

*Synchronous Servomotors*

**BTD - BCR**





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*Industry Process and Automation Solutions***Symbols and units of measure**

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Symbol	U.m.	Description
$n_n$	$[\text{min}^{-1}]$	Rated speed
$M_n$	$[\text{Nm}]$	Rated torque
$P_n$	$[\text{kW}]$	Rated power
$I_n$	$[\text{A}]$	Rated current
$M_0$	$[\text{Nm}]$	Stall torque
$I_0$	$[\text{A}]$	Stall current
$M_{\text{max}}$	$[\text{Nm}]$	Peak torque
$I_{\text{max}}$	$[\text{A}]$	Peak current
$n_{\text{max}}$	$[\text{min}^{-1}]$	Max. speed
$K_T$	$[\text{Nm/A}]$	Torque constant
$K_E$	$[\text{V}/1000\text{min}^{-1}]$	Counter-electromotive force constant
$R_{\text{pp}}$	$[\ ]$	Statoric resistance between two phases
$L_{\text{pp}}$	$[\text{mH}]$	Statoric inductance between two phases
$\tau_{\text{el}}$	$[\text{ms}]$	Electric time constant
$\tau_{\text{therm}}$	$[\text{min}]$	Thermal time constant
$J_M$	$[\text{Kgcm}^2]$	Motor moment of inertia
$m$	$[\text{kg}]$	Mass (weight) of motor
$J_{\text{Br}}$	$[\text{Kgcm}^2]$	Holding brake moment of inertia
$m_{\text{Br}}$	$[\text{Kg}]$	Weight of holding brake
$M_{\text{Br}}$	$[\text{Nm}]$	Torque of holding brake
$P_{\text{Br}}$	$[\text{W}]$	Electrical power absorbed by holding brake
$V_{\text{Br}}$	$[\text{V}]$	Supply voltage to holding brake
$t_{\text{BrC}}$	$[\text{ms}]$	Braking torque stabilisation time from voltage disconnect to brake
$t_{\text{BrS}}$	$[\text{ms}]$	Reduction time to 10% of braking torque from voltage reconnect to brake

## *Product description*

These brushless, sinusoidal motors are designed for a three phase power supply, 200 V AC and 330 V AC, and feature free ventilation. All models are equipped with a thermistor type temperature sensor.

These synchronous servomotors are ideal for applications in machines with high dynamic requirements. They are particularly suited to robotic applications in plastic and metal machining, packaging, food and beverage processing, winding and textile industries.

They are manufactured using the latest technology for optimised magnetic circuitry and electric motor windings and offer significantly improved torque reserve and motor longevity.

BTD and BCR Series servomotors can only be controlled in speed and/or torque by a suitable electronic servo drive. The servo drive therefore constitutes an integral part of the actuator and requires perfect synchronisation with it in order to achieve optimum performance.

The combination of BTD and BCR servomotors with frequency inverters from Bonfiglioli Vectron's ACTIVE CUBE Series guarantees excellent synergy by optimising the mathematical model of the motor in the drive using a self-learning function assisted by the frequency inverter's own configuration software. For further information on frequency inverters, refer to the **Bonfiglioli Vectron Active Cube** catalogues and manuals.

BTD and BCR Series motors are designed for use as part of a machine and should only be installed after a thorough check on compatibility with other devices.

Since each servomotor has a protective temperature sensor (PTC) integrated in the motor windings, operating temperature is constantly acquired and monitored by the drive to prevent all risk of damage to the motor irrespective of operating conditions.

An optional electromechanical holding brake is available for all models. Brake operation is controlled entirely by the frequency inverter.

Always bear in mind that synchronous servomotors are designed for use by expert mechatronic technicians.

## *Standards and directives*

BTD and BCR Series servomotors conform to the requirements of EEC directive 73/23 (Low Voltage Directive) and EEC directive 89/336 (Electromagnetic Compatibility Directive) and carry the CE mark on their data plate.

For the purposes of the EMC Directive, they are manufactured according to CEI EN standard 60034-1 section 12, EN 50081, EN 50082.

