AC Servodrives
Bivector 300/500

Advanced solutions for automation

ABB Automation

Bivector

- Field Oriented Torque Control
  - optimal working point setting for maximum KT
  - robust control in flux weakening region
  - total torque ripple reduction
- High Precision Speed Control
- Single-axis point-to-point Position Control
- High Dynamic Synchronization
- Flexible & User Friendly
- Motion Task Programmability
- Highest Efficiency

Global application and service know-how

The extreme flexibility of Bivector ensures wide applicability in any process:

- Packaging
- Handling
- Plastics
- Ceramics
- Robotics
- Food
- Wood
- Machine tools
- Electronics
- Glass
- Pulp & Paper
- Textile

ABB Servomotors supports customers with total engineering and pre-study services, providing customized solutions to improve efficiency and productivity.

Time Optimal Based Positioning

In Positioning operating mode the drive is position controlled from the actual position to the (fixed) target position following a Time Optimal Based trajectory that provides the minimum time for position reaching.

- Positioning set of parameters: maximum speed, acceleration/deceleration ramps & loop bandwidth
- position reference: digital (internal or via serial interface); range ± 32767 revolutions
- cycle time: 1 msec
- software limit switches
- various homing functions to define the start-up position

High Dynamic Angle Synchronization

The Synchronizing operating mode of Bivector is an high performance motion control used to replace mechanical shafts and gear units, differential gears and toothed belts.

Main features:

- Synchronizing reference: frequency input from master drive
- programmable parameters: gear ratio, pulses/rev for reference frequency input, angle offset between master and slave
- high dynamic synchronization (position angle as reference)
- cycle time: 0.25 msec

Customizable Motion Tasks

A Motion Task is described by a User Table containing the definition of the operating mode, working constraints, external loops (speed, position) tuning parameters and the target to be reached.
The Motion Tasks (max. 32) can be changed on fly by serial commands or digital inputs.

Interesting! A cycle of different Motion Tasks can be realized, self commutated between each orther by means of a user-defined rule.

ABB Servomotors - your partner in productivity

Bivector Technical Data

Standard I/O interface

Digital inputs:
- 2 dedicated digital inputs
  - enable/stop
  - alarms reset
- 8 configurable digital inputs

Optoinsulated and protected
Vin_{MAX} = 30 V, $Rin_{TYP} \cong 1\ k\Omega$

Digital outputs:
- 1 dedicated output (Drive OK) single switch relay, 48 V, 0.5 A
- 6 configurable digital outputs

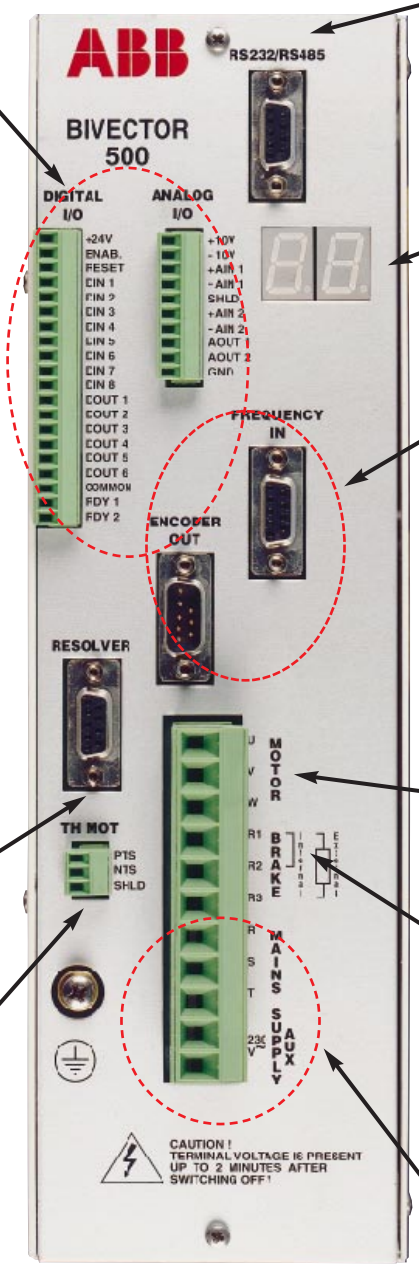
Optoinsulated and protected
$Vout_{MAX}$ = 30 V, $Iout_{MAX}$ = 20 mA

Analog inputs:
- 1 channel analog input ± 10V, 12 bit resolution, f_{MAX} = 300 Hz
- 1 channel analog input ± 10 V, 10 bit resolution, f_{MAX} = 1 kHz

Analog outputs:
2 configurable analog outputs with programmable ±5 V_{MAX} or ± 10 V_{MAX}

Reference voltage:
±10 V_{DC}, ±2 %, I_{MAX} = 10 mA

Output insulated voltage:
24 V_{DC} ±10 %, I_{MAX} = 100 mA



Serial interface

Standard configuration:
- RS 232: PC interface, Intelligent KeyBoard are available on request.
- RS 485: Protocol for RS 485 interface

Alarm and status display

Encoder interface

Encoder output:
Optoinsulated, differential
$Vout_{MIN}$ = ±2.5 V @ 20 mA
Programmable resolution:
256, 512, 1024, 2048 c.p.r.

Encoder input:
A, B, NM or frequency + direction
Optoinsulated, differential
Vin_{MAX} = ±5 V, $Rin_{TYP} \cong 300\ \Omega$

3-Phase motor output

Brake resistor connections

Feedback input

Speed and position transducer from resolver input

Motor thermal sensor

Power supply

Main power supply (BIVECTOR 300):
230 Vac 3-phase ±10 % 50/60 Hz

Main power supply (BIVECTOR 500):
400 Vac 3-phase ±10% 50/60 Hz

Aux supply:
230 Vac single phase 50/60 Hz; backup circuit is always present. If aux supply is applied, backup function is active.

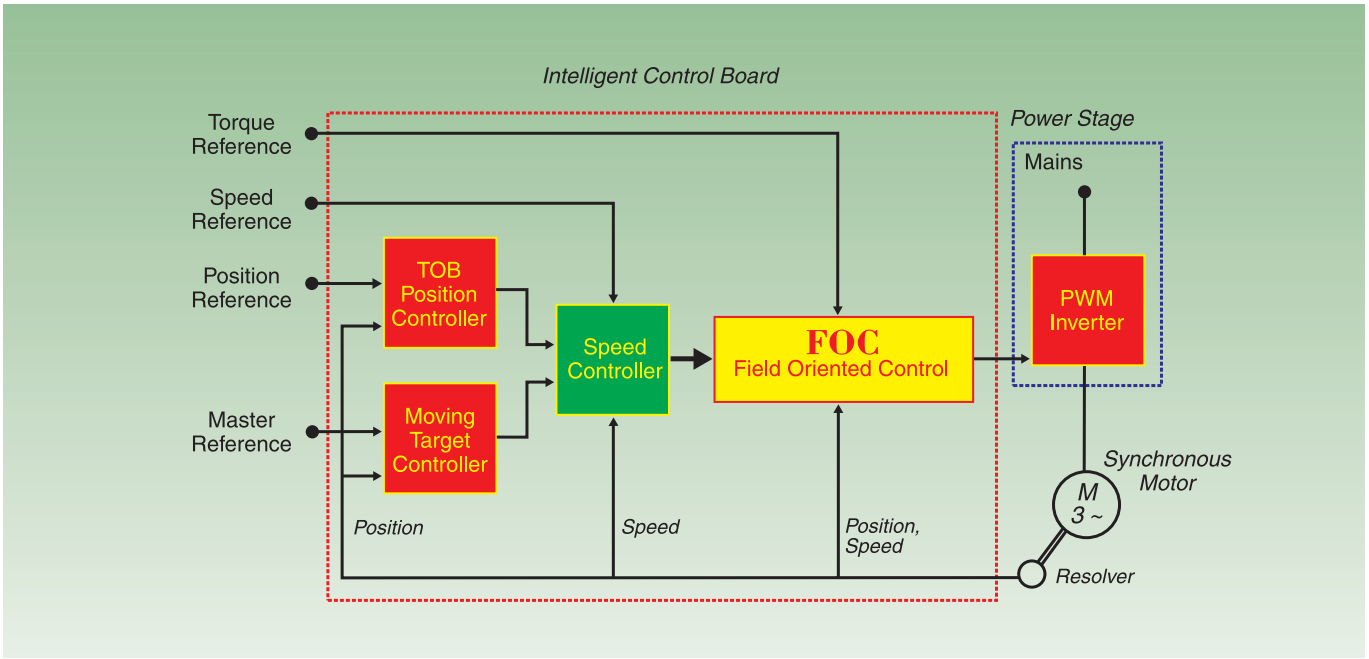
Soft-start (BIVECTOR 500 only)

