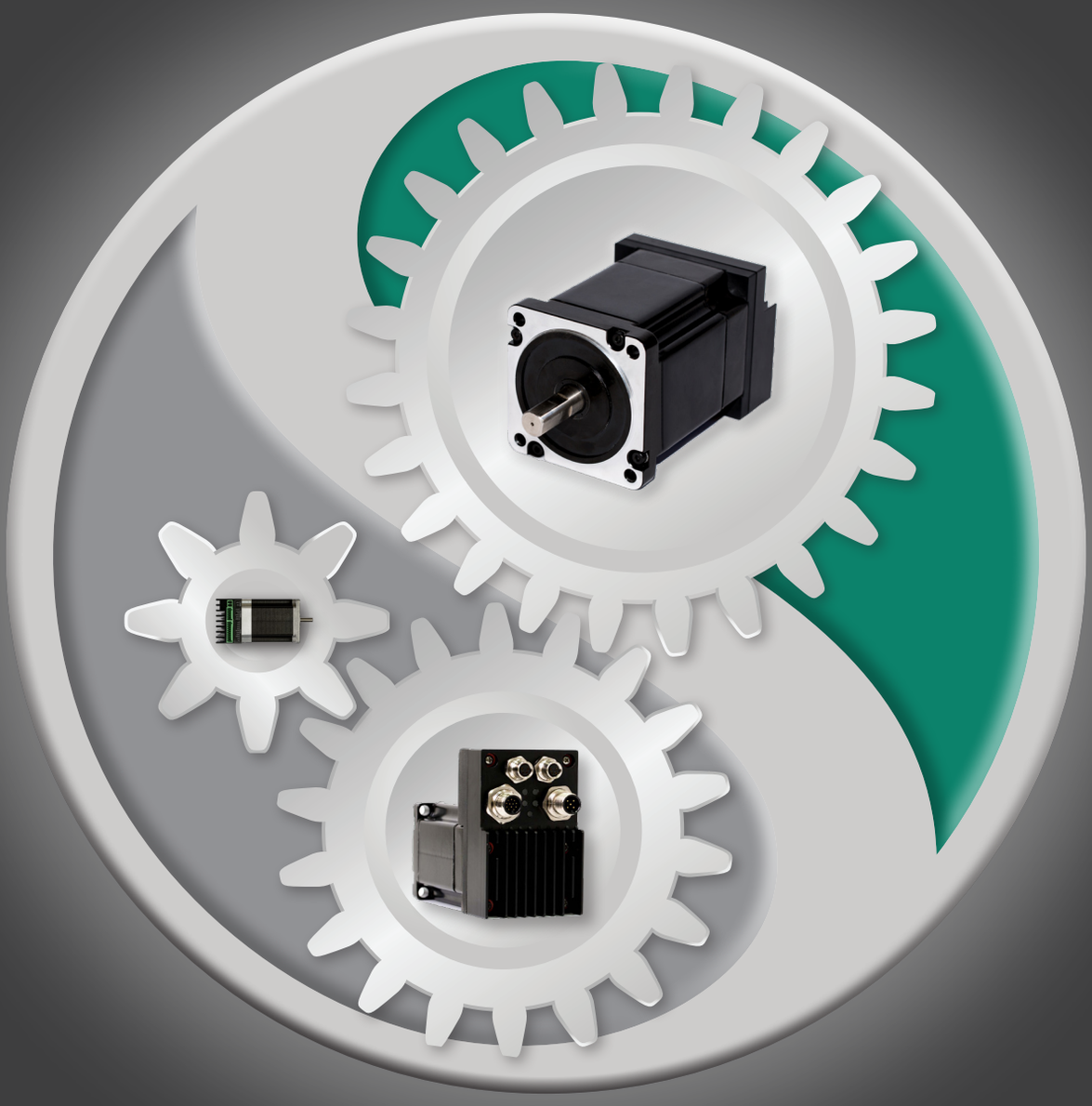
stepIM

INTEGRATED CLOSED-LOOP STEPPER MOTORS

GROSCHOPP

DRIVES & MORE

Performance of a servo at the price of a stepper



INTEGRATED CLOSED-LOOP STEPPER

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

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.

FEATURES AND BENEFITS

Sophisticated closed loop control enhances motor performance with no step loss
Integrated design minimizes component and wiring requirements
Reduced space, installation efforts and system cost
Efficient torque utilization optimizes motor sizing
Reduced machine complexity, as stepIM can function as distributed I/O points
Synchronized control of coordinated motion profiles
Operates in torque, velocity, and position modes
Fieldbus: CANopen DS402, EtherCAT
Absolute 12bit magentic encoder
Up to IP65 protection class
CE compliance, UL* certified

Customization options
Mechanical modifications
Communication protocols
Varions ratings and connectors
Software & Hardware features adaptions

