SERVOTRONIX
always in motion™

stepIM

Integrated Closed-Loop Stepper Motors

With a superior closed loop control and a cost-effective design, the integrated stepper motors provide an efficient and economical solution for applications that require the performance of a servo at the price level of a stepper.

Closed loop commutation enabling highly dynamic performance

The stepIM significantly enhances the performance of the stepper motors, when compared to conventional open loop control. The integrated electronics control the stepper motor as a two phase BLDC motor, implementing position loop, velocity loop, DQ current control, as well as additional algorithms. Closed loop commutation, by means of an absolute single-turn encoder, ensures optimal torque utilization at any speed.

Optimal cost-performance ratio for applications that require servo-like performance

- High torque/ low speed – eliminating the need for a gear
- High speed in low torque ranges
- The stepIM can function as distributed I/O points - reducing machine complexity

Benefits of closed loop vs. open loop operation

	Closed loop	Open loop
No step loss	Encoder feedback with closed loop control guarantees accurate motion	Abrupt changes in load may cause lost steps, creating a position error
High dynamics	Load dependent current control Optimal torque utilization for any speed and any load Eliminating the effect of mid-band resonance	Constant current control at all speed ranges without considering load variations
Torque & force control modes of operation	Supported	Not supported
Maximum torque utilization	Utilizing 100% of the full range of rated motor torque	Practical limitation of about 50% of rated motor torque due to risk of synchronization loss
Low noise & vibration	Silent operation due to reduced stepping vibration and low speed resonance	Stepping vibration and high speed resonance cause noisy operation
Energy efficiency	Provides current based on actual load. This reduces heating of the motor and saves energy	Maximum current is applied irrespective of required torque, leading to high losses and respective heating of the motor and drive

Key benefits

- Sophisticated closed loop control enhances motor performance with no step loss
- Operates in torque, velocity, and position modes
- Efficient torque utilization optimizes motor sizing
- Integrated design minimizes component and wiring requirements
- Reduced space, installation efforts and system cost
- Fieldbus: CANopen DS402, EtherCAT
- Synchronized control of coordinated motion profiles
- Reduced machine complexity, as stepIM can function as distributed I/O points
- Up to IP65 protection class
- Maintenance free
- CE compliance

Complete Motion Solution

softMI
Human Machine Interface

softTP Tablet
Teach Pendant

softMC
Multi Axis Motion Controllers

Integrated components reduce cost, space and machine complexity

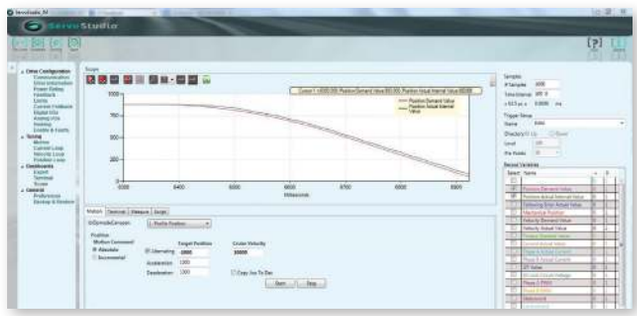
In decentralized architectures, wiring and assembly time can be reduced thus enabling significant cost savings for machine builders. Decentralized drives that integrate motor, control and power electronics also free up space and reduce heating in the cabinet. Machine complexity is reduced as fewer components and a smaller cabinet are used.

High resolution magnetic encoder increases system efficiency

With a 12 bit absolute encoder 4096 count per revolution and an update rate of 16 kHz, the stepIM precisely controls the magnetic flux generated based on actual load, ensuring accurate positioning and maximum machine efficiency.

ServoStudio™ for simple commissioning

- Step-by-step guidance through the setup and tuning process
- Real-time data recording and plotting
- Easy integration of servo axes
- Plug-and-play motor and feedback wiring



Rating and dimensions

Model	IP ratings	Com.	Input voltage (VDC)	Holding Torque (Nm)	Inertia (g*cm²)	Weight (kg)	Frame size (mm)	Motor length w/o shaft (mm)
17 Short	20	CANopen	14-48	0.35	57	0.37	42.3	75.3
17 Medium	20	CANopen	14-48	0.45	82	0.44	42.3	83.8
17 Long	20	CANopen	14-48	0.65	123	0.59	42.3	97.8
23 Short	20, 65	CANopen	14-48	1.1	260	0.6	56.4	86.4, 91.4
23 Medium	20, 65	CANopen	14-48	1.8	460	1.0	56.4	108.4, 112.4
23 Long	20, 65	CANopen	14-48	2.6	750	1.5	56.4	145.4, 148.4
23 Short	65	EtherCAT	14-60	1.1	260	0.88	56.4	91
23 Medium	65	EtherCAT	14-60	1.8	460	1.22	56.4	112
23 Long	65	EtherCAT	14-60	2.6	750	1.90	56.4	148
34 Medium	20	CANopen	14-48	3.5	1850	2.7	86.5	133.9
34 Long	20	CANopen	14-48	5.5	2750	3.8	86.5	163.4
34 Medium	65	CANopen/EtherCAT	14-75	5	1850	3.30	86.5	135.5
34 Long	65	CANopen/EtherCAT	14-75	7.7	2750	4.50	86.5	165

Ordering information:

	IS T - 23M 1 2 CO 1 0 0
	Integrated Stepper Motor
	Type
T	High torque
	Frame Size and Length
17S	NEMA 17 Short
17M	NEMA 17 Medium
17L	NEMA 17 Long
23S	NEMA 23 Short
23M	NEMA 23 Medium
23L	NEMA 23 Long
34M	NEMA 34 Medium
34L	NEMA 34 Long
	Shaft
1	Single flat (NEMA 17, NEMA 23)
2	Double flat (NEMA 34)
3	Keyway
4	Full round
	Connector and Degree of Protection
2	Crimp connectors, IP20
6	M-connectors, IP65 (NEMA 23, NEMA 34 only)
	Communication
CO	CANopen
EC	EtherCAT
	Feedback
1	Standard – 12-bit absolute single turn
	Brake
0	No brake
1	With brake (NEMA 23, NEMA 34 only)
	Options*
0	Standard: NEMA 17, 14–48V, 1.8A NEMA 23, 14–48V, 4.5A NEMA 34, 14–75V, 7A
1	NEMA 34, 14–48V, 4.5A (IP20 only)
3	Including gearbox 1:3 (NEMA 23, NEMA 34)
5	Including gearbox 1:5 (NEMA 17, NEMA 23, NEMA 34)
7	Including gearbox 1:7 (NEMA 17, NEMA 23, NEMA 34)
8	Including gearbox 1:10 (NEMA 23)
9	Including gearbox 1:15 (NEMA 34)

* Additional options available per request

I/Os:

Digital (IP20): 4 x Input, 2 x output
Digital (IP65): 3 x Input, 1 x output
Analog 1 x Differential Input

Motor feedback:

12 bit absolute encoder

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www.servotronix.com

For specification and manuals, go to
http://servotronix.com/products/stepim-integrated-closed-loop-steppers