



All-in-One Integrated Servo and Stepper Motors

ServoStep™

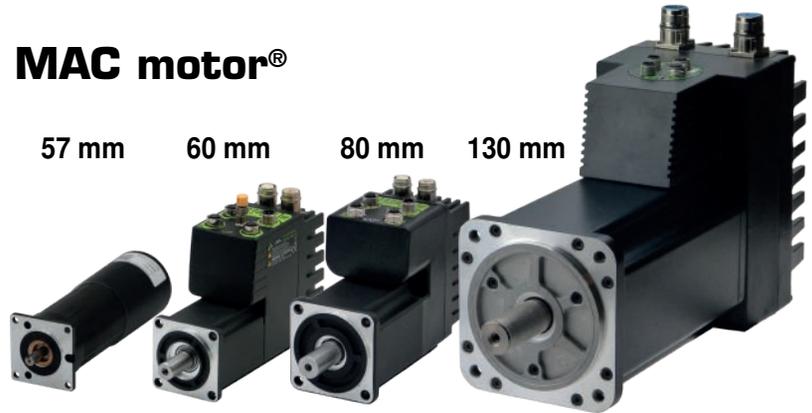
NEMA17 42 mm NEMA23 57 mm NEMA34 86 mm NEMA43 110 mm



0.78 Nm 3 Nm 12 Nm 25 Nm

MAC motor®

57 mm 60 mm 80 mm 130 mm



140 W 400 W 1500 W 4500 W



Benefits of integrated motors

Integrated motors are all-in-one units that do not take up space in the control cabinet and reduce the need for wiring and cabling. All electronics are combined in the same metal housing to ensure high EMC.

ePLC™ embedded PLC

All JVL motors have ePLC™ built-in with up to 8 IO points. It enables <1 ms reaction times and can work together with a master PLC running Ethernet. Fast and easy graphical point-n-click programming.

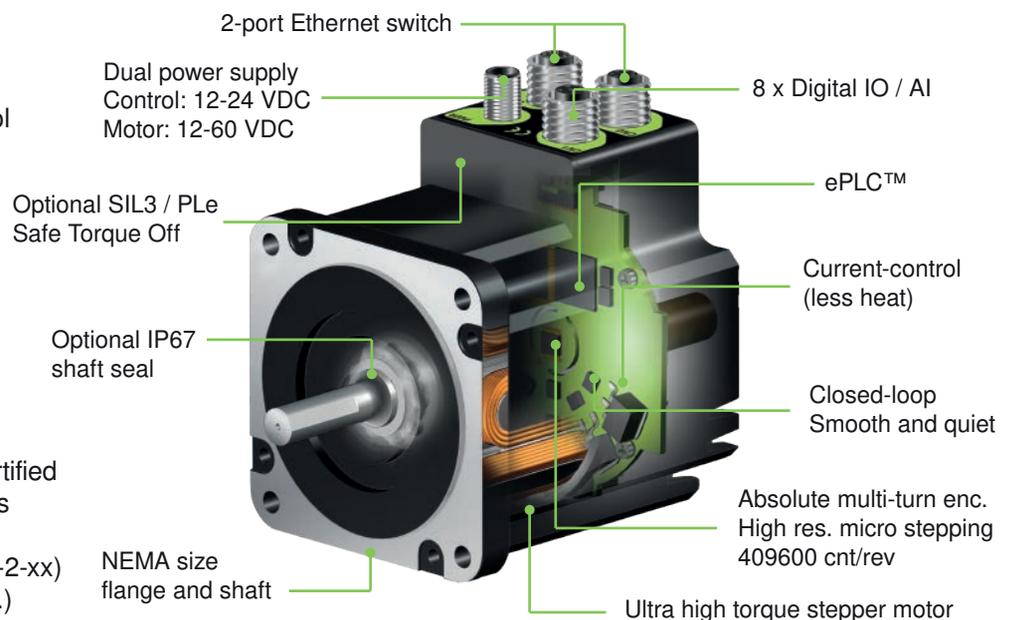
Ethernet with protocol change

This unique feature gives you the flexibility to change protocol between Profinet, EtherNet/IP, Sercos, EtherCAT, Powerlink and Modbus TCP/UDP on any JVL motor. It is easy with JVL's MacTalk® software.



