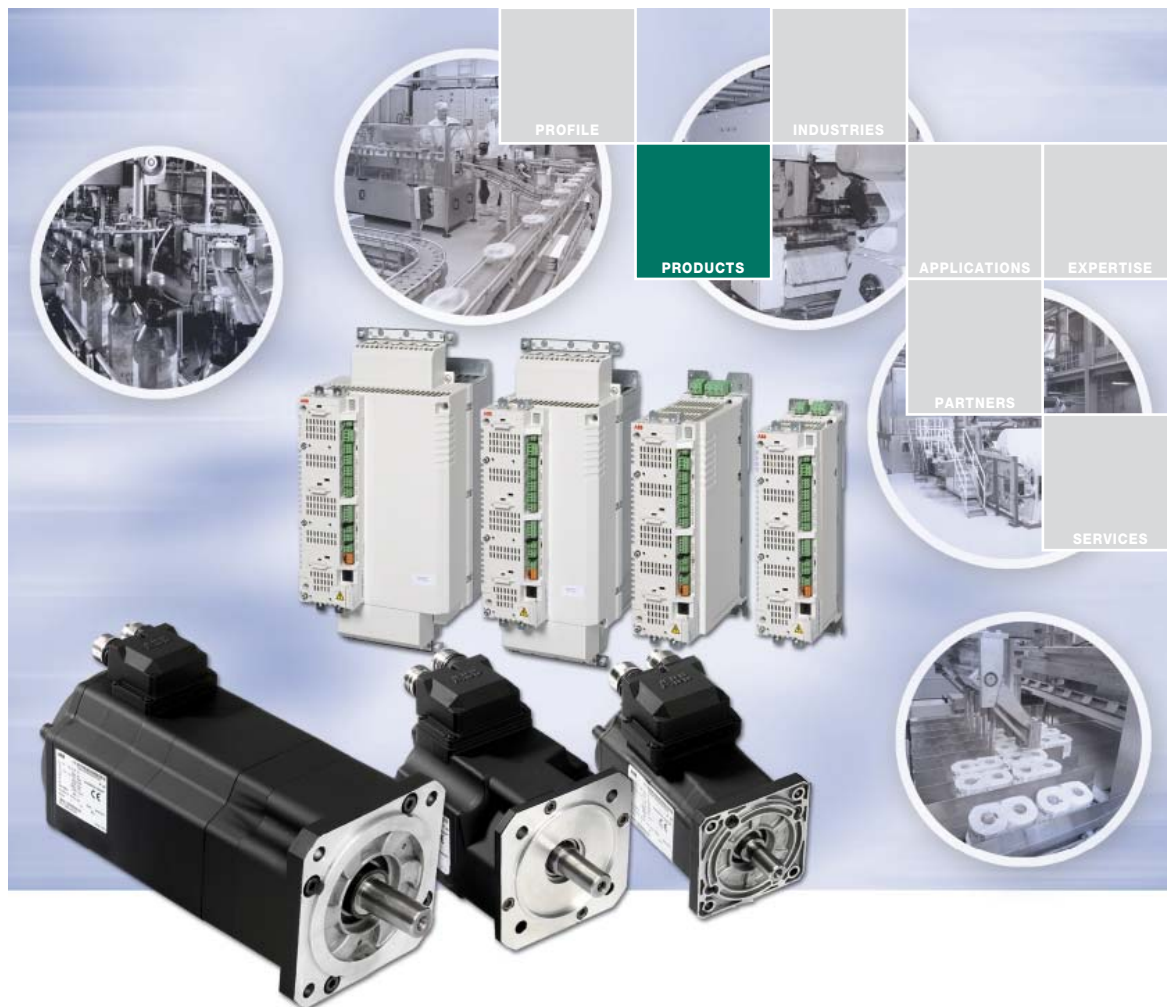


ABB servo motors

9C series

for ABB high performance machinery drives

Technical catalogue





Matched drive and motor combination

The 9C series servo motor and the ABB high performance machinery drive ACSM1 provide a compact and powerful package for machine building and other applications requiring high precision.