Even if fitted with electromechanical brakes, these motors still fall within the emission limits specified by EN 50081-1 "Electromagnetic Compatibility – Generic Requirements - Part 1: Residential, commercial and light industry".

They also satisfy the requirements of CEI EN standard 60204-1 "Electrical equipment of machines".

They likewise conform to CEI EN 61000-6-4 "Electromagnetic compatibility, Part 6-4: generic standards, Emission standards for industrial environments" and CEI EN 61000-6-2 Ed. 2 "Electromagnetic compatibility (EMC), Part 6-2: generic standards, Immunity for industrial environments".

As far as UL conformity for the North American market is concerned, these Bonfiglioli servomotors satisfy the requirements of UL 1004 (file number E 321737).

It is the responsibility of the manufacturer or assembler of the machine in which these motors are incorporated to ensure the safety of that machine as a whole and its conformity to all relevant end product directives.

# BTD - BCR

## The Bonfiglioli Vectron servomotor range



The Bonfiglioli Vectron servomotor range is made up of two series of actuators, one designated BCR and the other BTD. The difference between the two series lies in the extension of their speed and torque interval as well their overload and efficiency.

That is reached thanks two different construction technologies:

- standard wound-stator technology for BCR
- advanced wound-poles technology for BTD.

Thanks to features above, BCR offers a wide torque range and a significant overload capacity, as well BTD provide a high dynamic coefficient and high efficiency.

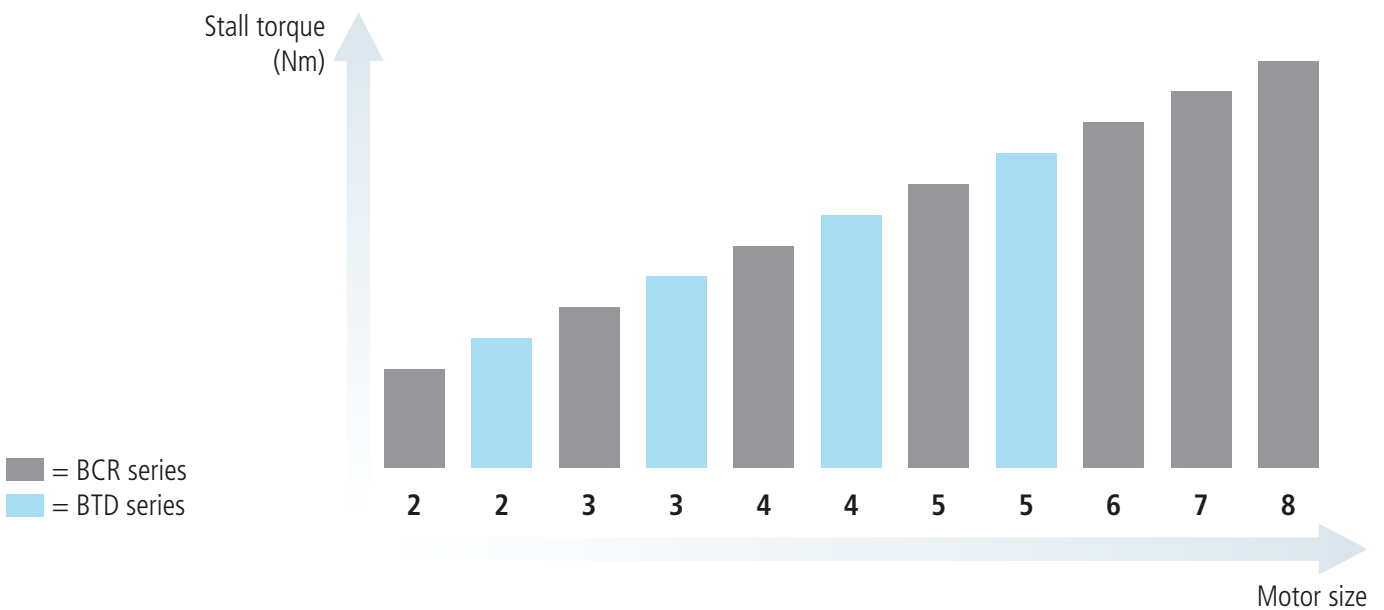
Each series is split on several sizes corresponding to equal flange dimension.