ServoStep™ motors

- Energy saving current control
- Combined position and torque control
- Closed-loop (Servo performance)
- Smooth and quiet running
- Speed control within 0.01 rpm
- Embedded PLC
- User friendly graphical programming
- Easy setup - No tuning
- No cabinet space required
- Fast installation with simplified wiring
- Functional Safety STO - SIL3/PLe certified
- Easy integration w. major PLC brands
- Inc. or absolute multi-turn encoder
- Vibration 4G, Shock 15G (IEC60068-2-xx)
- Low temp down to -20°C (Non-Cond.)





Integrated ServoStep™ motors

	NEMA17			NEMA23						
ServoStep™ Integrated Stepper Motor										
Main motor type*	MIS171	MIS173	MIS176	MIS231S	MIS232S	MIS234S	MIS231T	MIS232T	SMC66	Unit
Holding torque	0.18 [25]	0.40 [56]	0.78 [110]	0.97 [137]	1.97 [279]	3.08 [462]	1.16 [164]	2.53 [358]	6 A	Nm [Oz-In]
Resolution	409600			409600					409600	Counts per rev.
Supply voltage Driver	12-60			12-60					12-60	VDC
Supply: Control + I/O	12-24			12-24					12-24	VDC
Max supply current Driver @24 / 48 / 60 VDC	2.9 / 2.0 / 1.3	3.3 / 3.2 / 2.7	2.8 / 3.0 / 3.2	5.1 / 5.2 / 5.1	4.4 / 4.6 / 4.8	3.5 / 4.1 / 4.1	6.7 / 6.3 / 5.6	5.9 / 6.1 / 6.2	6.7 / 6.3 / 6.2	ADC RMS
Nominal speed range	0.01 - 3000			0.01-3000					0.01 - 3000	RPM
Max mechanical power**	92	99	145	177	221	212	198	316	-	W
Rotor inertia	0.020 [0.0003]	0.054 [0.0008]	0.10 [0.0014]	0.30 [0.0042]	0.48 [0.0068]	0.65 [0.0092]	0.30 [0.0042]	0.48 [0.0068]	-	kg-cm ² /oz-in-s
Flange dimensions	43x43 [1.7]			57x57 [2.3x2.3]					42x109	mm [Inch]
Length	73.5 [2.89]	85.2 [3.35]	106 [4.17]	103 [4.06]	124 [4.88]	161 [6.34]	103 [4.06]	124 [4.88]	59.5	mm [inch]
Shaft diameter***	Ø5.0 [0.20]	Ø5.0 [0.20]	Ø8.0 [0.315]	Ø6.35 [0.25]	Ø6.35 [0.25]	Ø10 [0.394]	Ø6.35[0.25]	Ø10 [0.394]	-	mm [inch]
Weight	0.48 [1.06]	0.59 [1.30]	0.79 [1.74]	0.98 [2.2]	1.33 [2.9]	2.0 [4.3]	0.99 [2.2]	1.35 [3.0]	0.33 [0.73]	kg [lb]
Protection class	IP42 (IP65 Optional)									

* Rear end connectors available ** Max 72 VDC non UL use / Max 60 VDC UL *** Other shaft types also available