Man-machine interface

Bivector has a user-friendly man-machine interface by means of an intelligent control panel or PC software (versions for DOS and Windows). It allows an easy commissioning and maintenance of the drive:
- monitoring, parameters setting and operation control in easy-to-understand form
- logical grouping of parameters by function
- easy duplication and transfer of memory contents for identical drives
- efficient trouble-shooting
- running autotuning procedures
- built-in fault memory function

bivector provides simultaneously RS 232/485 serial interfacing and is open to intelligent communication i.e. filed buses.

Bivector - Series 300						Bivector - Series 500					
S				Size		S			M1		M2
5	10	14	18	Type		3	5	9	13	18	25
Three-phase, 230 V ± 10%, 50/60 Hz				Power supply: phase to phase rated voltage (U_{VN})	[V_{RMS}]	Three-phase, 400 V -15% ÷ 440 V +10%, 50/60 Hz					
Single-phase, 230 V ±10%, 50/60 Hz				Auxiliary power supply (U_{AUXNN})	[V_{RMS}]	Single-phase, 230 V ±10%, 50/60 Hz					
5,6	11,2	15,7	20,4	Rated input current (I_{VN})	[A_{RMS}]	3,8	5,7	9,4	13,8	19	26,5
Three-phase, 220 V				Rated output voltage (U_{aN1})	[V_{RMS}]	Three-phase, 400 V					
5	10	14	18	Output continuous current (I_{aN})	[A_{RMS}]	3,5	5,3	8,8	13	18	25
1,9	3,8	5,3	6,9	Output continuous power (for Bivector 300)	[Kva]						
				Output continuous power @ U_{VN} = 400 V (for Bivector 500)	[kVA]	2,4	3,6	5,5	9	12,4	17,3
				Output continuous power @ U_{VN} = 440 V (for Bivector 500)	[kVA]	2,6	4	6	9,9	13,7	19
1,8				Overload time @ $I_{aM} = 2 \times I_{aN}$	[s]	1,8					
150	200	250	300	Power dissipation @ I_{aN} (excluding possible brake internal resistor)	[W]	100	130	180	270	360	485
+5 ÷ +40				Ambient temperature	[°C]	+5 ÷ +40					
55				Maximum ambient temperature	[°C]	55					
2,5				Derating in the 40 ÷ 55 °C range	[%/ °C]	2,5					
max 85 (condensation is not allowed)				Humidity	[%]	max 85 (condensation is not allowed)					
1000				Altitude	[m a.s.l.]	1000					
2000				Maximum altitude	[m a.s.l.]	2000					
1% every 100 m				Derating in the 1000 ÷ 2000 m a.s.l. range	[%]	1% every 100 m					
4,8				Weight	[kg]	4,6			8,6		10,5
290 x 92 x 225				Dimensions	[mm]	300 x 91 x 248			321 x 96 x 333		325x124x309



Field Oriented Torque Control

Bivector Torque Control utilizes the field Oriented Control (FOC) technology that offers optimum control of the motor torque. This is the result of the long experience of high dynamic applications.
Main features of the Torque Control:

- reference: digital (internal or via serial interface) or analog
- torque limitations:
  - direct: digital limit, analog limit
  - indirect: derived from power limitation, current module limitation or flux werkening limitation
- Torque Control quality:
  - setting of an optimal working point (flux-current) in order to achieve the maximum torque constant
  - robust control in flux weakening region
  - smooth characteristics achieved by total torque ripple minimization

High Precision Speed Control

Closed loop Speed Control provides an excellent dynamic speed precision and robustness suitable for the most demanding applications. At the same time, it allows the accuracy of the external loops of positioning and synchronizing.
Main features of the Speed Control:

- reference: digital (internal or via serial interface) or analog
- speed controller:
  - PI regulator + feed-forward
  - anti wind-up limitation
  - ramps controlling
- cycle time: 0.25 msec
- speed and position feedback from resolver

Servomotors 8C1 (1,3 ÷ 4,5 Nm)

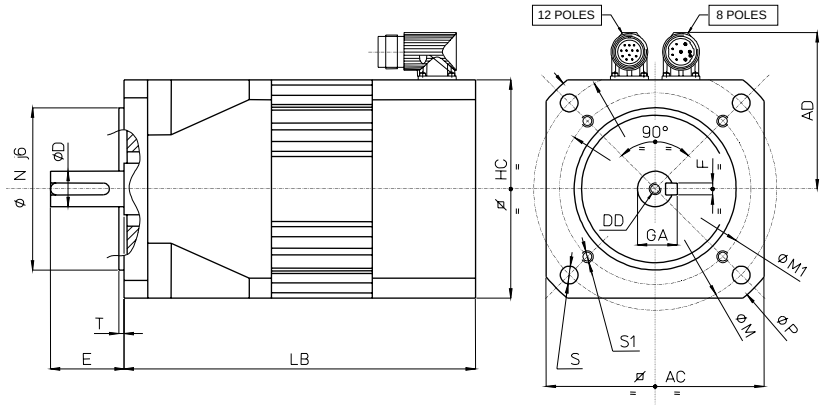
Series 8C Brushless Servomotors

Use of NdFeB permanent magnets and optimised design of active parts for highest torque density and best cogging minimization.
Available on choice with either terminal box or Signal and Power connectors directly integrated on the motor to reduce overall dimensions.

- Operating Temp. range: 0...+40°C; up to 50°C, derate nom. values by 1%/°C
- Storage: -30°C .... + 85°C
- Type of construction: IM B5, IM V1, IM V3, IM B14, IM V18, IM V19
- Cooling: IC 0041 completely enclosed machine, surface cooled - no fan
- Thermal class: F
- Protection degree: IP65 protection as per EN 60529 (shaft gland IP 64)
- Optional integrated brake (LB not affected by brake insertion)
- Resolver: integrated, 2-poles, hollow shaft, brushless
- Sinewave e.m.f.

TYPE	Continuous torque at zero speed M_0 [Nm] (3)	Current at continuous torque I_0 [A] (1) (2) (3)	Rated torque M_N [Nm] (3)	Rated current I_N [A] (1) (2) (3)	Rated speed n_N [revi/min]
Supply: 3x 400 Vac					
8C1.1.30... ..M	1,3	1,4	1,2	1,3	3000
8C1.1.60... ..M	1,3	2,1	1,05	1,8	6000
8C1.2.30... ..M	2,5	2,5	2,2	2,3	3000
8C1.2.60... ..M	2,5	3,1	1,8	2,4	6000
8C1.3.30... ..M	3,6	2,4	3,1	2,2	3000
8C1.3.60... ..M	3,6	4,3	2,3	2,9	6000
8C1.4.30... ..M	4,5	2,8	3,8	2,5	3000
8C1.4.60... ..M	4,5	4,9	2,5	3,0	6000
Supply: 3x 230 Vac					
8C1.1.30... ..E	1,3	2,1	1,2	2,0	3000
8C1.1.60... ..E	1,3	3,2	1,05	2,7	6000
8C1.2.30... ..E	2,5	3,1	2,2	2,8	3000
8C1.2.60... ..E	2,5	5,0	1,8	3,8	6000
8C1.3.30... ..E	3,6	4,0	3,1	3,6	3000
8C1.3.60... ..E	3,6	7,9	2,3	5,4	6000
8C1.4.30... ..E	4,5	4,9	3,8	4,4	3000
8C1.4.60... ..E	4,5	9,2	2,5	6	6000

Notes: (1) Current values shown in table are RMS values. • (2) Tolerance ± 5%.• (3) Duty type S1, ambient tem values are RMS values. • (6) Tolerances ±10 %. • (7) Rotor inertia can be increased on request.