Each flange is available on several motor length able to provide as many torque levels.

BCR series warrant continuous duty torque up to 115 Nm with 400% overload.

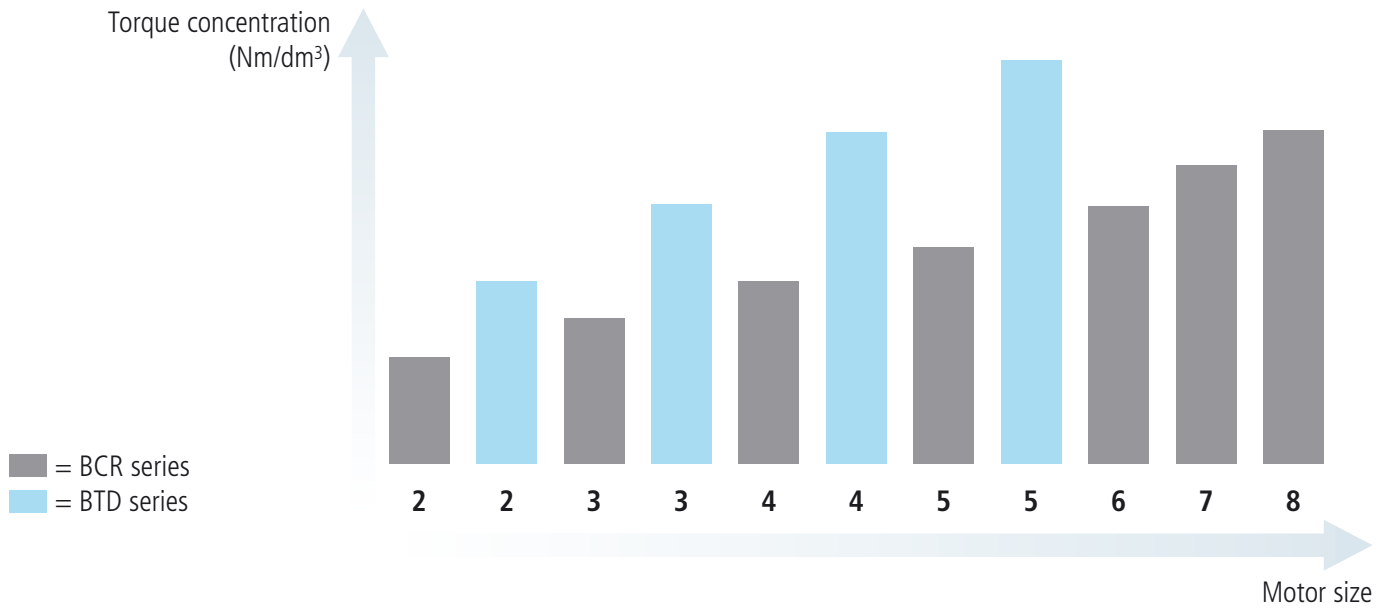
BTD series fulfils the needs of compactness where the torque comes out from space saving. The winding construction and permanent magnets quality allows to reach torque density up to 16 Nm/dm<sup>3</sup>.