ABB servo motors

The 9C series of ABB servo motors is ideal for operation with the ABB high performance machinery drives. The motors are manufactured using the most advanced technology:

- Concentrated windings
- Encapsulation of windings with epoxy resin under vacuum
- Special composite magnetic material
- Modular structure
- Smart solution on connections
- Low cogging torque

ABB high performance machinery drives

ABB high performance machinery drives provide speed, torque and motion control for demanding applications. They can control induction, synchronous and asynchronous servo and high torque motors with a variety of feedback devices. The compact hardware and various control arrangements ensure optimum solutions for many different needs.

Feature	Advantage	Benefit
9C series AC synchronous servo motors		
Concentrated windings	Low energy consumption Extremely compact	Reduced running costs Space savings, easy to fit in restricted spaces
Encapsulation of windings with epoxy resin under vacuum	Motor winding partial discharge free up to 3 kV Uniform temperature on the motor windings	High product reliability
Special composite material "Soft Magnetic Composite"	Low losses in high frequency	Higher nominal speed
Modular structure	More variants with standard components	Short delivery time
Flexible connection methods	Connectors easy to turn back to front Easy-to-use plug-in connectors or cost-effective internal connections	Maximum connection flexibility Time savings Cost savings
High stall and rated torque	Excellent torque/dimensions ratio	Efficient space usage
Very low rotor inertia	High dynamic performance	High acceleration in very heavy duty cycle
Most common feedback devices available	Resolver Optical multiturn SinCos encoder, Endat 2.1	Cost-effective and very reliable solution in harsh environmental conditions Very high performance
Optional integrated holding brake with high dynamic characteristics	Permanent magnet brake Spring holding brake	Holding brake without any backlash Suitable for dynamic emergency braking
Shaft with keyway - delivery contains half and full key	Full key for belt and pulley transmission or half key for friction coupling transmission	Wide flexibility, one motor for two different applications
Ready-made power and feedback cables	Complete package solution	Guaranteed quality of final installation
Motors delivered from centralized stock	Well organized logistics	Motors available on customer site in a few days



9C series technical details

Type	Continuous torque at zero speed ⁵⁾ T_{cs} [Nm]	Current at continuous torque ^{1) 3) 5)} I_{cs} [A]	Rated torque ⁵⁾ T_{rat} [Nm]	Rated current ^{1) 3) 5)} I_{rat} [A]	Rated speed n_{rat} [r/min]	Rated frequency f_{rat} [Hz]	Mechanical rated power ⁵⁾ P_{rat} [kW]	Peak torque T_{pk} [Nm]	Current at peak torque ^{1) 3)} I_{pk} [A]	Torque constant ^{1) 2) 3)} k_T [Nm/A]	B.e.m.f. between phases at rated speed ^{1) 2) 3)} V [V]	Moment of inertia of rotor ³⁾ J_M [kgcm ²]	Moment of inertia of rotor + brake ³⁾ J_M with brake [kgcm ²]	Weight ^{3) 4)} W [kg]
9C1.1.30.. ..M	1.4	1.3	1.3	1.4	3000	250	0.41	4.1	4.5	1.147	208	0.57	0.62	3.0
9C1.2.30.. ..M	2.3	1.8	2	1.7	3000	250	0.63	6.9	6.1	1.440	261	1.04	1.09	3.9
9C1.3.30.. ..M	3.2	2.7	2.8	2.5	3000	250	0.88	9.6	9.0	1.350	245	1.51	1.56	4.8
9C1.4.30.. ..M	4.2	3.3	3.5	2.9	3000	250	1.10	12.6	11.1	1.440	261	1.99	2.04	5.7
9C1.1.60.. ..M	1.4	2.1	1.2	2.0	6000	500	0.75	4.1	7.1	0.720	261	0.57	0.62	3.0
9C1.2.60.. ..M	2.3	3.6	1.6	2.7	6000	500	1.01	6.9	12.1	0.720	261	1.04	1.09	3.9
9C1.3.60.. ..M	3.2	5.2	2.3	3.9	6000	500	1.45	9.6	17.3	0.702	255	1.51	1.56	4.8
9C1.4.60.. ..M	4.2	6.5	2.5	4.1	6000	500	1.57	12.6	21.6	0.738	268	1.99	2.04	5.7
9C4.1.30.. ..M	4.3	3.0	3.9	2.8	3000	250	1.23	12.9	9.8	1.654	300	4.0	4.7	4.1
9C4.2.30.. ..M	7.5	5.0	6.1	4.3	3000	250	1.92	22.5	16.7	1.704	309	7.6	8.3	7.0
9C4.3.30.. ..M	9.4	6.0	6.9	4.6	3000	250	2.17	28.2	19.9	1.786	324	11.1	11.8	9.9
9C4.4.30.. ..M	12.0	8.2	7.5	5.4	3000	250	2.36	36.0	27.3	1.665	302	14.7	15.4	12.8
9C4.1.40.. ..M	4.3	4.0	3.7	3.6	4000	333	1.55	12.9	13.2	1.232	298	4.0	4.7	4.1
9C4.2.40.. ..M	7.5	6.9	5.4	5.2	4000	333	2.26	22.5	23.1	1.232	298	7.6	8.3	7.0
9C4.3.40.. ..M	9.4	7.8	5.8	5.1	4000	333	2.43	28.2	26.1	1.365	330	11.1	11.8	9.9
9C4.4.40.. ..M	12.0	10.0	6.3	5.5	4000	333	2.64	36.0	33.3	1.365	330	14.7	15.4	12.8
9C5.2.20.. ..M	12.3	5.9	10.3	5.2	2000	166.7	2.16	36.9	19.7	2.365	286.0	21.8	23.6	16
9C5.3.20.. ..M	18.4	9.0	14.8	7.6	2000	166.7	3.10	55.2	29.9	2.328	281.5	31.6	33.4	20
9C5.4.20.. ..M	23.5	11.6	17.1	8.9	2000	166.7	3.58	70.5	38.6	2.306	278.9	41.4	43.2	24
9C5.6.20.. ..M	30.0	12.8	22.0	9.9	2000	166.7	4.61	90.0	42.7	2.661	321.8	61.0	62.8	32
9C5.2.30.. ..M	12.3	9.0	9.0	6.9	3000	250	2.83	36.9	30.0	1.552	281.5	21.8	23.6	16
9C5.3.30.. ..M	18.4	12.1	12.4	8.6	3000	250	3.90	55.2	40.3	1.730	313.7	31.6	33.4	20
9C5.4.30.. ..M	23.5	15.1	14.0	9.4	3000	250	4.40	70.5	50.2	1.774	321.8	41.4	43.2	24
9C5.6.30.. ..M	30.0	19.2	18.0	12.1	3000	250	5.65	90.0	64.1	1.774	321.8	61.0	62.8	32