*pending

RoHS REACh CE UL

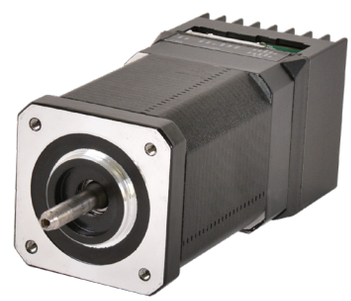
GROSCHOPP DRIVES & MORE

NEMA 17, IP20, CANopen

NEMA 17 CANopen Short

NEMA 17 CANopen Medium

NEMA 17 CANopen Long

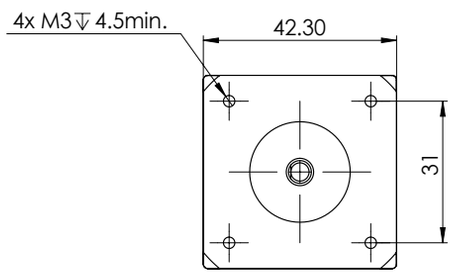


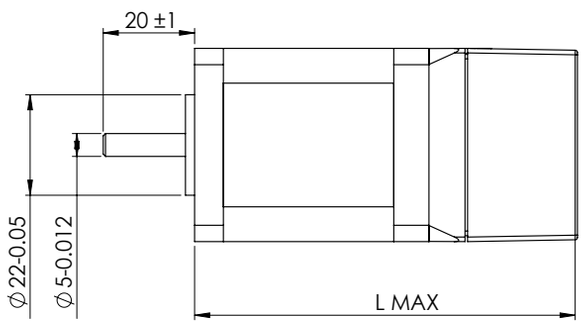
RATINGS AND SPECIFICATIONS

NEMA size		17S	17M	17L
Protection class		IP20		
Input Power, Nominal (±10%)	VDC	14–48	14–48	14–48
Auxiliary Input Power, Nominal (±10%)	VDC	6–24	6–24	6–24
Auxiliary Input Power, Maximum	W	1	1	1
Detent Torque	mNm	15	25	25
Thrust Load Limit	kg	0.28	0.36	0.6
Overhung Load Limit (from shaft end)	N	20	20	20
Rotor Inertia	$g \cdot cm^2$	57	82	123
Holding torque at continuous current	Nm	0.35	0.45	0.65
Holding torque at peak current	Nm	0.5	0.6	1.05
Continuous Output Current	A	1.8	1.8	1.8
Peak Output Current (application dependent)	A	3.5	3.5	3.5
Circuit Loss	W	6	6	6
Weight	kg	0.37	0.44	0.59
Connection Hardware Screw Size/Torque	Nm	0.63	0.63	0.63
Under-Voltage Trip, Nominal	VDC	Logic		
Over-Voltage Trip	VDC	Logic		

DIMENSIONS

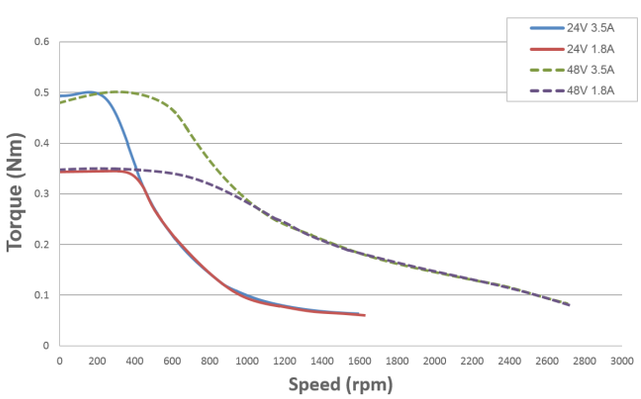
Model	L MAX (mm)
17S	75.7
17M	84.2
17L	98.2