### Torque distribution

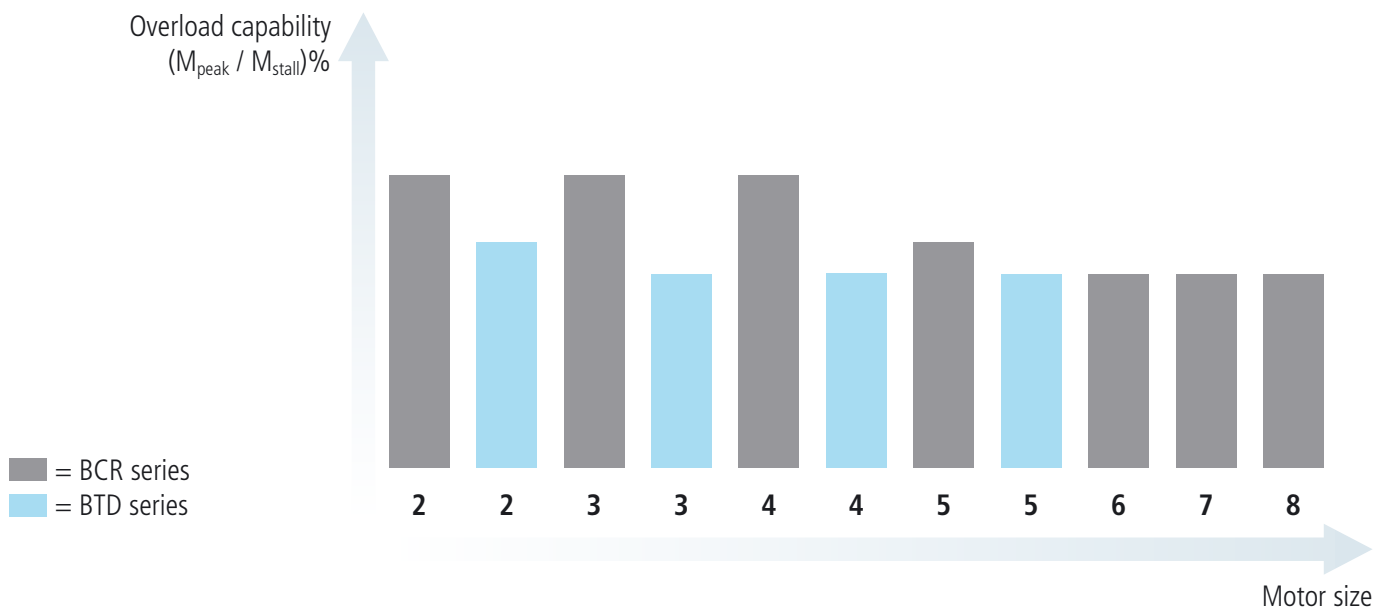


BCR and BTD share out the torque range and overall dimensions with extreme efficiency, offering a wide spectrum of application solutions characterized by strong dynamics and rational compactness.

**Specific torque**



**Dynamic torque**



# 6 **BTD - BCR** The Bonfiglioli Vectron servomotor range

BTD and BCR series are the ideal solutions for designers of servosystems which find always in them a successful answer to opposed needs of dynamics and compactness.

Every motion control application find its right solution choosing among BTD or BCR:

- high torque and high overload
- high torque and narrow space
- high torque and high efficiency
- high overload and wide torque range

### **BTD series**

High torque density, high efficiency, compact dimensions





Bonfiglioli servomotors are technically identified by their designation. This consists of a rigorous succession of alphanumeric characters, whose positions and values conform to precise rules and define the characteristics of the product.

The complete designation provides a unique identification of the exact servomotor configuration and distinguishes it from all the other possible configurations available from the catalogue.

The designation is made up of two main parts, containing fields for:

- BASIC variants
- OPTIONAL variants

Both the basic variant and optional variant sections of the designation are divided into fields, each of which defines a particular design feature of the motor.

The basic variant fields are all mandatory. Those of the optional variants are only used if the motor has different characteristics to those that are standard for the basic variants.

Each Bonfiglioli servomotor is identified by its series (BCR or BTD), size (2, 3, 4, 5, 6, 7, 8), (stall) torque, (rated) speed and AC supply voltage.