¹⁾ Voltage and current values shown in table are RMS values.

²⁾ All parts of motor at 20 °C.

³⁾ Tolerance ±10%.

⁴⁾ Weight without a holding brake. Please refer to table on page 5 for the weight of the brake.

⁵⁾ Duty type S1, ambient temperature 40 °C, mounted on steel flange (dim. 300 x 300 x 20 mm), altitude ≤ 1000 m above sea level.

Technical specifications



General specifications

9C series AC synchronous servo motors	
Mounting	IMB5, V1, V3
Cooling	IC-0041 (EN 60034-6)
Motor pole pairs	5
Operating temperature range	0 to 40°C, up to 50 °C (derating of 1% per 1 °C must be applied above 40 °C)
Storage temperature range	-30 to 85 °C
Operating humidity range	85% max w/o condensation
Insulation class	F
Thermal protection	PTC
Compliance	CE, UL pending
Degree of protection	Body: IP65 Shaft: IP54 standard, IP64 with oil seal
Motor feedback	Resolver, one pole pair, size 15. Optical encoder, 1Vpp 512 signal periods per revolution, absolute position, multiturn (Endat) 4096 revolutions. Inductive encoder, 1Vpp 32 signal periods per revolution, absolute position, multiturn (Endat) 4096 revolutions.