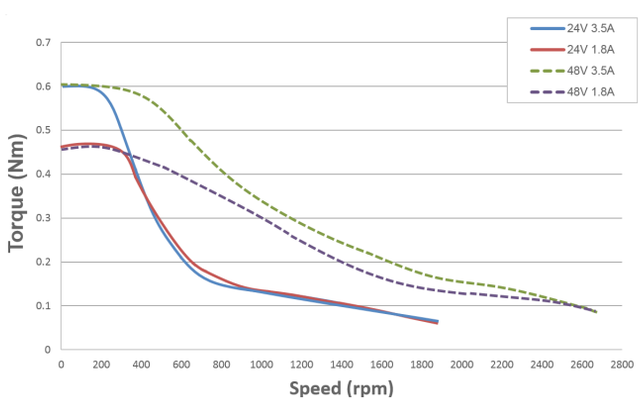


TORQUE AND SPEED CHARTS

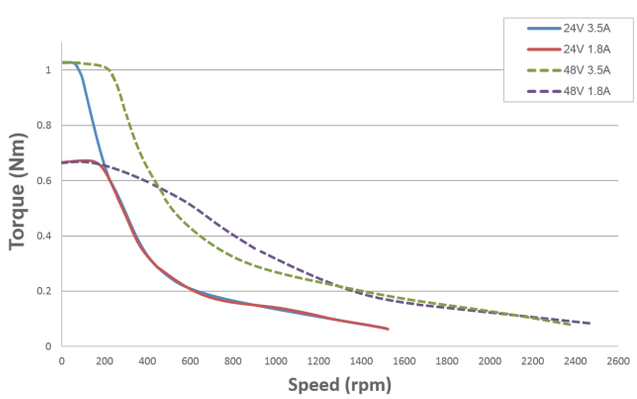
NEMA 17 CANopen Short



NEMA 17 CANopen Medium

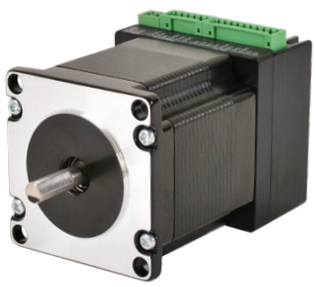


NEMA 17 CANopen Long



NEMA 23, IP20 / IP65, CANopen / EtherCAT

NEMA 23 IP20 CANopen



NEMA 23 IP65 CANopen

NEMA 23 IP65 EtherCAT

RATINGS AND SPECIFICATIONS

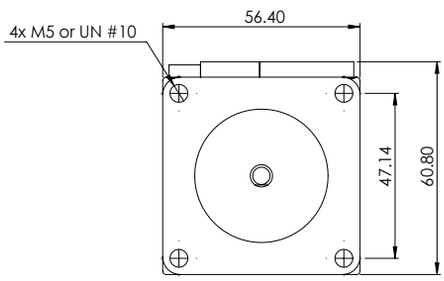
NEMA size		23S	23M	23L	23S	23M	23L
Protection class		IP20			IP65		
Input Power, Nominal (±10%)	VDC	14–48	14–48	14–48	14–48*	14–48*	14–48*
Auxiliary Input Power, Nominal (±10%)	VDC	6–24	6–24	6–24	6–24	6–24	6–24
Auxiliary Input Power, Maximum	W	1	1	1	1	1	1
Detent Torque	mNm	40	70	120	40	70	120
Thrust Load Limit	kg	0.6	1.0	1.5	0.6	1.0	1.5
Overhung Load Limit (from shaft end)	N	50	50	50	50	50	50
Rotor Inertia	$g{\cdot}cm^2$	260	460	750	260	460	750
Holding torque at continuous current	Nm	1.1	1.8	2.6	1.1	1.8	2.6
Holding torque at peak current	Nm	1.3	2.1	3.25	1.3	2.1	3.25
Continuous Output Current	A	4.5	4.5	4.5	4.5	4.5	4.5
Peak Output Current (application dependent)	A	6.5	6.5	6.5	6.5	6.5	6.5
Circuit Loss	W	6	6	6	6	6	6
Weight	kg	0.80	1.13	1.75	0.84	1.18	1.83
Connection Hardware Screw Size/Torque	Nm	3	3	3	3	3	3
Under-Voltage Trip, Nominal	VDC	Logic					
Over-Voltage Trip	VDC	Logic					

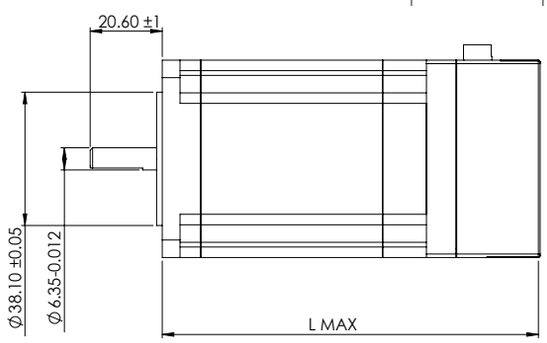
*EtherCAT model: 14 - 60 VDC

DIMENSIONS

NEMA 23 IP20 CANopen

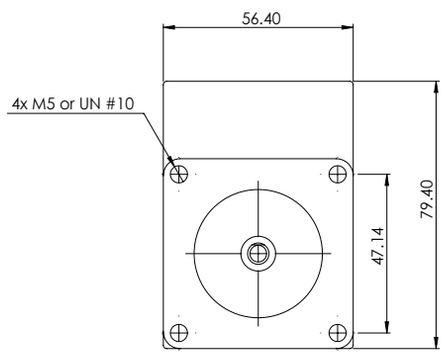
Model	L MAX (mm)
23S	86.4
23M	108.4
23L	145.4

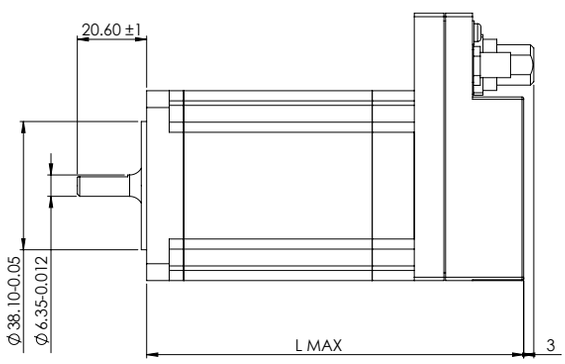




NEMA 23 IP65 CANopen

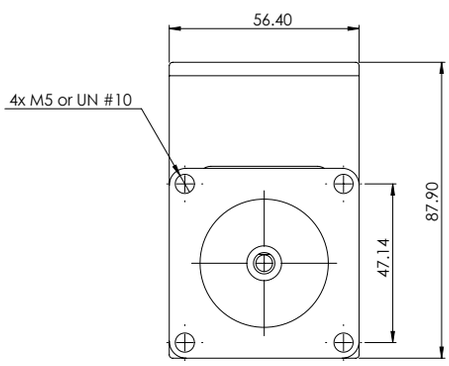
Model	L MAX (mm)
23S	91.4
23M	112.4
23L	148.4