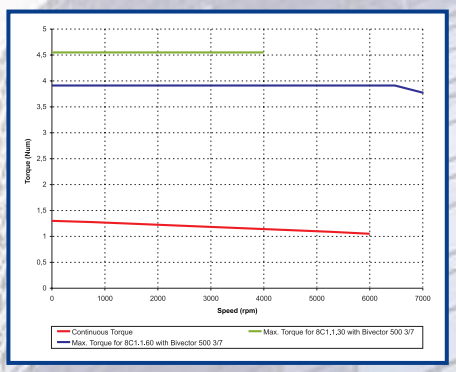
Overall dimension drawings of 8C1 Series servomotors with connectors

TYPE		LB	AC	N	T	M	S	M1	S1	P	D	E	DD	F	GA	AD	HC
8C1.1	xx0xxxxxSE3E	185	80	60	2.5	75	M5x10	/	/	100	16 j6	40	M5x12.5	5	18	83	80
8C1.2		212															
8C1.3		239															
8C1.4		266															
8C1.1	xx1xxxxxSG3E	185	100	95	3	115	Ø10	/	/	140	19 k6	40	M6x16	6	21.5	83	80
8C1.2		212															
8C1.3		239															
8C1.4		266															
8C1.1	xx2xxxxxSC3E	185	90	80	3	100	Ø7	/	/	120	14 k6	30	M5x12.5	5	16	83	80
8C1.2		212															
8C1.3		239															
8C1.4		266															

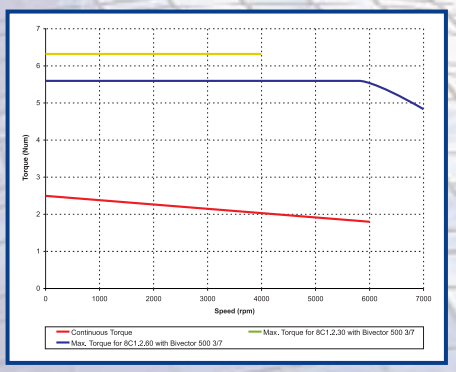
Mechanical rated power P_N [kW] (3)	Peak torque M_{max} [Nm]	Current at peak torque I_{max} [A] (1)	Motor current limit I_{limit} [A]	Torque constant K_{t0} [Nm/A] (4) (5) (2)	B.e.m.f. between phases at rated speed V [V] (4) (5) (2)	Resistance at terminals R_{UV} [Ω] (4) (2)	Inductance at terminals L_{UV} [mH] (6)	Moment of inertia of rotor J_m [kgcm^2] (2) (7)	Weight m [kg]
0,38	4,6	5,5	9,3	1,05	190	20,8	47	0,9	3,1
0,66	4,6	8,1	13,8	0,71	257	9,07	21	0,9	3,1
0,69	8,8	9,7	16,4	1,14	208	6,85	23	1,65	4,1
1,13	8,8	12,2	20,7	0,90	328	4,26	14	1,65	4,1
0,97	12,6	9,3	15,8	1,71	310	8,33	31	2,35	4,9
1,45	12,6	16,7	28,3	0,95	346	2,60	9,6	2,35	4,9
1,19	15,8	10,8	18,4	1,84	333	6,27	25	3	5,8
1,57	15,8	19,2	32,5	1,04	376	2,02	8	3	5,8
0,38	4,6	8,1	13,8	0,71	128	9,5	21	0,9	3,1
0,66	4,6	12,5	21,3	0,46	166	3,8	9	0,9	3,1
0,69	8,8	11,9	20,1	0,93	169	4,5	15	1,65	4,1
1,13	8,8	19,3	32,8	0,57	208	1,70	6	1,65	4,1
0,97	12,6	15,4	26,1	1,03	187	3,0	11	2,35	4,9
1,45	12,6	30,8	52,3	0,52	187	0,76	2,8	2,35	4,9
1,19	15,8	19,2	32,5	1,04	188	2,10	8	3	5,8
1,57	15,8	35,6	60,4	0,56	203	0,61	2	3	5,8

perature mounted on 40°C, steel flange (dim. 300x300x20 mm), altitude < 1000 m above sea level. • (4) All parts of motor at 20°C. • (5)Voltage and current