Optional holding brake specification

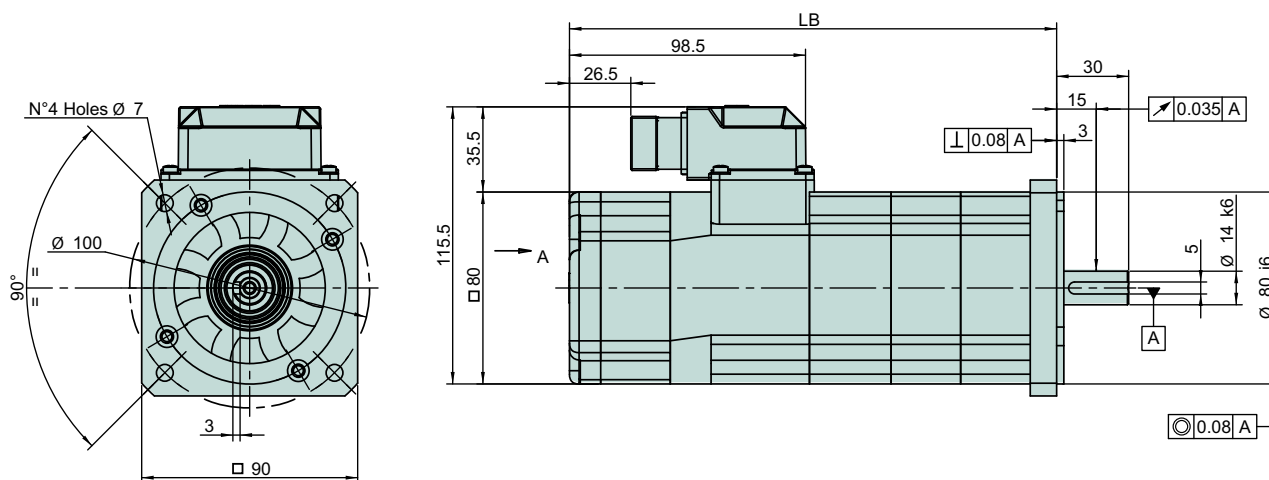
Motor type	Rated voltage [VDC]	Input power [W]	Input current [A]	Braking torque [Nm]	Armature release time [ms]	Armature pull-in time [ms]	Inertia [kgcm ²]	Weight (Approx.) [kg]
9C1	24	6.3	0.26	2.5	50	30	0.102	0.5
9C4	24	19.5	0.81	16	70	30	0.73	1.1
9C5	24	28.0	1.17	30	75	30	1.82	1.8

Note: Release and pull-in time values apply with ABB varistor 5248 122-256 wired into electrical circuit.

Dimensions

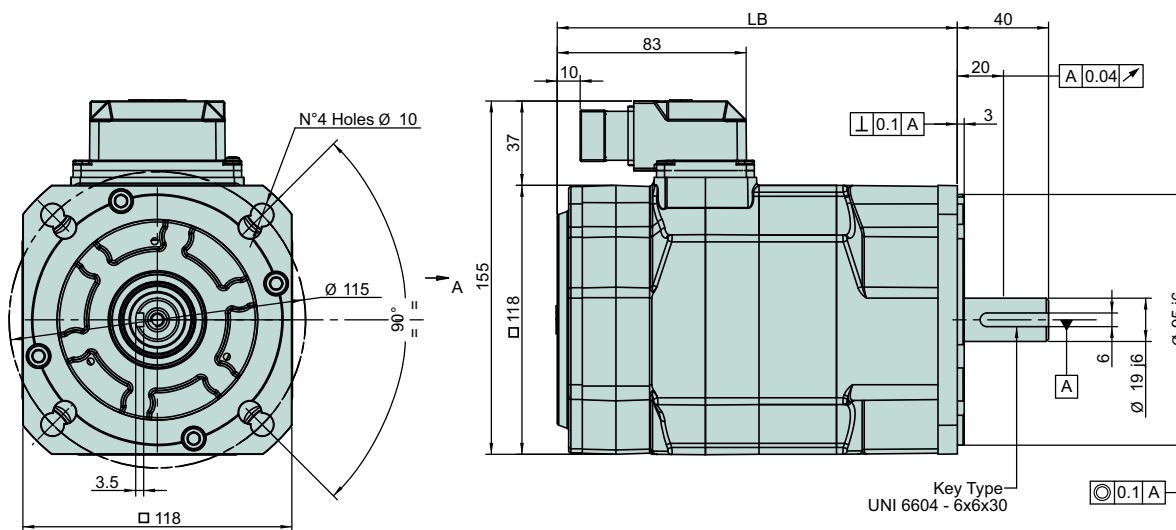


9C1



Motor size	9C1.1	9C1.2	9C1.3	9C1.4
LB with resolver [mm]	142	176	210	244
LB with encoder [mm]	171	205	239	273
LB with brake [mm]	171	205	239	273
LB with brake + encoder [mm]	200	234	268	302