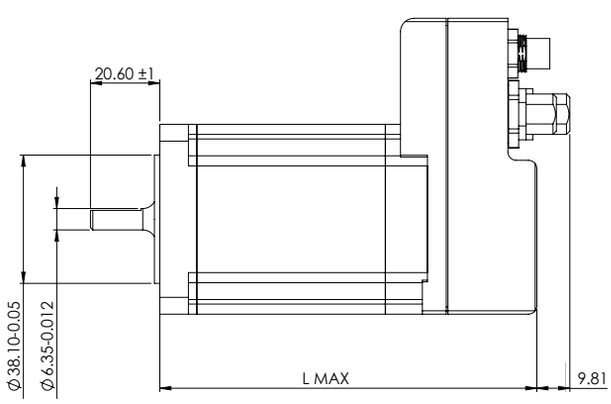




NEMA 23 IP65 EtherCAT

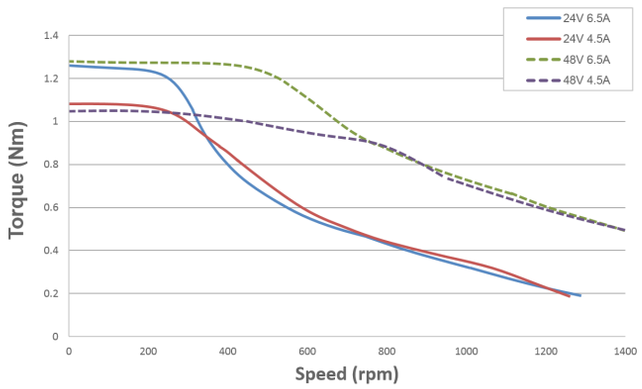
Model	L MAX (mm)
23S	91.4
23M	112.4
23L	148.4