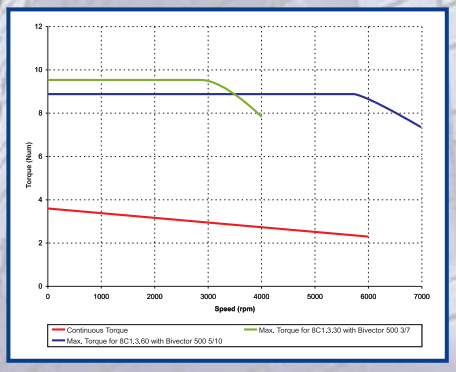
Servomotors 8C1.1



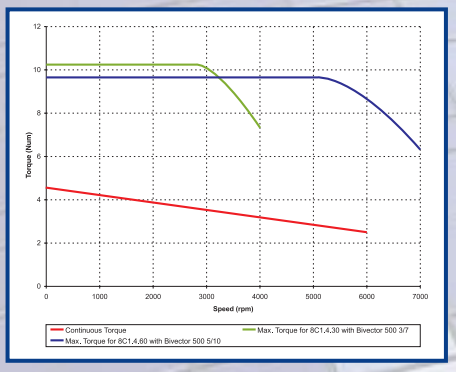
Servomotors 8C1.2



Servomotors 8C1.3



Servomotors 8C1.4

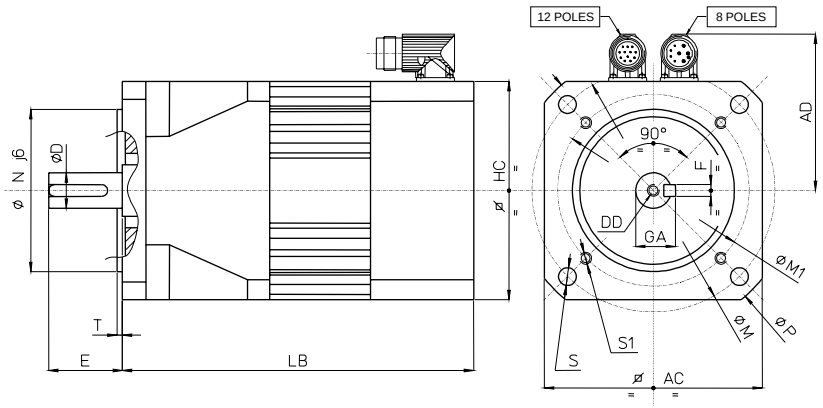


Curves obtained with DC bus voltage 535V

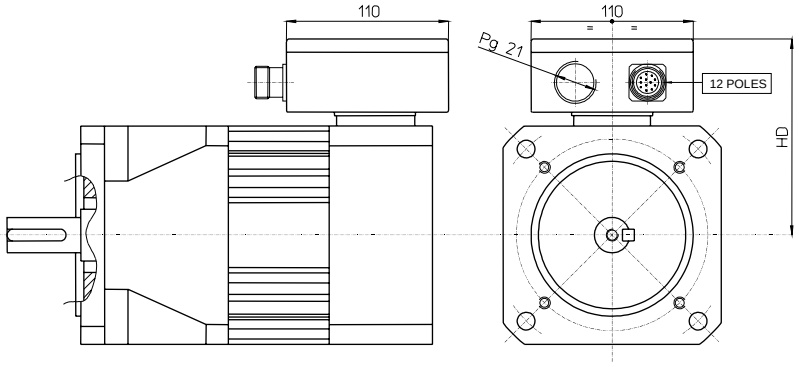
Servomotors 8C4

TYPE	Continuous torque at zero speed M_0 [Nm] (3)	Current at continuous torque I_0 [A] (1) (2) (3)	Rated torque M_N [Nm] (3)	Rated current I_N [A] (1) (2) (3)	Rated speed n_N [revi/min]
Supply: 3x 400 Vac					
8C4.0.15... ..M	4	1,5	3,9	1,5	1500
8C4.0.30... ..M	4	2,8	3,6	2,6	3000
8C4.1.15... ..M	7,5	2,6	7,2	2,6	1500
8C4.1.30... ..M	7,5	4,7	6,5	4,3	3000
8C4.2.15... ..M	10	3,4	9,4	3,4	1500
8C4.2.30... ..M	10	6,1	8,4	5,4	3000
8C4.3.15... ..M	12,2	4,1	11,5	4,0	1500
8C4.3.30... ..M	12,2	7,6	10	6,6	3000
8C4.4.15... ..M	15,1	4,9	14	4,8	1500
8C4.4.30... ..M	15,1	8,5	12,2	7,3	3000
Supply: 3x 230 Vac					
8C4.0.15... ..E	4	3,0	3,9	3,0	1500
8C4.0.30... ..E	4	4,9	3,6	4,6	3000
8C4.1.15... ..E	7,5	4,5	7,2	4,5	1500
8C4.1.30... ..E	7,5	7,7	6,5	7,0	3000
8C4.2.15... ..E	10	5,0	9,4	4,9	1500
8C4.2.30... ..E	10	9,7	8,4	8,6	3000
8C4.3.15... ..E	12,2	7,2	11,5	7	1500
8C4.3.30... ..E	12,2	13,3	10	11,5	3000
8C4.4.15... ..E	15,1	8,0	14	7,8	1500
8C4.4.30... ..E	15,1	15,3	12,2	13,1	3000

Notes: (1) Current values shown in table are RMS values. • (2) Tolerance ± 5%.• (3) Duty type S1, ambient tem values are RMS values. • (6) Tolerances ±10 %. • (7) Rotor inertia can be increased on request.



Overall dimension drawings of 8C4 Series servomotors with connectors



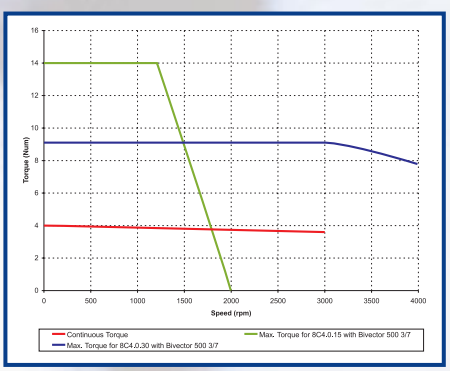
Overall dimension drawings of 8C4 Series servomotors with connection box

TYPE		LB	AC	N	T	M	S	M1	S1	P	D	E	DD	F	GA	AD	HC	HD
8C4.0	xx0xxxxxSGE3E	220	118	110	3.5	130	Ø10	/	/	150	19 j6	40	M6x16	6	21.5	91	118	116
8C4.1		251																
8C42		276																
8C4.3		299																
8C4.4		332																
8C4.0	xx1xxAxxSG3E	220	118	95	3	115	Ø10	/	/	150	19 k6	40	M6x16	6	21.5	91	118	116
8C4.1		251																
8C4.2		276																
8C4.3		299																
8C4.4		332																
8C4.0	xx9xxxxxSL3E	220	140	130	3.5	165	Ø12	/	/	190	24 J6	50	M8x19	8	27	91	118	116
8C4.1		251																
8C4.2		276																
8C4.3		299																
8C4.4		332																

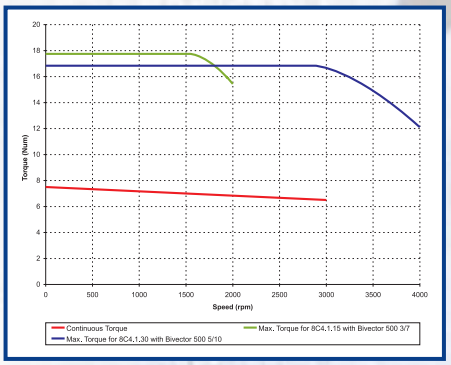
Mechanical rated power P_N [kW] (3)	Peak torque M_{max} [Nm]	Current at peak torque I_{max} [A] (1)	Motor current limit I_{limit} [A]	Torque constant K_{t0} [Nm/A] (4) (5) (2)	B.e.m.f. between phases at rated speed V [V] (4) (5) (2)	Resistance at terminals R_{UV} [Ω] (4) (2)	Inductance at terminals L_{UV} [mH] (6)	Moment of inertia of rotor J_m [kgcm^2] (2) (7)	Weight m [kg]
0,61	14	5,8	9,9	3,04	276	29,3	113	5	6,9
1,13	14	10,8	18,3	1,63	296	8,51	33	5	6,9
1,13	26,3	10,3	17,5	3,22	292	10,7	52	9,4	9,2
2,04	26,3	18,3	31,1	1,81	328	3,22	16	9,4	9,2
1,48	35	13,4	22,7	3,30	299	6,76	38	12,8	10,8
2,64	35	23,8	40,4	1,85	336	2,12	12	12,8	10,8
1,81	42,7	15,9	26,9	3,40	308	5,13	30	16	12,4
3,14	42,7	29,5	50,0	1,83	332	1,46	8,7	16	12,4
2,2	52,9	19,2	32,5	3,48	316	3,76	24	20,5	14,8
3,83	52,9	33,0	56,1	2,02	366	1,30	8	20,5	14,8
0,61	14	11,7	19,9	1,51	137	7,3	28	5	6,9
1,13	14	19,0	32,2	0,93	169	2,7	11	5	6,9
1,13	26,3	17,3	29,4	1,91	173	3,7	18	9,4	9,2
2,04	26,3	29,9	50,8	1,11	201	1,25	6	9,4	9,2
1,48	35	19,5	33,1	2,3	206	3,2	18	12,8	10,8
2,64	35	37,8	64,2	1,17	212	0,84	5	12,8	10,8
1,81	42,7	28,1	47,8	1,9	174	1,6	10	16	12,4
3,14	42,7	51,6	88	1,05	190	0,48	2,9	16	12,4
2,2	52,9	31,3	53,1	2,13	193	1,45	9	25	14,8
3,83	52,9	59,5	100,9	1,1	204	0,40	2,5	25	14,8

perature mounted on 40°C, steel flange (dim. 300x300x20 mm), altitude < 1000 m above sea level. • (4) All parts of motor at 20°C. • (5)Voltage and current