The BASIC variant fields are used to designate the 5 properties of BCR and BTD servomotors listed above and define the following standard characteristics:

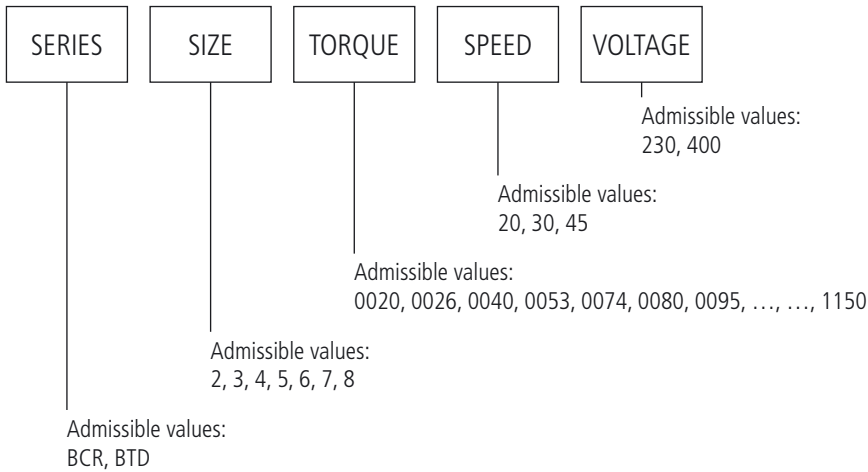
- Standard geometric dimensions (see the technical specifications section)
- IP65 index of protection
- Motor shaft without keyway
- No electromechanical holding brake
- 2-pole feedback resolver
- Vertically fixed 8 - pin power connectors
- Vertically fixed 12 - pin control connectors
- CE, UL and cUL certification

Any deviation from the above standard characteristics implies an OPTIONAL variant. This is expressed using the next 8 optional fields in the designation string.

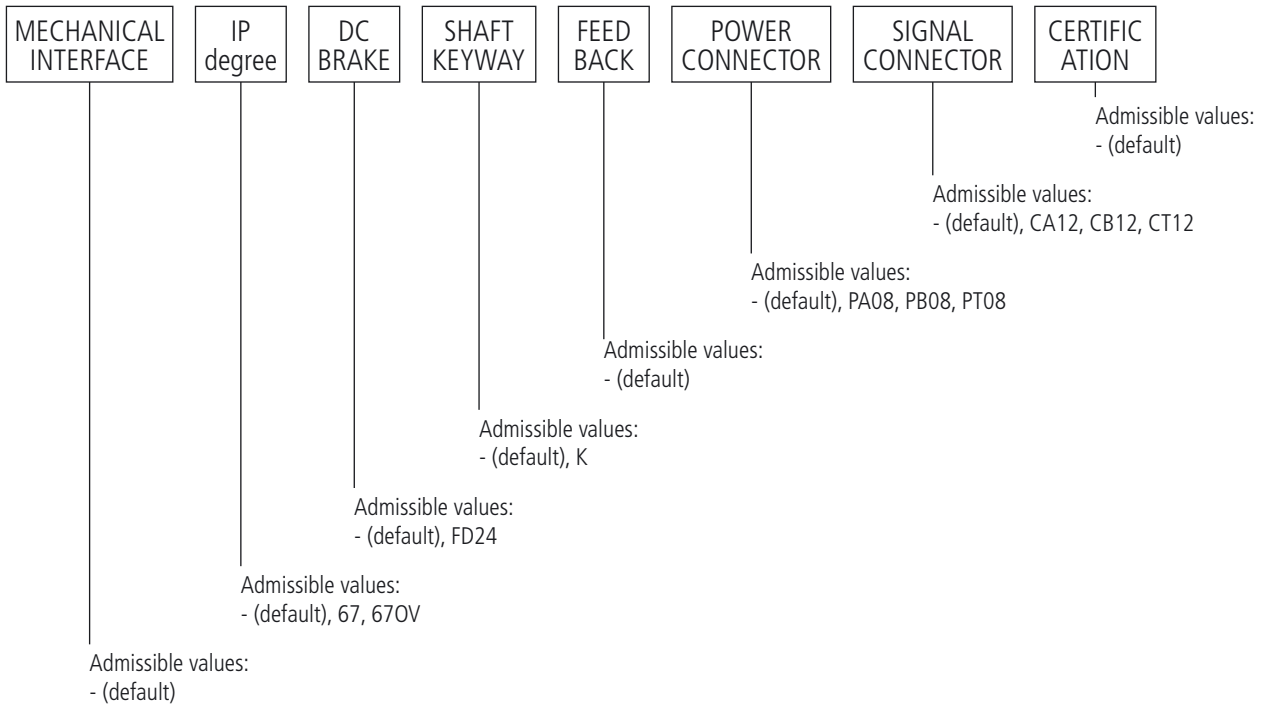
All basic variant and optional variant fields can assume only one value at a time. These values are selected from a limited set of pre-defined values for each field in the designation.