9C4

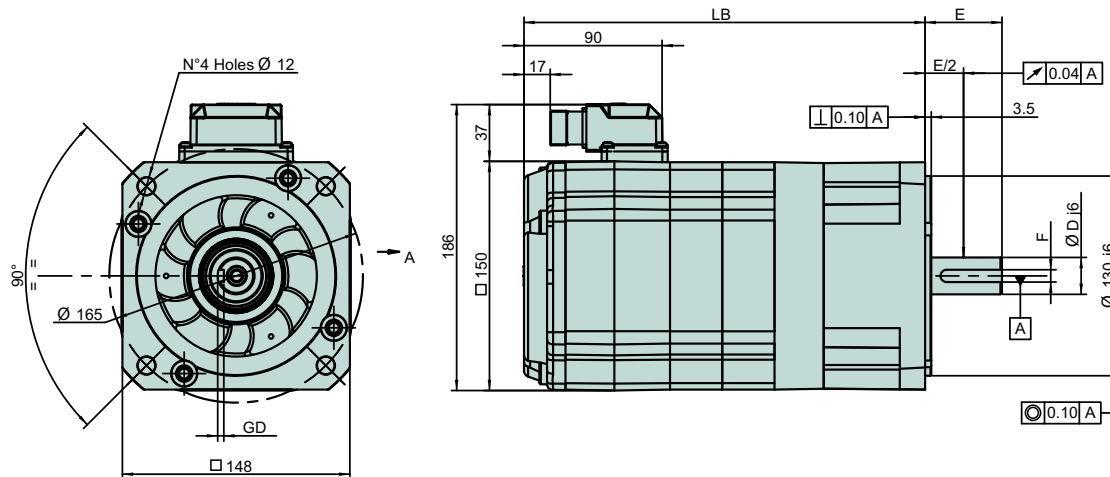


Motor size	9C4.1	9C4.2	9C4.3	9C4.4
LB with resolver [mm]	146	180	214	248
LB with encoder [mm]	175.5	209.5	243.5	277.5
LB with brake [mm]	175.5	209.5	243.5	277.5
LB with brake + encoder [mm]	205	239	273	307