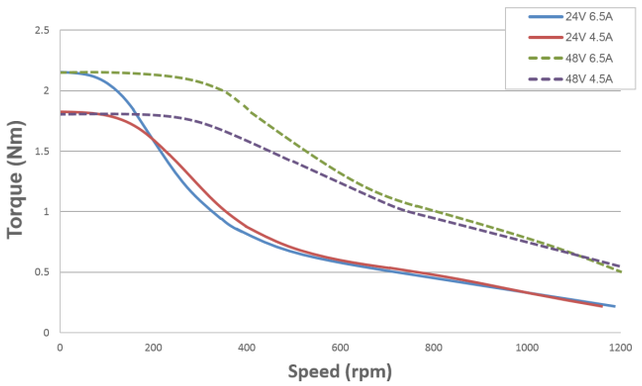


TORQUE AND SPEED CHARTS

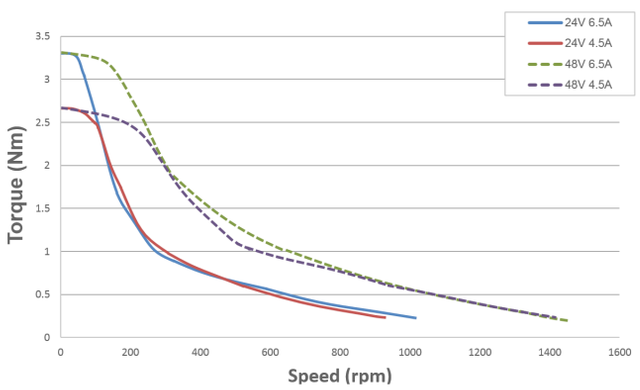
NEMA 23 Short



NEMA 23 Medium

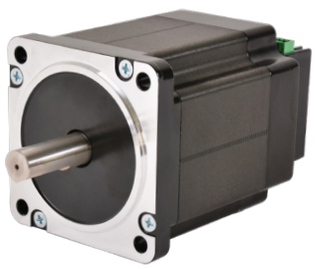


NEMA 23 Long

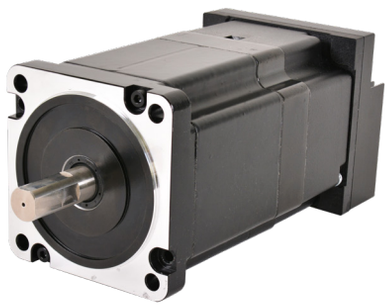


NEMA 34, IP20 / IP65, CANopen / EtherCAT

NEMA 34 IP20 CANopen



NEMA 34 IP65 EtherCAT



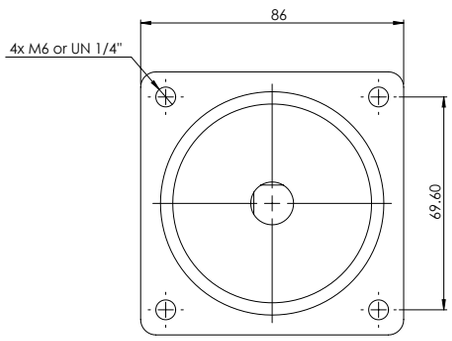
RATINGS AND SPECIFICATIONS

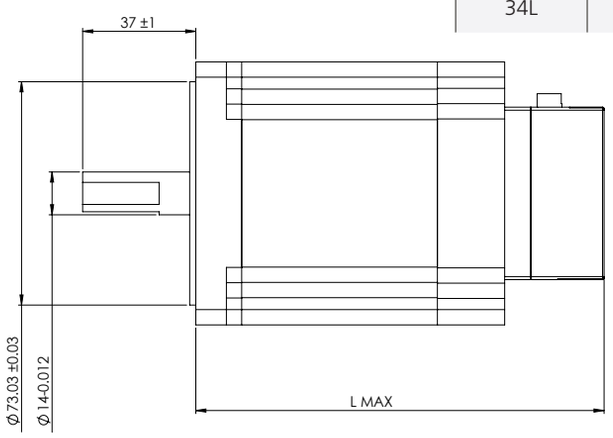
NEMA size		34M	34L	34M	34L
Protection class		IP20		IP65	
Input Power, Nominal (±10%)	VDC	14–48	14–48	14–75	14–75
Auxiliary Input Power, Nominal (±10%)	VDC	6–24	6–24	6–24	6–24
Auxiliary Input Power, Maximum	W	1	1	1	1
Detent Torque	mNm	250	350	250	350
Thrust Load Limit	kg	2.7	3.8	2.7	3.8
Overhung Load Limit (from shaft end)	N	260	260	260	260
Rotor Inertia	$g{\cdot}cm^2$	1850	2750	1850	2750
Holding torque at continuous current	Nm	3.5	5.5	5	7.7
Holding torque at peak current	Nm	4.5	7	6.3	9
Continuous Output Current	A	4.5	4.5	7	7
Peak Output Current (application dependent)	A	6.5	6.5	11.5	11.5
Circuit Loss	W	6	6	6	6
Weight	kg	3.05	4.30	3.30	4.50
Connection Hardware Screw Size/Torque	Nm	5.2	5.2	5.2	5.2
Under-Voltage Trip, Nominal	VDC	Logic			
Over-Voltage Trip	VDC	Logic			