On the basis of these rules, the structure of the designation can be represented as follows:

BASIC variants



OPTIONAL variants

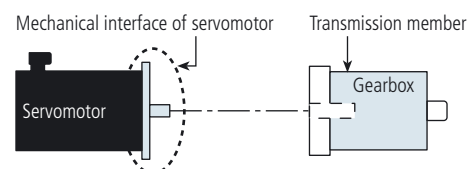






Concerning BTD and BCR servomotors, the physical part in charge of coupling with other transmission components (gearboxes, joints, ...) is named Mechanical Interface.

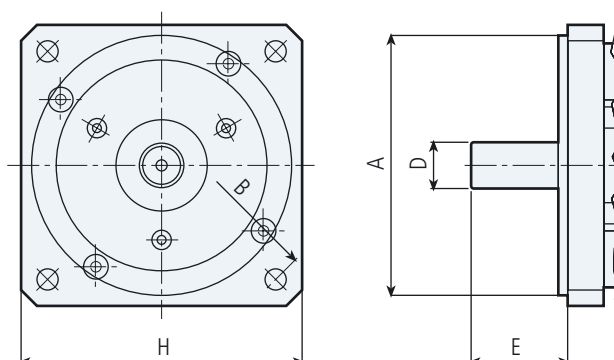
Therefore the Mechanical Interface is a part of the motor and includes both flange and shaft univocally defined by its geometrical dimensions.



The flange and the shaft of BTD and BCR are described by fixed geometrics according to a standard Bonfiglioli configuration oriented to coupling with gearboxes, but also available to be adapted to other application requirements.

**Mechanical interface = connection Flange + transmission Shaft**

The interface geometry is defined by quantities H, B, A, D, E published in the side drawing whose numerical values (mm) depend on motor series and motor size.



The basic configuration of BTD and BCR servomotors is defined by the following table:

**IMB table (Basic Mechanical Interface)**

		Servomotor							
		BTD2 BCR2	BTD3 BCR3	BTD4 BCR4	BTD5 BCR5	BCR6	BCR7	BCR8	
Mechanical interface	ø shaft (D) [mm]	9	14	19	24	24	28	38	42
	Shaft lenght (E) [mm]	21,5	27	37	46,5	46,5	54	76	106
	ø motor centering (A) [mm]	40	80	95	130	180	180	230	230
	ø holes distance (B) [mm]	63	100	115	165	215	215	265	265
	Flange (H) [mm]	55	86	98	142	190	190	240	240

The data of the table correspond to blank character into designation field named "mechanical interface".

Different interface dimensions can be agreed together Bonfiglioli Drive Service Centre upon technical evaluation and feasibility analysis of application.

The modern magnet and electrical circuits employed in BTD allow to reduce the temperature and to increase the motor torque keeping limited the dimensions.

The BTD series is developed in 4 sizes identified by progressive digits (from 2 to 5) corresponding to identical quantity of flanges designed for defined coupling with gearboxes.