	NEMA34					NEMA43					
ServoStep™ Integrated Stepper Motor											
Main motor type	MIS340	MIS341	MIS342	MIS343	MIL34	MIS430	MIS431	MIS432	SMC85	Unit	
Holding torque	3.0 [425]	6.1 [864]	9.0 [1274]	12.0 [1699]	2300 N	10.0 [1416]	18.7 [2648]	25.0 [3539]	9 A	Nm [Oz-In]	
Resolution	409600					409600				409600	Counts per rev.
Supply voltage Driver	12-60					12-60				12-60	VDC
Supply: Control + I/O	12-24					12-24				12-24	VDC
Max supply current Driver @24 / 48 / 72 VDC	5.0 / 5.2 / 5.4	5.6 / 5.3 / 5.9	6.0 / 5.4 / 6.1	6.3 / 5.7 / 6.6	5.6 / 5.3 / 5.6	6.6	6.6	6.6	6.6	ADC RMS	
Nominal speed range	0.01 - 3000					0.01-3000				0.01-3000	RPM
Max mechanical power**	260	277	315	296	288	240	322	245	-	W	
Rotor inertia	1.4 [0.0198]	2.7 [0.0382]	4.0 [0.0564]	5.3 [0.0750]	N.A.	5.5 [0.0778]	10.9 [0.154]	16.2 [0.2292]	-	kg-cm ² /oz-in-s	
Flange dimensions	87x87 [3.4x3.4]					110x110 [4.3x4.3]				51x104x86	mm [Inch]
Length	95.0 [3.74]	125.0 [4.92]	155.0 [6.10]	185.0 [7.28]		145.5 [5.73]	196.5 [7.74]	247.5 [9.74]	[2.0x4.1x3.4]	mm [inch]	
Shaft diameter***	Ø9.53 [0.375]	Ø9.53 [0.375]	Ø14.0 [0.551]	Ø14 [0.551]	Ø19 [0.748]	Ø19 [0.748]	Ø19 [0.748]			mm [inch]	
Weight	2.0 [4.3]	3.1 [6.8]	4.1 [9.0]	5.3 [11.7]		5.0 [10.9]	8.5 [18.7]	11.2 [24.6]	0.63 [1.4]	kg [lb]	
Protection class	IP42 (IP65 Optional)										

** Max 72V DC non UL use / Max 60 VDC UL *** Other shaft types also available

Software integration:



Plug-in module
(Not used in New G3 MAC motors)

Integrated Servo motors

DC Supplied Servo Motors

MAC motor®
Integrated Servo Motor



Main motor type	MAC083-L	MAC140-F	MAC141-F	MAC320-L	MAC101-F	MAC402-D	MAC802	MAC1202	MAC1403	Unit	
Supply voltage	12-48						24-48		48		VDC
Supply: Control + I/O	12-24										VDC
Speed range (nominal)	0-4000	0-4000	0-2700	0-4000	0-2700	0-3000	0-3000	0-3000	0-3000	RPM	
Rated power	83	134	134	320 S3	134	400	750	1200	1500	Watt	
Torque	0.20 (28.3)	0.32 (45.3)	0.48 (68)	0.80 (113.3)	0.32 (45.3)	1.28 (184.1)	2.39 (342)	3.82 (541)	4.78 (677)	Nm (oz-in)	
Peak torque	0.60 (85)	0.90 (127.5)	1.59 (225.2)	2.40 (339.9)	0.90 (127.5)	3.80 (538)	7.17 (963)	11.5 (1628)	14.3 (2025)	Nm (oz-in)	
Rotor inertia	0.075 (0.0010)	0.173 (0.0025)	0.227 (0.0032)	0.227 (0.0032)	0.173 (0.0010)	0.34 (0.0048)	1.36	2.47	3.15 (0.0045)	kgcm ² (oz-in-s ²)	
Encoder resolution (std.)	8192										CPR
Abs. enc. (Single/Turns)	8192 ±262143 rev			8192 ±8178 rev			8192 ±2°31 rev			CPR ±Rev	
Dimensions WxHxL [mm]	57x57x111	57x57x150.5	57x57x172	57x57x176.5	80x80x265	63x115x191	81x120x157	81x120x190	81x120x200	mm	
Dimensions WxHxL [inch]	2.3x2.3x4.37	2.3x2.3x5.93	2.3x2.3x6.77	2.3x2.3x5.93	3.15x3.15x10.433	2.48x4.53x7.52	3.19x4.72x6.18	3.19x4.72x7.48	3.19x4.72x7.87	inch	
Length with brake	Optional external brake: MAB23X +54 (2.26)				-	224 (8.82)	N.A.	224 (8.82)	237 (9.33)	mm (inch)	
Flange	57.7x57.7 (2.27x2.27) NEMA23				60x60(2.36x2.36)		80x80(3.15x3.15)			mm (inch)	
Shaft	Ø6.35 (0.25)			Ø8 (0.315)	Ø10 (0.394)	Ø14 (Ø0.55)	Ø19 (Ø0.748)			mm (inch)	
Weight	0.55 (1.21)	1.1 (2.43)	1.32 (2.91)	1.1 (2.43)	2.7 (5.95)	2.05 (4.52)	N.A.	N.A.	4.0	kg (lb)	
Weight with brake	-	-	-	-	-	2.5 (5.51)	N.A.	-	5.1	kg (lb)	
Protection class	IP42 (IP67 Optional)				IP67 (IP69K)		IP55 (IP66 optional).				