DIMENSIONS

NEMA 34 IP20 CANopen

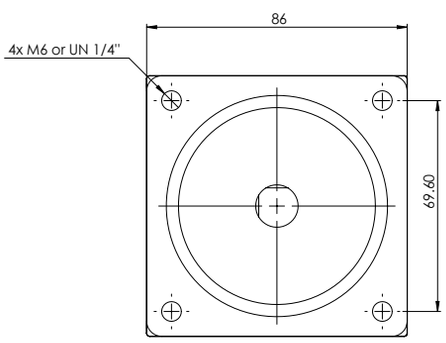
Model	L MAX (mm)
34M	133.9
34L	163.4

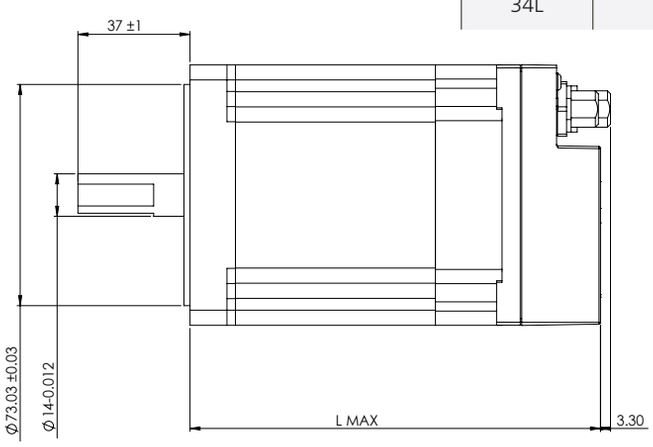




NEMA 34 IP65 CANopen

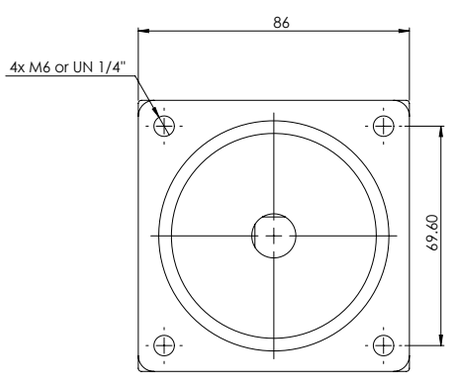
Model	L MAX (mm)
34M	136.9
34L	166.4

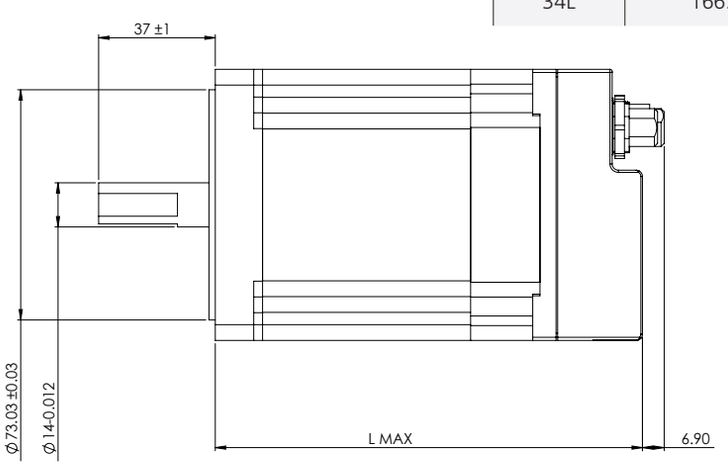




NEMA 34 IP65 EtherCAT

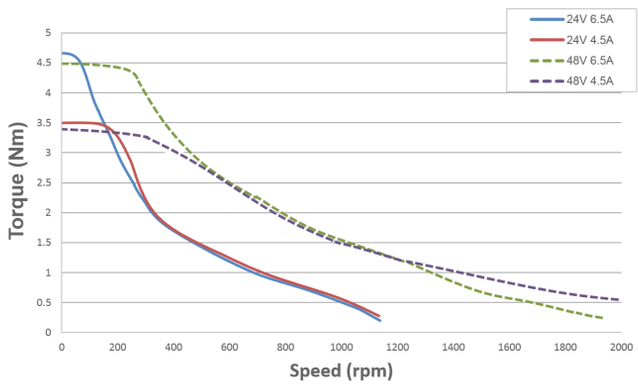
Model	L MAX (mm)
34M	136.9
34L	166.4



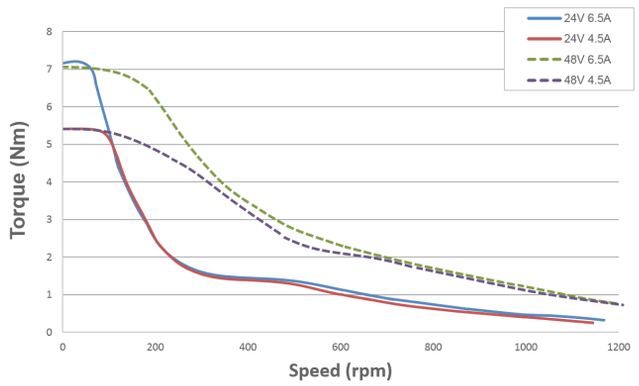


TORQUE AND SPEED CHARTS

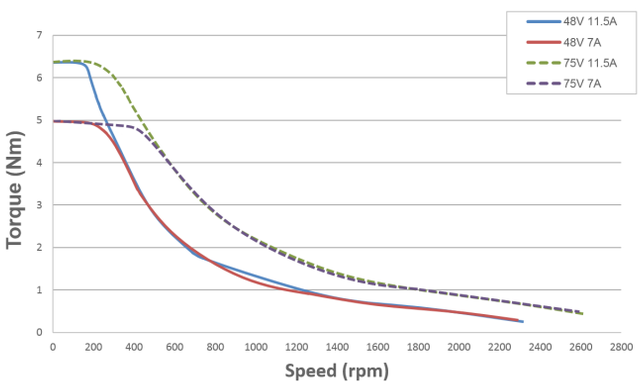
NEMA34 IP20 Medium



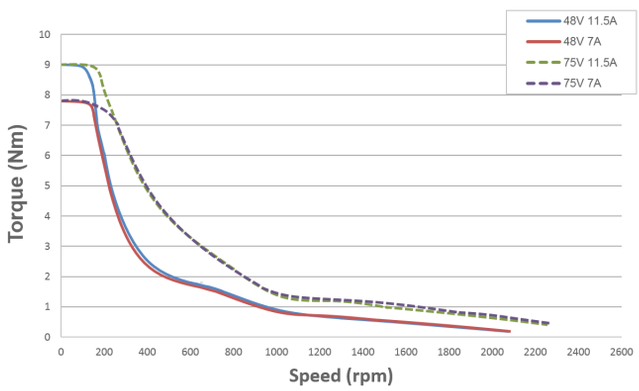
NEMA34 IP20 Long



NEMA34 IP65 Medium



NEMA34 IP65 Long



Control

Feature	Specification	
Operation Modes	Selectable	Profile position, Velocity, Profile velocity, Profile torque, Homing, Cyclic synchronous position
Display		LEDs
Software Tools	User Interface	ServoStudio, Windows-based
	Functions	Connection settings, Drive info, Power info, I/O configuration, Motion settings and tuning, Fault history/display
Rotary Units	Position	Counts
	Velocity	rpm/100
	Acc/Dec	rpm/100/s

Communication

Feature	Specification
CANopen	CANopen – CiA 301 application layer and CiA 402 device profile for drives and motion control. Baud rate 10 kbps – 1 Mbps CAN ID 1 – 126 (Default 101) Heartbeat producer, SDO, PDO (dynamic mapping)
EtherCAT	CANopen – CiA 301 application layer and CiA 402 device profile for drives and motion control. Communication cycle time: up to 250 µs

Protection and Environment

Feature	Specification
Protective Functions	I^2T limit, Over-voltage, Under-voltage, Drive over-temperature, Over-speed, Velocity error, Position error, Magnet missing, Power stage fault, PLL lock lost, Position command error, Acceleration / deceleration violation
Standards	IP20 CE, IP65 CE
	UL Pending
Environment	Ambient temperature: Operation 0 – 40°C, Storage 0 – 70°C Heat sink max. temperature: 100°C Motor max. temperature: 120°C
	Humidity: 10 – 90%
	Altitude: If in accordance with specified clearances, per IEC 61800-5-1, the stepIM is rated for use at altitudes up to 2000m
	Vibration: under review
Operating Conditions	Protection class: IP20 or IP65 Pollution degree: 2 as per IEC 60664-1 Do not use where the following are present: corrosive gases, flammable gases, water, oil, chemicals, dust (including iron dust and salts)
Configuration	Flange mounting