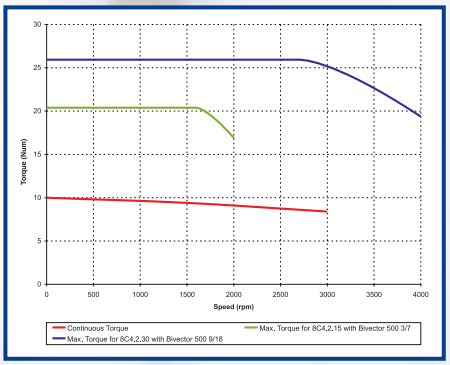
Servomotors 8C4.0



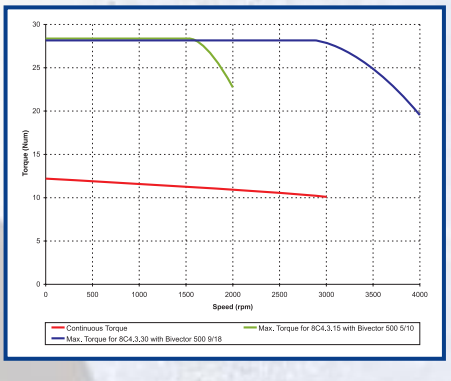
Servomotors 8C4.1



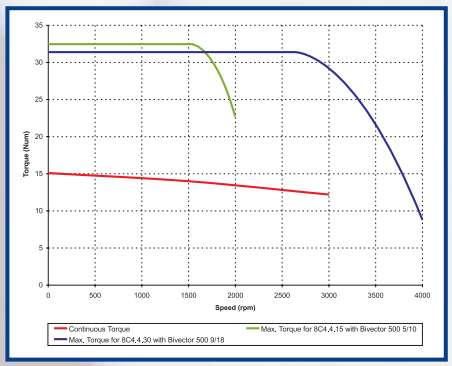
Servomotors 8C4.2



Servomotors 8C4.3



Servomotors 8C4.4

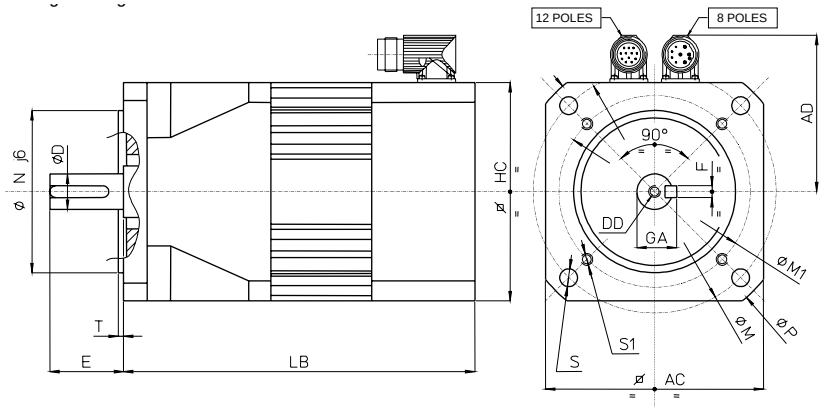


Curves obtained with DC bus voltage 535V

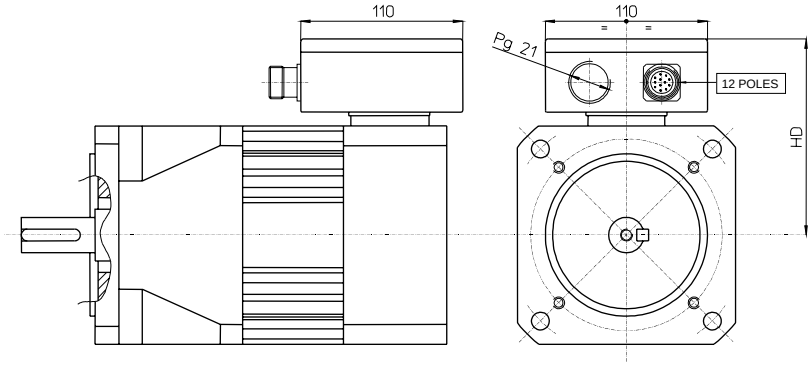
Servomotors 8C5

TYPE	Continuous torque at zero speed M_0 [Nm] (3)	Current at continuous torque I_0 [A] (1) (2) (3)	Rated torque M_N [Nm] (3)	Rated current I_N [A] (1) (2) (3)	Rated speed n_N [revi/min]
Supply: 3x 400 Vac					
8C5.0.15... ..M	12,2	4,2	11,6	4,1	1500
8C5.0.30... ..M	12,2	8,0	10	6,8	3000
8C5.1.15... ..M	16,9	5,3	16	5,1	1500
8C5.1.30... ..M	16,9	11,0	13	8,8	3000
8C5.2.15... ..M	21,5	7,5	20	7,1	1500
8C5.2.30... ..M	21,5	14,1	16	10,9	3000
8C5.3.15... ..M	25,8	8,4	23,5	7,8	1500
8C5.3.30... ..M	25,8	15,6	18,5	11,6	3000
8C5.4.15... ..M	30	9,8	27	9,0	1500
8C5.4.30... ..M	30	17,8	21	13,0	3000
8C5.6.15... ..M	38,2	12,5	33	11,0	1500
8C5.6.30... ..M	38,2	23,4	24	15,5	3000
Supply: 3x 230 Vac					
8C5.0.15... ..E	12,2	8,0	11,6	7,7	1500
8C5.0.30... ..E	12,2	13	10	11,3	3000
8C5.1.15... ..E	16,9	10,0	16	9,7	1500
8C5.1.30... ..E	16,9	17	13	13,6	3000
8C5.2.15... ..E	21,5	13,2	20	12,5	1500
8C5.2.30... ..E	21,5	21,1	16	16,3	3000
8C5.3.15... ..E	25,8	16,9	23,5	16	1500
8C5.3.30... ..E	25,8	25,3	18,5	18,9	3000
8C5.4.15... ..E	30	16,3	27	15	1500
8C5.4.30... ..E	30	32,7	21	24	3000
8C5.6.15... ..E	38,2	18,7	33	16,6	1500
8C5.6.30... ..E	38,2	37,4	24	24,7	3000

Notes: (1) Current values shown in table are RMS values. • (2) Tolerance ± 5%.• (3) Duty type S1, ambient tem values are RMS values. • (6) Tolerances ±10 %. • (7) Rotor inertia can be increased on request.



Overall dimension drawings of 8C5 Series servomotors with connectors



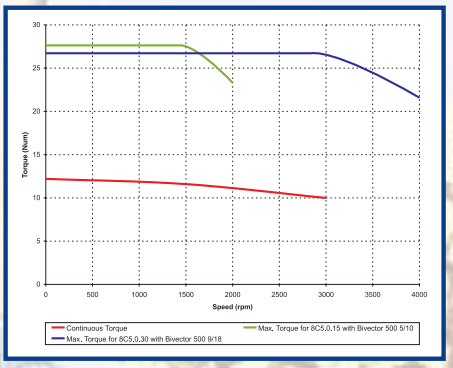
Overall dimension drawings of 8C5 Series servomotors with connection box

TIPO		LB	AC	N	T	M	S	M1	S1	P	D	E	DD	F	GA	AD	HC	HD
8C5.0	xx0xxAxxSL3E	266	148	130	3.5	165	Ø12	/	/	190	24 j6	50	M8x19	8	27	106	148	133
8C5.1		296																
8C5.2		326																
8C5.3	xx0xxxxxSN3E	356									32 k6	58	M12x28	10	35			
8C5.4		387																
8C5.6		447																
8C5.0	xx4xxxxxSL3E	266	148	110	4	165	Ø12	130	M8x12	190	24 j6	50	M8x19	8	27	106	148	133
8C5.1		296																
8C5.2		326																
8C5.3	xx4xxxxxSN3E	356									32 k6	58	M12x28	10	35			
8C5.4		387																
8C5.6		447																