AC Supplied Servo Motors

MAC motor®
Integrated Servo Motor



Main motor type	MAC404	MAC804	MAC800-D	MAC1200-D	MAC1404	MAC1500-D	MAC3000-G	MAC4500-G	MAC7000-G	Unit	
Supply voltage	115/230 VAC	115/230 VAC	115/230 VAC	115/230 VAC	115/230 VAC	3x400-480	3x400-480	3x400-480	3x400-480	VAC	
Supply: Control + I/O	12-24										VDC
Speed range (nominal)	0-3000										RPM
Rated power	400	750	750	1180	1500	1500	3000	4500	7000	Watt	
Torque	1.28 (184.1)	2.39 (342)	2.38 (342)	3.82 (538.1)	4.78 (677)	4.78 (677)	9.55 (1352.4)	14.3 (2025)	N.A.	Nm (oz-in)	
Peak torque	3.8 (544)	7.17 (963)	6.8 (963)	11.46 (1614)	15.0 (2124)	15 (2025)	28.6 (4050)	52.3 (7406)	N.A.	Nm (oz-in)	
Rotor inertia	0.52 (0.0074)	N.A.	0.91 (0.0129)	1.6 (0.0225)	3.15	13.96 (0.0886)	27.83 (0.394)	27.83 (0.394)	N.A.	kgcm ² (oz-in-s ²)	
Encoder resolution (std.)	8192	8192	8000	8000	8192	8192	8192	8192	8192	CPR	
Abs. encoder (Single/Turns)	8192 ±2°31 rev		8192 ±8178 rev		8192 ±2°31 rev		8192 ±8178 rev			CPR ±Rev	
Dimensions WxHxL [mm]	60x120x170	80x136x188	84x120x174	84x120x203	80x135x231	134x205x250	134x205x330	134x205x330	N.A.	mm	
Dimensions WxHxL [inch]	2.4x4.7x6.7	3.2x5.4x7.4	3.3x4.7x6.9	3.31x4.72x7.99	3.2x5.3xN.A.	5.3x8.07x9.84	5.3x8.1x13	5.3x8.1x13	N.A.	inch	
Length with brake	170 (6.69)	227 (8.94)	209 (8.23)	239 (9.41)	238	306 (12.05)	391 (15.39)	391 (15.39)	N.A.	mm (inch)	
Flange	60x60 (2.4x2.4)		80x80 (3.2x3.2)			130x130 (5.1x5.1)				mm (inch)	
Shaft	Ø14 (Ø0.551)		Ø19 (Ø0.748)			Ø24 (Ø0.94)			N.A.	mm (inch)	
Weight	2.0 (3.99)	N.A.	2.9 (6.39)	4.0 (8.82)	N.A.	11.2 (22.49)	18.7 (37.9)	19.1 (41.1)	N.A.	kg (lb)	
Weight with brake	2.4 (4.87)	N.A.	3.7 (8.16)	5.0 (11.02)	N.A.	13.2 (29.1)	19.7 (44.09)	20.1 (44.3)	N.A.	kg (lb)	
Protection class	IP55 (IP66 optional)										