Inputs/Outputs

Feature	Specification	
1x Analog Input	Signal	Analog ±10 VDC differential
	Functions	User define
	Input Resolution	12 bit
	Input Impedance	94 kΩ
	Bandwidth (-3 db)	8 KHz
4x Digital Input Exception: 3x Digital Input on NEMA 23 IP65 CANopen	Signal	Configurable opto-isolated. User defined compatibility with sinking or sourcing input. Exception: sinking input only on NEMA 17.
	Functions	Homing, limit switch, remote enable, start motion command for profiled position operation mode
	Voltage High Level Input	30 V
	Min. High Level Input	11 V
	Max. Low Level Input	5 V
	Input Resistance	2.2 kΩ Except: 24 kΩ NEMA17 IP20
	Max. Input Frequency	1 kHz
	Isolation Voltage	2500 Vrms
	Max. Input Current	According to max. voltage level, input current is not limited, drive limits the input current
	Propagation Delay Time	1 ms
2x Digital Output Exception: 1x Digital Output on NEMA 23 IP65 CANopen	Signal	Configurable open collector. User defined compatibility with opto-isolated sinking output or sourcing output.
	Functions	Motor speed set, Current, Motor speed set clear, Regen resistor control, Motion completed, In position, Zero speed, Software position limit switch, Active, Selectable.
	Voltage	30 V
	Max. Current	500 mA
	Min. Load Resistance	60 Ω
	Output Voltage	0.25 V
	Min. Propagation Delay Time	1 ms (may be longer if load current is lower)