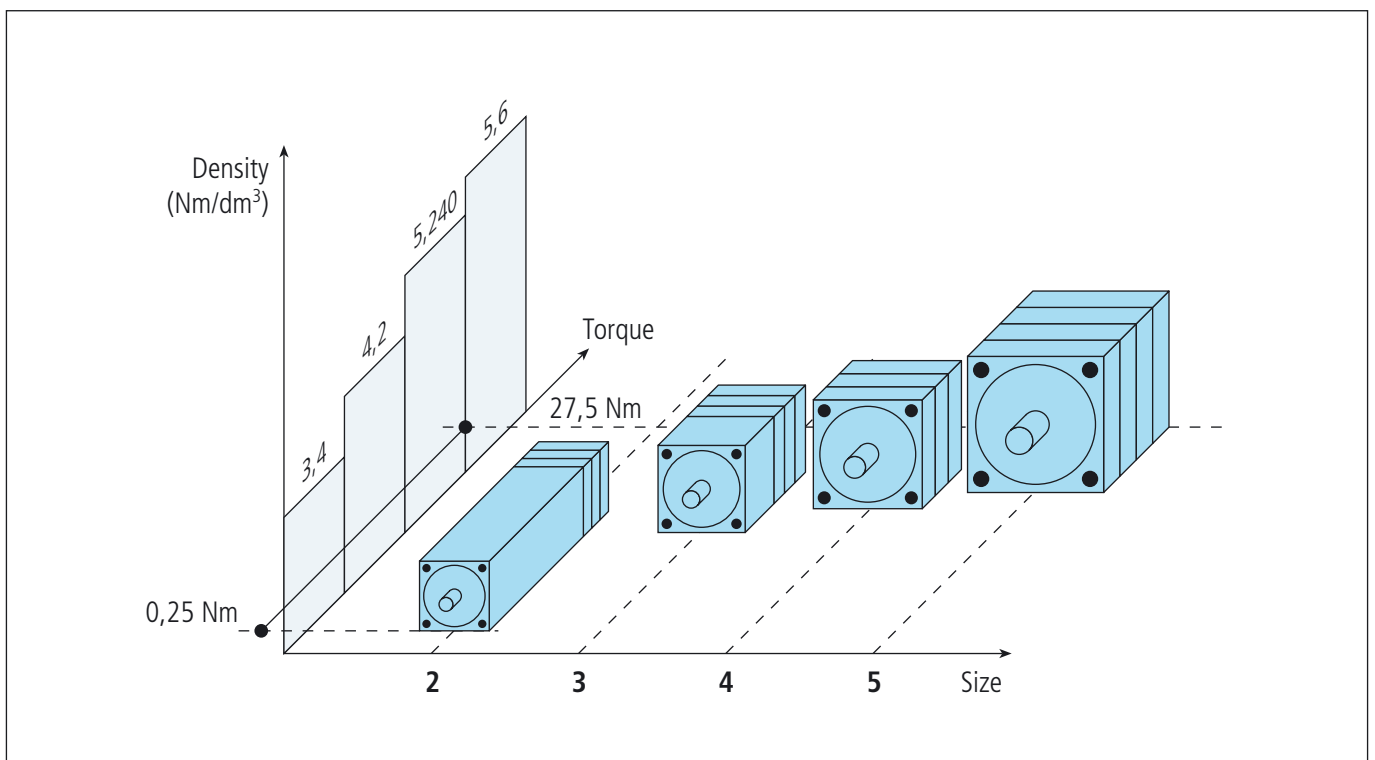
To each size of flange several torque values are available corresponding to different motor length from which it is possible to extract great torque quantities inside reduced volumes.

The meaning of the name is the following:

BTD = **B**rushless-**T**orque-**D**ensity

The high torque concentration ( $3.4 \div 5.6 \text{ Nm/dm}^3$ ) makes the BTD able to fulfil the applications in which a space saving is required without renouncing to performances.