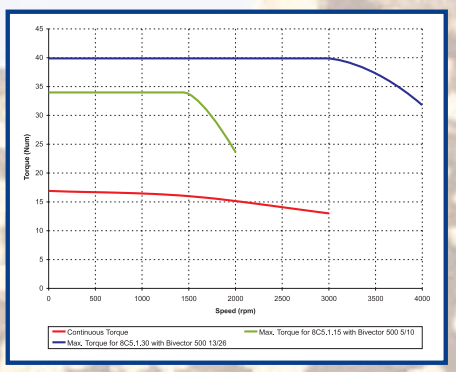
Mechanical rated power P_N [kW] (3)	Peak torque M_{max} [Nm]	Current at peak torque I_{max} [A] (1)	Motor current limit I_{limit} [A]	Torque constant K_{t0} [Nm/A] (4) (5) (2)	B.e.m.f. between phases at rated speed V [V] (4) (5) (2)	Resistance at terminals R_{UV} [Ω] (4) (2)	Inductance at terminals L_{UV} [mH] (6)	Moment of inertia of rotor J_m [kgcm^2] (2) (7)	Weight m [kg]
1,82	42,7	16,3	27,7	3,30	300	5,71	44	21	15
3,14	42,7	21,0	52,6	1,74	315	1,58	12	21	15
2,51	59,2	20,5	34,7	3,65	331	3,65	32	30,2	18,3
4,08	59,2	43,0	72,9	1,74	315	0,82	7,3	30,2	18,3
3,14	75,3	29,3	49,7	3,25	294	1,91	19	40	21,9
5,03	75,3	54,6	92,7	1,74	315	0,55	5,3	40	21,9
3,69	90,3	32,8	55,6	3,48	315	1,59	17	49,2	25,3
5,81	90,3	60,5	102,7	1,88	342	0,46	4,9	49,2	25,3
4,24	105	38,1	64,7	3,48	315	1,23	13	59	28,6
6,6	105	69,3	117,6	1,91	347	0,38	4,1	59	28,6
5,18	134	48,5	82,4	3,48	315	0,86	9,7	78	35,4
7,54	134	91,0	154,5	1,85	336	0,24	2,8	78	35,4
1,82	42,7	31,0	52,6	1,7	158	1,6	12	21	15
3,14	42,7	52	87,7	1,04	189	0,56	4	21	15
2,51	59,2	39,0	66,3	1,91	173	1,00	98	30,2	18,3
4,08	59,2	66	112,1	1,13	205	0,35	3,1	30,2	18,3
3,14	75,3	51,2	86,9	1,85	168	0,62	6	40	21,9
5,03	75,3	82,0	139,1	1,16	210	0,25	2,4	40	21,9
3,69	90,3	65,6	111,3	1,74	158	0,40	4	49,2	25,3
5,81	90,3	98,4	167	1,16	210	0,18	1,8	49,2	25,3
4,24	105	63,5	107,8	2,09	189	0,44	5	59	28,6
6,6	105	127,1	216	1,04	189	0,11	1,2	59	28,6
5,18	134	73	123,6	2,32	210	038	4,3	78	35,4
7,54	134	146	155	1,16	210	0,09	1,1	78	35,4

perature mounted on 40°C, steel flange (dim. 300x300x20 mm), altitude < 1000 m above sea level. • (4) All parts of motor at 20°C. • (5)Voltage and current

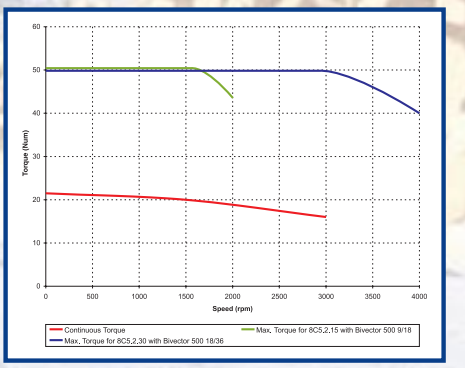
Servomotors 8C5.0



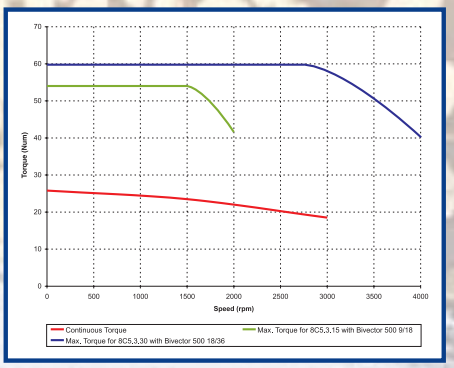
Servomotors 8C5.1



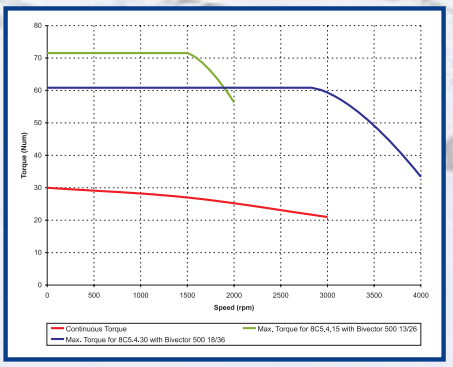
Servomotors 8C5.2



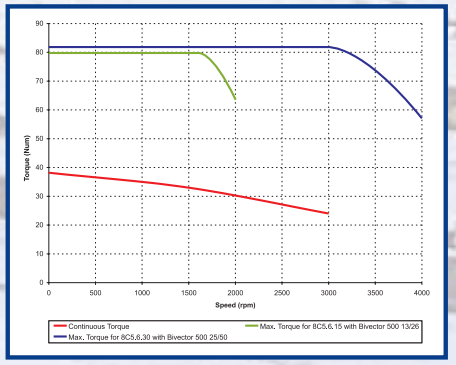
Servomotors 8C5.3



Servomotors 8C5.4



Servomotors 8C5.6



Curves obtained with DC bus voltage 535V

Ordering Code

8C Brushless Servomotors

Position	Code	Description	Options
1	**8**		
2	**C**		
3	X	Transversal Dimensions	
4	X	Size	
5 6	X X	Rated Speed	
7	X	Flange	
8	X	Brake and Resolver	0 - with resolver and without brake 6 - with resolver and with brake
9	X	Connections	V - with Terminal Box (oriented toward A-side) W - with Terminal Box (oriented toward B-side) Y - with connectors (oriented toward A-side) Z - with connectors (oriented toward B-side)
10	X	IP Protection	0 - IP 54 (motor with terminal box) A - IP 65 (motor with connectors)
11	**0**	Mech. Toll. and Vibr. Degree	Mech Tolerance class “N” and Vibr. Degree class “N”
12	X	Keyway and oil-sealer	2 - with keyway and without oil-sealer 3 - without keyway and without oil-sealer
13	**S**		
14	X	Shaft	
15	**3**	Thermal Protection	PTC wired on Signal Connector
16	X	DC Bus Voltage	E - 310 Vdc M - 535 Vdc

Notes: For position 3,4,7 and 14 see Mechanical Drawings • For position 5 and 6 see Electrical Data

8C4.2.30.06V002SGE3E
- servomotor type 8C.4.2.30
- flange type 0 (centering 110; 4 holes Ø10 on dia 130)
- with brake
- with terminal box (IP 54)
- with keyway
- shaft 19j6 x 40
- DC bus voltage 310 Vdc

BVC1DRA000502P
- Bivector 300 (supply: 3-phase 230 Vac)
- Internal braking resistor
- Software for position control
- Current ratings: 5 Arms

Bivector converters

Position	Code	Description	Options
1	**B**		
2	**V**		
3	**C**		
4	X	Braking Resistor	1-Internal S - External (Small) M - External (Medium) L - External (Large)
5	X	Power Supply	D - Three-phase (230 V) H - Three-phase (400 V)
6	**R**		
7	**A**		
8 9	X X	Software Functions	00 - Position Control 01 - Speed Control
10 11	X X	Current Rating	**Bivector 300** 05 - 5 Arms 10 - 10 Arms 14 - 14 Arms 18 - 18 Arms **Bivector 500** 03 - 3,5 Arms 05 - 5,3 Arms 09 - 8,8 Arms 13 - 13 Arms 18 - 18 Arms 25 - 25 Arms
12 13	Y Y	Software Version	
14	**P**		

Drive system specifications and servomotor/converter matchings (Bivector 300)