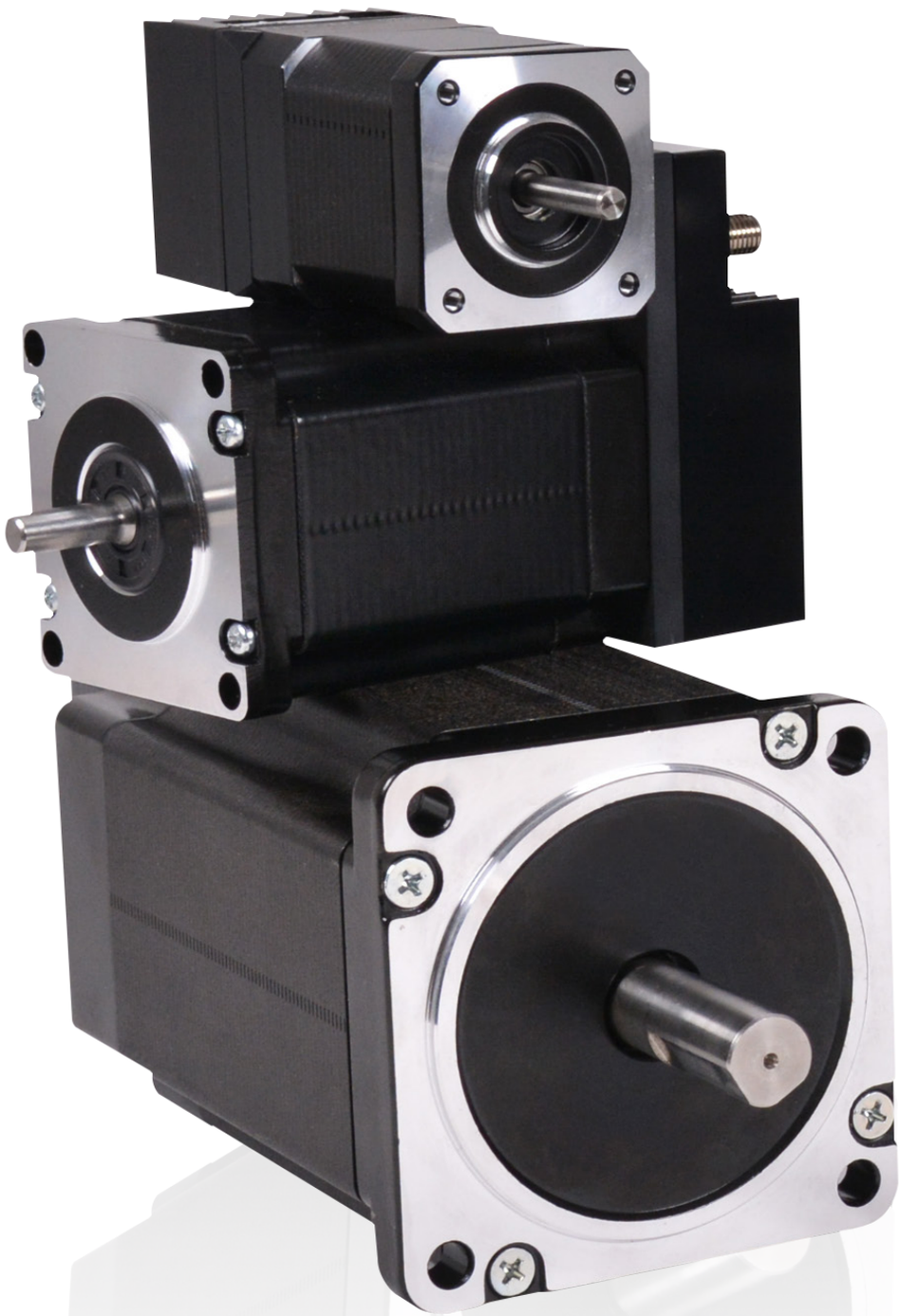
INTEGRATED CLOSED-LOOP STEPPER MOTORS

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

INTEGRATED CLOSED-LOOP STEPPER MOTORS



GROSCHOPP
DRIVES & MORE

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stepIM

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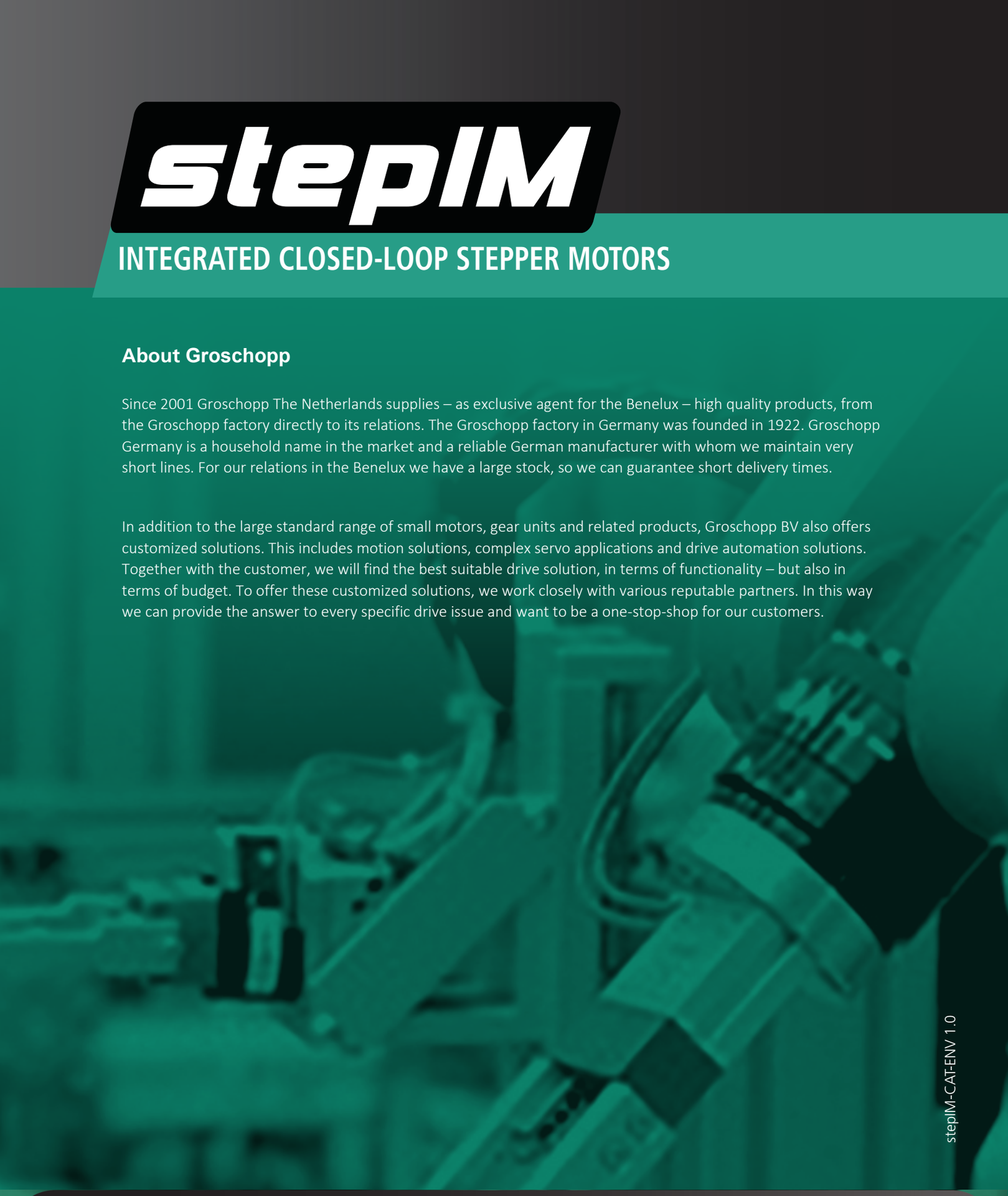
About Groschopp

Since 2001 Groschopp The Netherlands supplies – as exclusive agent for the Benelux – high quality products, from the Groschopp factory directly to its relations. The Groschopp factory in Germany was founded in 1922. Groschopp Germany is a household name in the market and a reliable German manufacturer with whom we maintain very short lines. For our relations in the Benelux we have a large stock, so we can guarantee short delivery times.

In addition to the large standard range of small motors, gear units and related products, Groschopp BV also offers customized solutions. This includes motion solutions, complex servo applications and drive automation solutions. Together with the customer, we will find the best suitable drive solution, in terms of functionality – but also in terms of budget. To offer these customized solutions, we work closely with various reputable partners. In this way we can provide the answer to every specific drive issue and want to be a one-stop-shop for our customers.



stepIM-CAT-ENV 1.0

GROSCHOPP
DRIVES & MORE

Groschopp BV
Moerbei 6
3371 NZ Hardinxveld-Giessendam
The Netherlands
+31 184 620 190
info@groschopp.nl
www.groschopp.nl