IO-Link

EtherNet/IP

PROFINET

EtherCAT

Modbus

SERCOS
the automation bus

ETHERNET POWERLINK

CANopen

ePLC RS232

ePLC RS485



MAC motor®
Plug-in modules



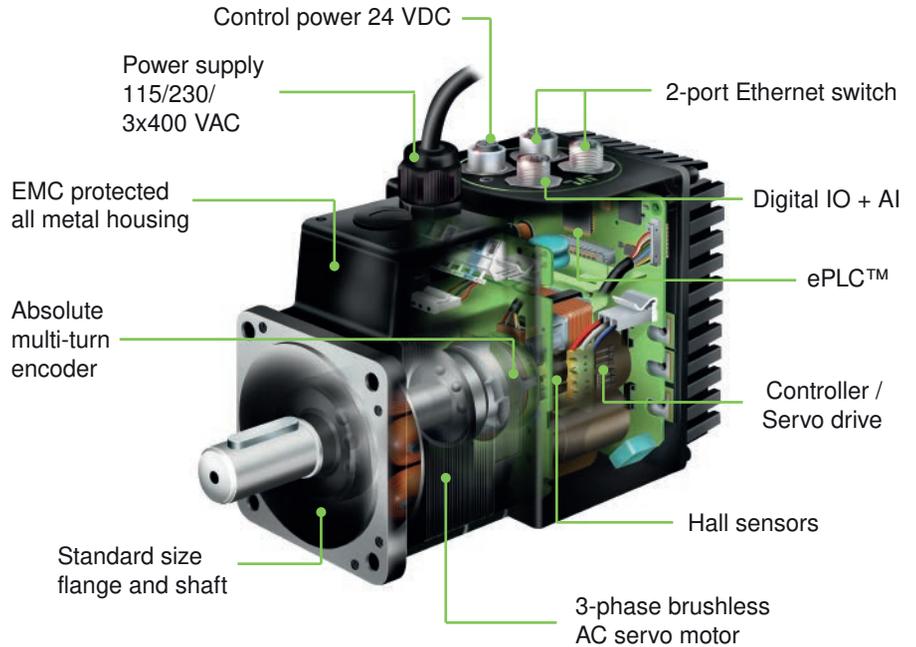
Protocol	EtherNet/IP	Profinet	EtherCAT	Modbus TCP/UDP	Sercos	Powerlink	CANopen	Serial	Serial	Analog
Part number	MAC00-EI4	MAC00-EP4	MAC00-EC4	MAC00-EM4	MAC00-ES4	MAC00-EL4	MAC00-FC41	MAC00-B41	MAC00-B42	MAC00-P4
Ethernet switch ports	2 ports						-	-	-	-
IO	1DI + 1DO + 1AI						4IO	6IO 2AI Enc. I/O	8DI 4DO 1AI	4DI 2DO 3AI
Specs	CIP / DLR	Profinet IO	CANopen	TCP/IP or UDP/IP	Line, Ring	CANopen	DSP402	RS485/RS232	RS485/RS232	RS485/RS232
Extended IO Part number	MAC00-E41	MAC00-EP41	MAC00-EC41	MAC00-EM41	MAC00-ES41	MAC00-EL41				
Extended IO	4DI + 2DO + 2AI									



All-in-One motors with multiturn encoder and support for all Ethernet protocols

MAC motor®

- High efficiency
- Cost effective
- Decentral intelligence
- Quiet and maintenance free operation
- No control cabinet space required
- Minimized electronic noise
- Lower heat in control cabinet
- Faster installation
- Simplified wiring
- Embedded ePLC
- Connect IO directly to motor
- Plug-in control module for most protocols
- User friendly graphical programming
- Easy integration w. major PLC brands
- Optional Integrated brake
- Incremental or absolute multi-turn encoder
- Protection class IP55-IP69k



JVL offers a wide range of motion control products and accessories

Stainless steel motors IP69K



Electric actuators



Cables



Gears



Pioneering integrated motors since 1986

JVL A/S is a Danish manufacturer founded in 1986 and is the inventor of the integrated servo motor concept. Our focus is on developing state-of-the-art products for motion control.

We are proud to be a certified supplier to the aerospace and automotive industries.

We offer two all-in-one ranges: Servo motors from 50 to 4500 W and ServoStep™ motors from size NEMA17 up to size NEMA43 with 25 Nm torque.

DC supplied servo motors are available up to 1500W.

