servos have inherent dither -slight shaft oscillations at position
6. Potential instability

Stepper technology —
Advantages
1. High torque at low speed (may eliminate need for gearbox)
2. Shaft stiffness at standstill
3. No tuning
4. Cost effective

Disadvantages
1. Threat of loss of motor synchronization or stall
2. Must size with up to a 50% torque margin
3. Constant torque and current device
4. Excessive heating
5. Resonant zones -dependent on system to which mounted

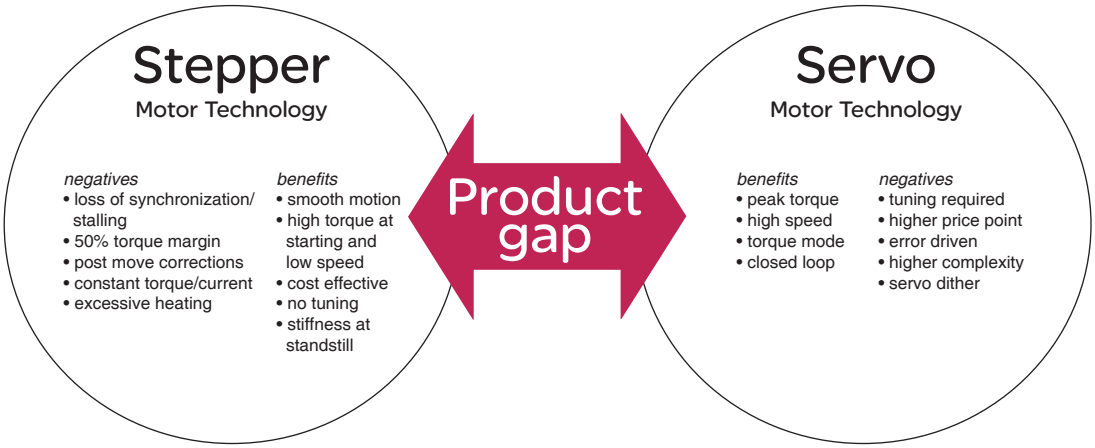
Historically, the advantages and disadvantages of both servo and stepper systems have drawn a rather clear line as to when one or the other is applied. Most design engineers have justifications for a preferred motion platform. Engineers may have used a technology in the past and developed their opinion based on a positive or negative experience. Servo system manufacturers have tried to dominate the motion arena while placing doubts among would-be users of anything other than servo, and they have had a good measure of success.

Many manufacturers abandoned further product development of stepper motor based systems for which Intelligent Motion Systems (IMS), now IMS Schneider Electric Motion USA, has benefited over the last 15 years. This has allowed IMS SEM to gain significant market share and, through a continued commitment to stepper motor control technology, emerge as the innovation market leader with the MDrive® integrated platform of products.

With the introduction of the MDrive integrated platform in 2001, and since having sold over ½ million of these products worldwide, IMS SEM solidified its leadership position in integrated motion control and continues to be recognized as the innovation leader in stepper motor control systems.

Today, IMS SEM continues our commitment to innovation by introducing another new patented motor control technology:
Hybrid Motion Technology™.

The gap between stepper and servo technologies.



Hybrid Technology

IMS SEM recognized a gap between stepper and servo technologies, and addressed this by creating a new motion control technology. This new technology delivers the benefits of both servo and stepper motor technologies, with unique capabilities and enhancements over both.

Because the industry needs a clear definition and way to have deliberate discussion as to its application, this new technology required a name. And, being the innovation leader in stepper motor based control systems, we believe we have the inertia within the industry to coin the term for this new category of motion control.

So we recommend this new technology be referred to generically as "**hybrid",** within the context of motion control, as the best intuitive reference.

So, now we have:

- Stepper
- Servo
- Hybrid

And IMS SEM has trademarked our version of this new motion control category:

- Hybrid Motion Technology™

As you can see in the figure below, Hybrid Motion Technology™ not only eliminates many drawbacks of stepper and servo systems, it introduces benefits.