Servomotor Type	Converter Type	PDS performance			
		Continuous torque at zero speed $M_{0\ (PDS)}$ (1) [Nm]	Peak torque at zero speed $M_{max\ (PDS)}$ (2) [Nm]	Peak torque at rated speed $M_{mn\ (PDS)}$ (3) [Nm]	Rated speed n_N [rpm]
8C Series	**BIVECTOR**				
8C1.1.30... ..E	300-05/10	1,3	4,6	4,3	3000
8C1.1.60... ..E	300-05/10	1,3	3,6	3,6	6000
8C1.2.30... ..E	300-05/10	2,5	7,4	7,4	3000
8C1.2.60... ..E	300-05/10	2,5	5,0	5,0	6000
8C1.3.30... ..E	300-05/10	3,6	8,2	8,2	3000
8C1.3.60... ..E	300-10/20	3,6	8,2	8,2	6000
8C1.4.30... ..E	300-05/10	4,5	9,1	9,1	3000
8C1.4.60... ..E	300-10/20	4,5	9,8	9,8	6000
8C4.0.15... ..E	300-05/10	4	12,0	12,0	1500
8C4.0.30... ..E	300-05/10	4	8,2	8,2	3000
8C4.1.15... ..E	300-05/10	7,5	16,8	16,8	1500
8C4.1.30... ..E	300-10/20	7,5	17,5	17,5	3000
8C4.2.15... ..E	300-05/10	10	19,9	18,7	1500
8C4.2.30... ..E	300-10/20	10	20,6	20,6	3000
8C4.3.15... ..E	300-10/20	12,2	30,3	30,3	1500
8C4.3.30... ..E	300-14/28	12,2	25,8	25,8	3000
8C4.4.15... ..E	300-10/20	15,1	37,5	37,5	1500
8C4.4.30... ..E	300-18/36	15,1	35,6	35,6	3000
8C5.0.15... ..E	300-10/20	12,2	27,5	27,5	1500
8C5.0.30... ..E	300-14/28	12,2	25,7	25,7	3000
8C5.1.15... ..E	300-10/20	16,9	33,7	33,7	1500
8C5.1.30... ..E	300-18/36	16,9	35,8	35,8	3000
8C5.2.15... ..E	300-14/28	21,5	45,7	45,7	1500
8C5.2.30... ..E	300-18/36	18,4 *	36,7	36,7	3000
8C5.3.15... ..E	300-18/36	25,8	55,1	55,1	1500
8C5.3.30... ..E	300-18/36	18,4 *	36,7	36,7	3000
8C5.4.15... ..E	300-18/36	30	66,1	66,1	1500
8C5.4.30... ..E	300-18/36	16,5 *	33,1	33,1	3000
8C5.6.15... ..E	300-18/36	36,7 *	73,4	73,4	1500
8C5.6.30... ..E	300-18/36	18,4 *	36,7	36,7	3000

Drive system specifications and servomotor/converter matchings (Bivector 500)

Servomotor Type	Converter Type	PDS performance			
		Continuous torque at zero speed $M_{0\ (PDS)}$ (1) [Nm]	Peak torque at zero speed $M_{max\ (PDS)}$ (2) [Nm]	Peak torque at rated speed $M_{mn\ (PDS)}$ (3) [Nm]	Rated speed n_N [rpm]
8C Series	**BIVECTOR**				
8C1.1.30... ..M	500-3	1,3	4,6	4,6	3000
8C1.1.60... ..M	500-3	1,3	3,9	3,9	6000
8C1.2.30... ..M	500-3	2,5	6,3	6,3	3000
8C1.2.60... ..M	500-3	2,5	5,6	5,6	6000
8C1.3.30... ..M	500-3	3,6	9,5	9,5	3000
8C1.3.60... ..M	500-5	3,6	8,9	8,9	6000
8C1.4.30... ..M	500-3	4,5	10,2	10,2	3000
8C1.4.60... ..M	500-5	4,5	9,7	9,7	6000
8C4.0.15... ..M	500-3	4	14,0	8,9	1500
8C4.0.30... ..M	500-3	4	9,1	9,1	3000
8C4.1.15... ..M	500-3	7,5	17,8	17,8	1500
8C4.1.30... ..M	500-5	7,5	16,9	16,9	3000
8C4.2.15... ..M	500-3	10	20,3	20,3	1500
8C4.2.30... ..M	500-9	10	25,9	25,9	3000
8C4.3.15... ..M	500-5	12,2	28,5	28,5	1500
8C4.3.30... ..M	500-9	12,2	28,3	28,3	3000
8C4.4.15... ..M	500-5	15,1	32,5	32,5	1500
8C4.4.30... ..M	500-9	15,1	31,3	31,3	3000
8C5.0.15... ..M	500-5	12,2	27,7	27,7	1500
8C5.0.30... ..M	500-9	12,2	26,9	26,9	3000
8C5.1.15... ..M	500-5	16,9	34,1	34,1	1500
8C5.1.30... ..M	500-13	16,9	39,8	39,8	3000
8C5.2.15... ..M	500-9	21,5	50,3	50,3	1500
8C5.2.30... ..M	500-18	21,5	49,6	49,6	3000
8C5.3.15... ..M	500-9	25,8	53,9	53,9	1500
8C5.3.30... ..M	500-18	25,8	59,7	59,7	3000
8C5.4.15... ..M	500-13	30	71,6	71,6	1500
8C5.4.30... ..M	500-18	30	60,6	60,6	3000
8C5.6.15... ..M	500-13	38,2	79,6	79,6	1500
8C5.6.30... ..M	500-25	38,2	81,6	81,6	3000

Notes: (1) for matchings marked by an asterisk "*" the continuous torque at zero speed provided by the PDS is limited by the continuous output current of the converter. • (2) The peak torque provided by the PDS is limited by the converter maximum current value. On request, it is possible to create servomotor/converter matchings or windings to allow the PDS to supply higher peak torques (see Table 2/5). • (3) Mmn: it si the maximum peak torque (except for rotational losses) the PDS can supply, at rated speed, with a rated value of the power supply voltage.

Synchronous reluctance servomotors

255 Series - Synchronous Reluctance Motors

The 255 Serie is a 4-pole motor made up of

- a transversally laminated rotor, with a patented special geometry to obtain high saliency (no permanent magnets, no aluminum cage)
- a 3-phase wound slotted stator to work with sinusoidal currents to provide reluctance torque.

The enhanced (patented) design of this combination allows very low torque ripple in the whole range of torque/ speed capability.

The main difference vs. the usual permanent magnet brushless servomotors is the absence of permanent magnets

➡ cost saving of both material and manufacturing

➡ no cogging torque

➡ no demagnetizing risks

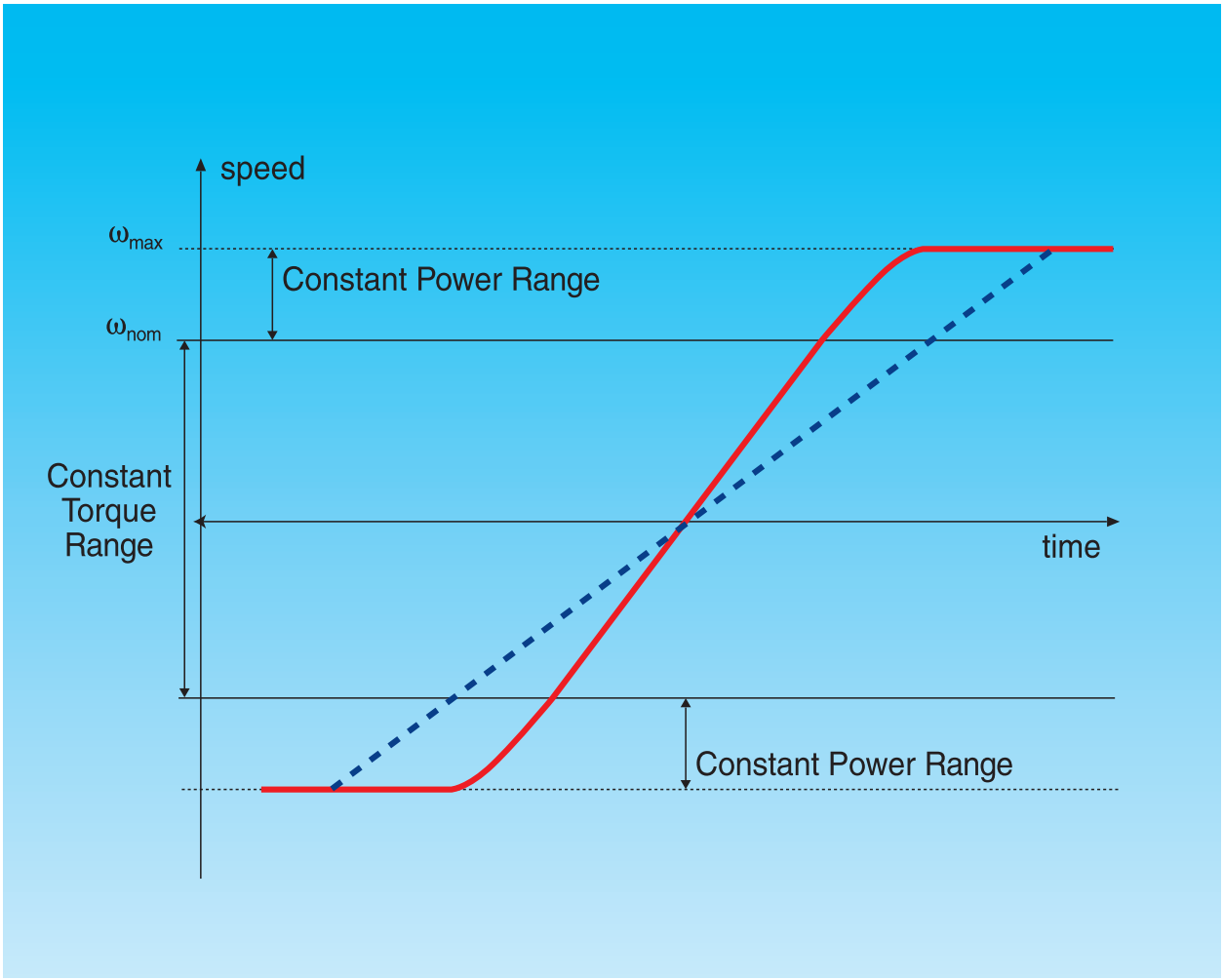
➡ torque constant (Nm/A) independent from temperature