Dimensions

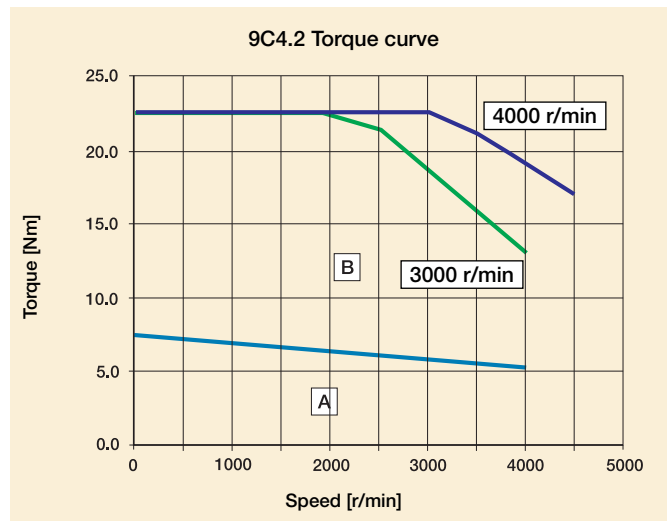
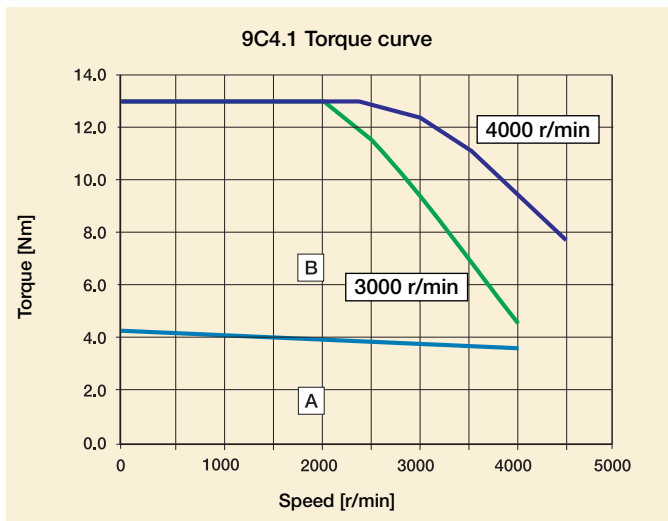
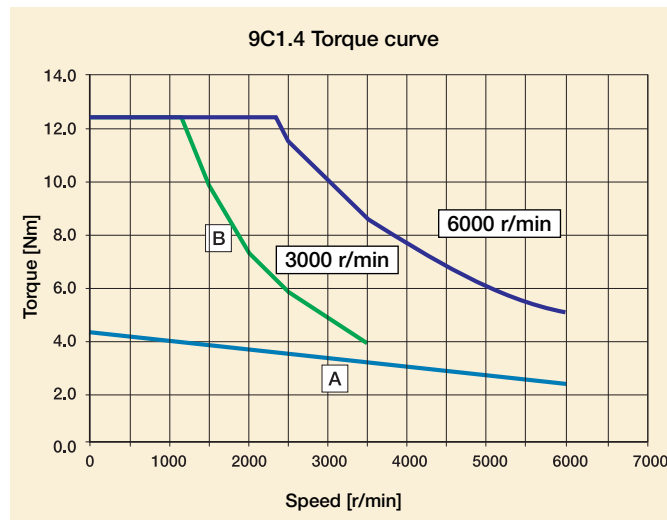
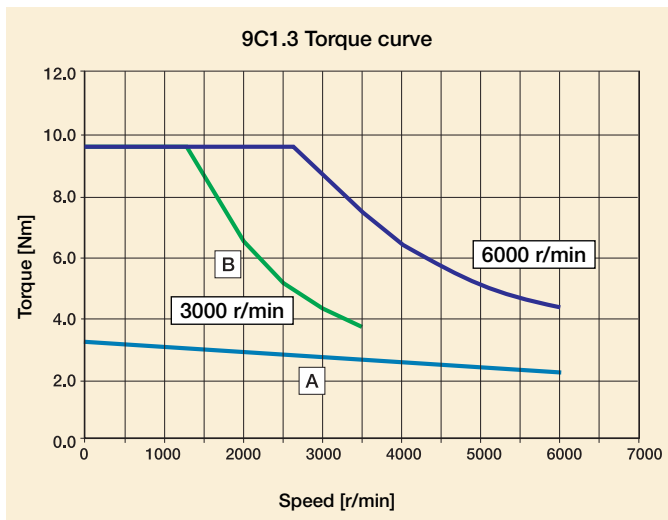
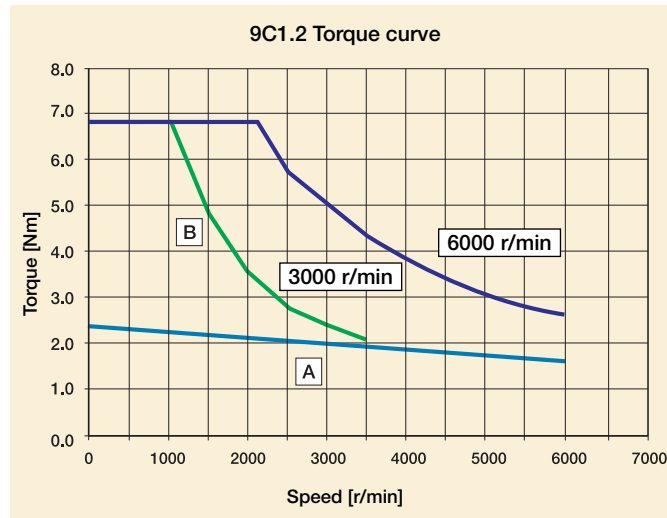
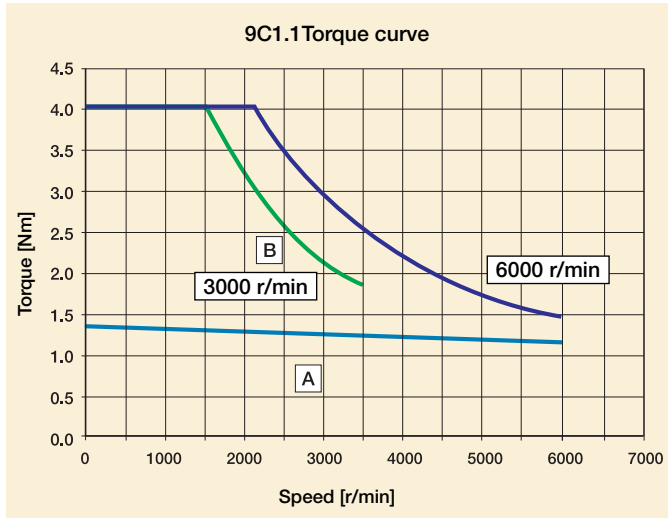


