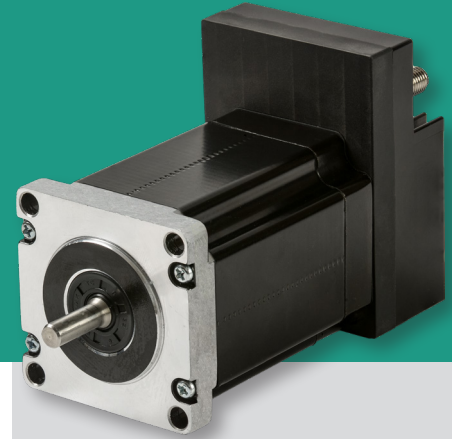


# stepIM

## 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
<b>No step loss</b>	Encoder feedback with closed loop control guarantees accurate motion	Abrupt changes in load may cause lost steps, creating a position error
<b>High dynamics</b>	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
<b>Torque &amp; force control modes of operation</b>	Supported	Not supported
<b>Maximum torque utilization</b>	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
<b>Low noise &amp; vibration</b>	Silent operation due to reduced stepping vibration and low speed resonance	Stepping vibration and high speed resonance cause noisy operation
<b>Energy efficiency</b>	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  
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

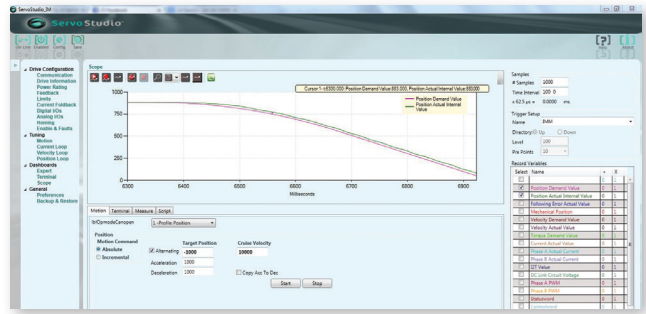
With a 12 bit absolute encoder 4096 count per revolution and an update rate of 16 kHz, the stepIM precisely controls the magnetic flux generated based on actual load, ensuring accurate positioning and maximum machine efficiency.

## Rating and dimensions

Model	IP ratings	Com.	Input voltage (VDC)	Holding Torque (Nm)	Inertia (g*cm <sup>2</sup> )	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

## 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



## 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									
2 Double flat									
3 Keyway									
4 Full									
Connector and Degree of Protection									
2 Crimp connectors, IP20									
6 M-connectors, IP65 (Frame size 23; 34 only)									
Communication									
CO CANopen									
EC EtherCAT									
Feedback									
1 Standard – 12-bit absolute single turn									
0 Without brake									
Options									
Standard:									
0 Frame size 17, 14-48V, 1.8A									
Frame size 23, 14-48V, 4.5A									
Frame size 34, 14-75V, 7A									
1 Frame size 34, 14-48V, 4.5A (IP20 only)									

## 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

### Available Part Numbers

NEMA17 CANopen	NEMA23 CANopen	NEMA23 EtherCAT	NEMA34 CANopen	NEMA34 EtherCAT
IST-17S12CO10-0	IST-23S12CO10-0	IST-23S16EC10-0	IST-34M22CO10-1	IST-34M26EC10-0
IST-17M12CO10-0	IST-23M12CO10-0	IST-23M16EC10-0	IST-34L22CO10-1	IST-34L26EC10-0
IST-17L12CO10-0	IST-23L12CO10-0	IST-23L16EC10-0	IST-34M26CO10-0	
	IST-23S16CO10-0		IST-34L26CO10-0	
	IST-23M16CO10-0			
	IST-23L16CO10-0			