➡ constant power operation (flux weakening)

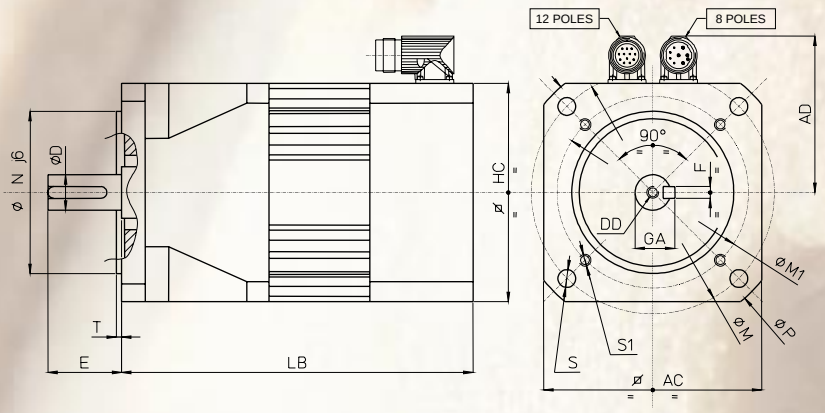
Possible applications:

- all high dynamic motion control applications where traditional permanent magnet brushless servomotors are used. In particular where very high accelerations or repeatability of delivered torque under variable thermal conditions are requested
- applications where constant power range is needed
- this motor is especially suited in extreme conditions where external or internal cooling is required

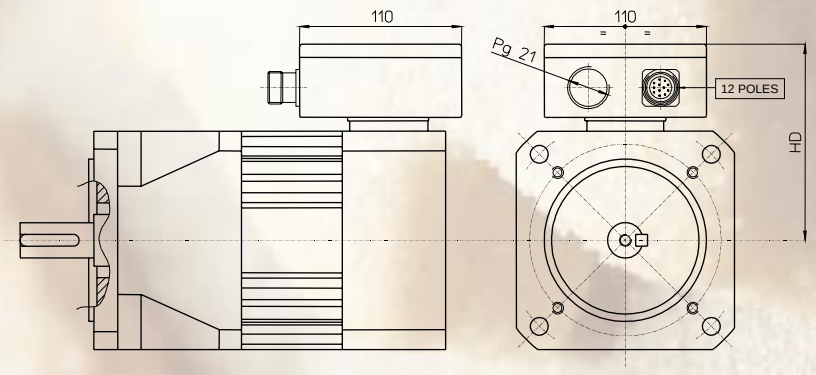
The versatility of this motor series makes is possible to solve new applications and opens new opportunities for technology enhancement.



Synchronous reluctance servomotors type	Continuous torque at zero speed M_0 [Nm]	Peak torque M_{max} [Nm]	Rated speed n_N [rpm]	Moment of inertia of rotor J_m [kgcm^2]	Mass m [kg]	310V$_{BUS}$ Continuous current at zero speed I_0 [A]	535V$_{BUS}$ Continuous current at zero speed I_0 [A]
255.0.15	7.0	22.5	1500	17.1	15.4	4.7	2.8
255.0.30	7.5	22.5	3000	17.1		9.3	5.2
255.1.15	10	30	1500	23.9	17.9	7.2	4.2
255.1.30	10	30	3000	23.9		13.9	7.9
255.2.15	13	39	1500	31.2	19.9	9.4	5
255.2.30	13	39	3000	31.2		17.9	8.5
255.3.15	15.5	46.5	1500	38.7	23.2	10	5.3
255.3.30	15.5	46.5	3000	38.7		17.1	11.4
255.4.15	18	54	1500	46.4	27.2	12.6	7.4
255.4.30	18	54	3000	46.4		27.3	12.6
255.5.15	21	63	1500	53.8	30.4	13.6	7.8
255.5.30	21	63	3000	53.8		32.6	16.3
255.6.15	23.5	70.5	1500	60.6	33.3	16.1	8.5
255.6.30	23.5	70.5	3000	60.6		32.2	17.9
255.7.15	27	81	1500	70.4	37.4	17.6	8.8
255.7.30	27	81	3000	70.4		39.7	22.7



Overall dimension drawings of 255 Series servomotors with connectors



Overall dimension drawings of 255 Series servomotors with connection box

TYPE		LB	AC	N	T	M	S	M1	S1	P	D	E	DD	F	GA	AD	HC	HD
255.0	0..A..SL..	271	148	130	3.5	165	Ø12	/	/	190	24 j6	50	M8x19	8	27	116	148	133
255.1		296																
255.2		315																
255.3		348																
255.4		387																
255.5		418																
255.6		447									32 k6	58	M12x28	10	35			
255.7		487																
255.0	4..A..SL..	271	148	110	4	165	Ø12	130	M8x12	190	24 j6	50	M8x19	8	27	116	148	133
255.1		296																
255.2		315																
255.3		348																
255.4		387																
255.5		418																
255.6		447									32 k6	58	M12x28	10	35			
255.7		487																

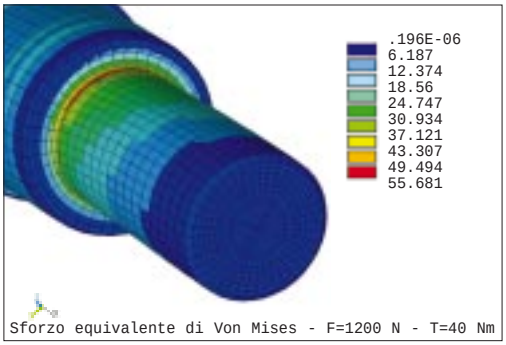


ABB Servomotors R&D Team

- skilled and motivated engineers for the design, test and application of complete drivers (Motors & Convertors)
- up-to-date tools, such as CAD workstations for mechanical and electrical design and dedicated SW for the computer assisted calculation of electroma-gnetic circuits
- always on the leading edge of technology thanks to the scientific support of Universities
- ready to support customers for all applications, and to provide tailor-made solutions when necessary.

ABB Servomotors
Frazione Stazione Portacomaro 97/C
14100 Asti
Tel. +39.0141.276111
Fax +39.0141.276294

Ufficio Export
Viale Edison, 50
20099 Sesto San Giovanni - MI
Tel. +39.02.26232.565/562
Fax +39.02.26232.972

COMPANY WITH QUALITY SYSTEM CERTIFIED BY DNV ISO 9002