9C5



Motor size	9C5.2	9C5.3	9C5.4	9C5.6
LB with resolver [mm]	261	295	329	397
LB with encoder [mm]	261	295	329	397
D shaft diameter [mm]	24	24	32	32
E shaft length [mm]	50	50	58	58
GD keyway depth [mm]	4	4	5	5
F keyway width [mm]	8	8	10	10
Key type	UNI6604 - 8x7x40		UNI6604 - 10x8x36	

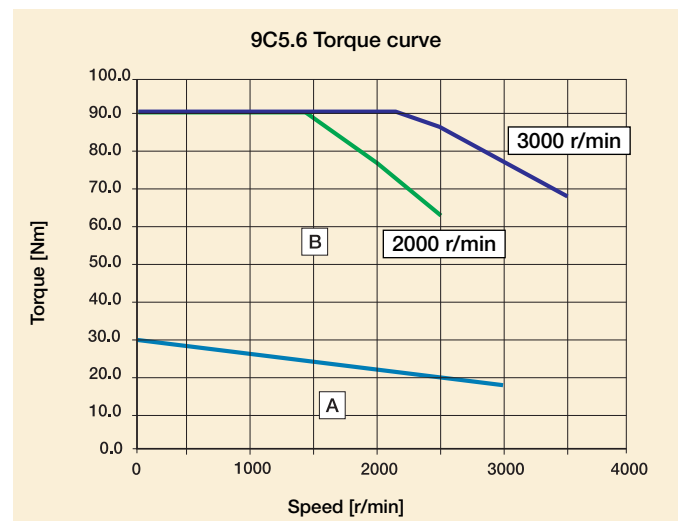
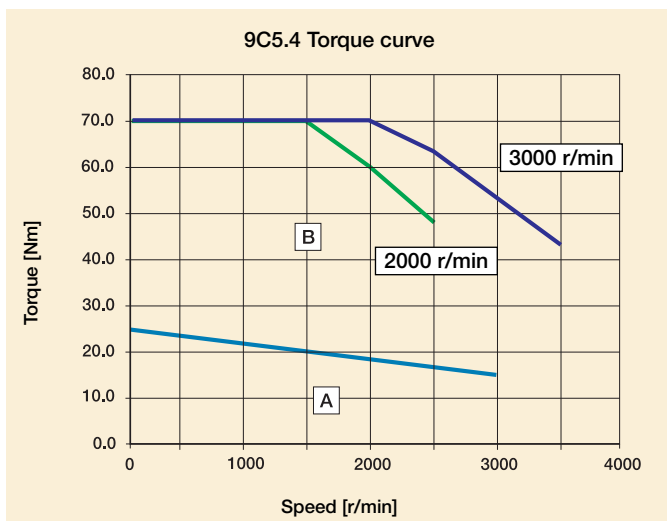
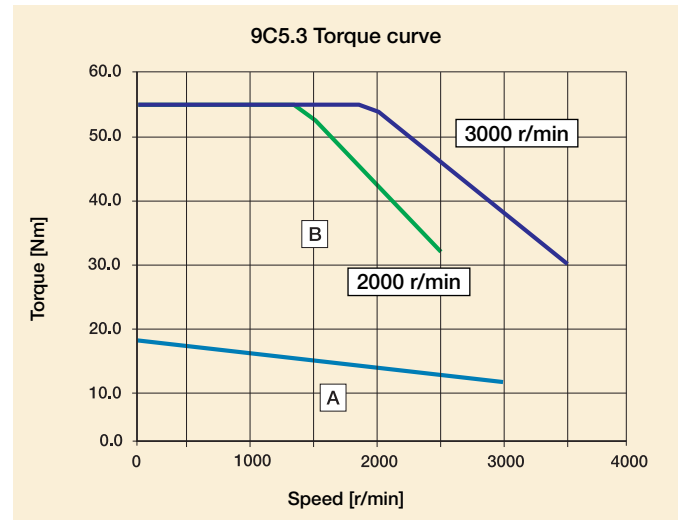
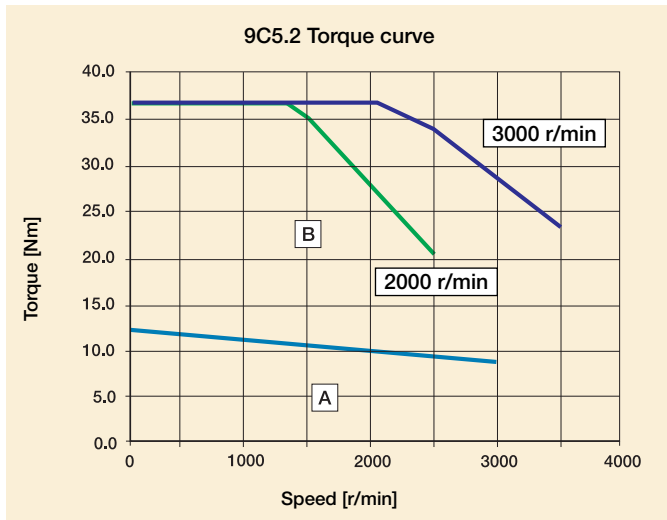
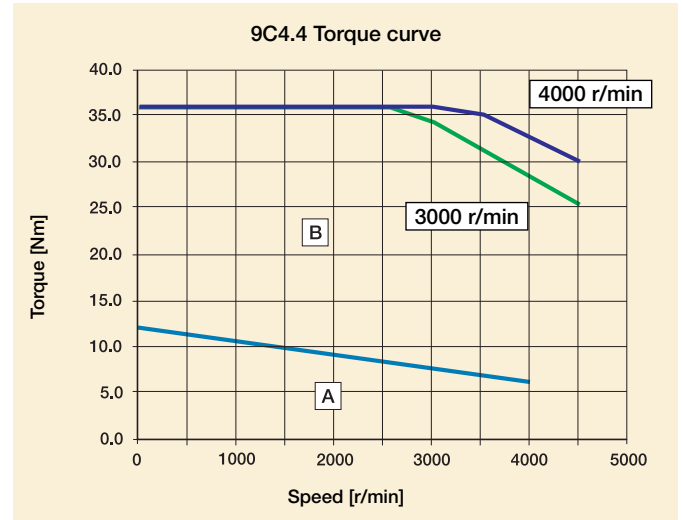
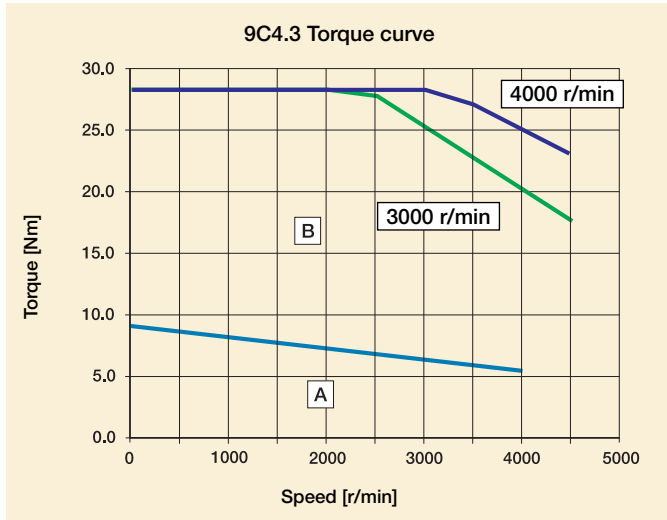
Motor speed/torque curves



- A** Continuous operation zone
- B** Intermittent operation zone

Note!
 All performance data is measured at duty type S1, ambient temperature 40 °C,
 mounted on steel flange (dim. 300 x 300 x 20 mm), altitude ≤ 1000 m above sea level.

Motor speed/torque curves



- A** Continuous operation zone
- B** Intermittent operation zone

Note!
 All performance data is measured at duty type S1, ambient temperature 40 °C,
 mounted on steel flange (dim. 300 x 300 x 20 mm), altitude ≤ 1000 m above sea level.