These benefits include:

- Variable current/torque
- Real time control
- Optimum torque at all speeds
- Stiffness as standstill
- No tuning
- Cost effective

Hybrid Motion Technology™ also greatly expands the application range of stepper based motion control to include:

- Web tensioning
- Clamping
- Roll feeders
- Force applications
  – *requiring torque mode*

- Conveyors
- Rotary knife
- Pick and place
  – *unaffected by tansient loading*

What does Hybrid Motion Technology™ mean to the design engineer?

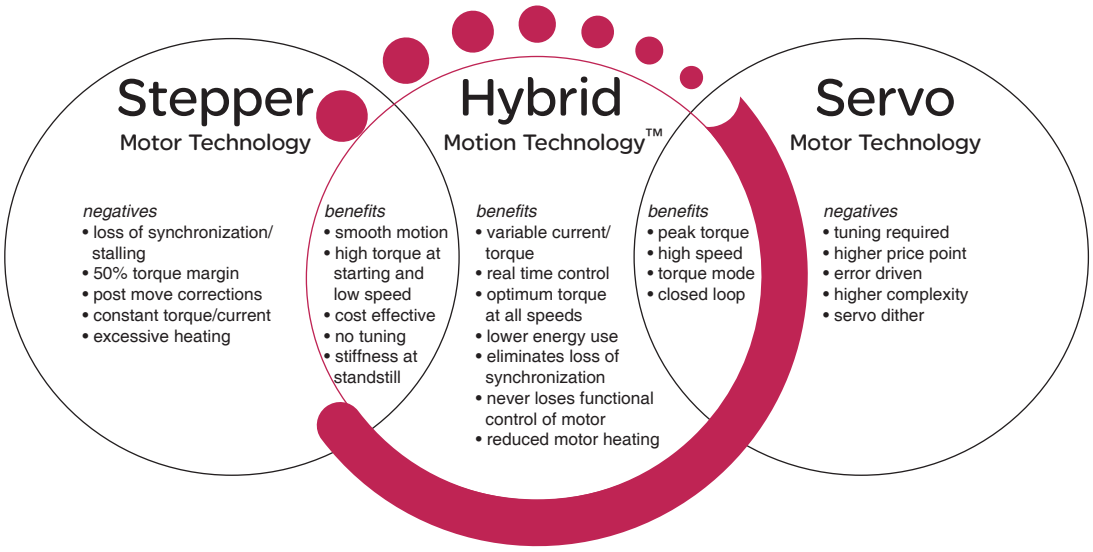
1. A compelling alternative for demanding motion applications
2. Reduced system cost
3. Reduced complexity

For

2+ years

Hybrid Motion Technology™ has been solving demanding applications for customers.

Hybrid Motion Technology™ more than fills the gap between servo and stepper motor technologies.



Motion systems with Hybrid Motion Technology™

MDrive® motor+driver with Hybrid Motion Technology™

low cost

integrated solutions where brushless motion is required

Environmentally friendly

energy saving

variable current control feature reduces electrical power consumption

Hybrid Motion Technology™

changing the rules

of motor control preventing the loss of synchronization due to transient or continued overload, extreme acceleration or deceleration, or excessive slew speed when applied to stepper motors

MDrive®Hybrid with Hybrid Motion Technology™

Hybrid Motion Technology™ is available in industry leading MDrive® motor+driver products. These integrated motion systems solve many servo applications with a compact, low cost stepper solution.

MDrive Hybrid motion systems combine a flexible operating environment and long list of features, offering clear advantages in a cost effective package for a wide range of motion control applications such as: web tensioning, conveyors, bottle capping, medical automation, clamping, feeders, cut-to-length, package sorter, pick and place, and form, fill and seal.

MDrive Hybrid motion systems are available in NEMA motor sizes 17, 23 and 34. System versions include:

Step • Torque • Speed

A stepper motor integrated with microstepping drive and internal encoder features three (3) HMT operating modes – Step, Torque and Speed. Programming is via a GUI provided.

Motion Control

A fully programmable motion controller integrated with a stepper motor, microstepping drive and internal encoder. MDrive Hybrid Motion Control systems communicate via RS-422/485 or Ethernet. CANopen products are also available.

hybrid motion technology™

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