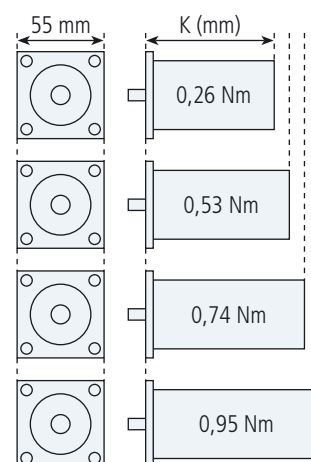
Series	Size	Flange [mm]	Speed [min <sup>-1</sup> ]	Stall torque [Nm]				Torque density [Nm/dm <sup>3</sup> ]
BTD	2	55	4500	0,26	0,53	0,74	0,95	3,4
	3	86	3000	0,95	1,9	3,25	4,2	4,2
	4	98	3000	4,1	6,3	8,6	-	5,2
	5	142	3000	11,6	14,9	18,7	27,3	5,6



All BTD servomotors belonging to size 2 are equipped by the same geometrical flange, whereas they are differentiated by the length correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

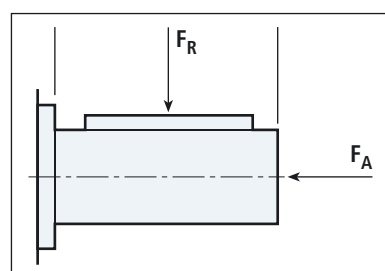
Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BTD2-0026	0,26	4500	55	67	105
BTD2-0053	0,53			82	120
BTD2-0074	0,74			97	135
BTD2-0095	0,95			112	150



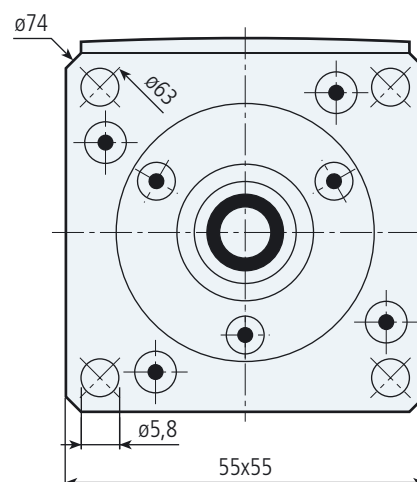
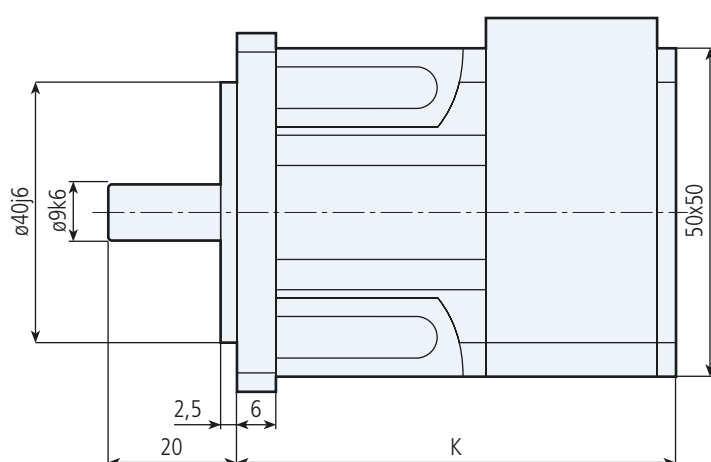
The motor size BTD2 is structured on four torque levels corresponding to different four motor lengths with nominal speed equal to 4500 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial F <sub>R</sub>	Axial F <sub>A</sub>
BTD2-0026	219	42
BTD2-0053	234	45
BTD2-0074	245	46
BTD2-0095	252	48



# BTD2 400V

Motor		BTD2-0026-45-400	BTD2-0053-45-400	BTD2-0074-45-400	BTD2-0095-45-400
Stall torque	$M_o$ [Nm]	0.26	0.53	0.74	0.95
Rated speed	$n_n$ [min <sup>-1</sup> ]	4500	4500	4500	4500
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330	330
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.24	0.45	0.67	0.84
Rated AC current	$I_n$ [A]	0.68	0.66	0.89	1.19
Stall AC current	$I_o$ [A]	0.42	0.73	0.96	1.31
Torque peak	$M_{max}$ [Nm]	1.0	2.0	2.8	3.6
Current peak	$I_{max}$ [A]	1.7	3.0	3.9	5.3
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	37.5	44.0	47.0	44.0
Torque constant	$K_T$ [Nm/A]	0.62	0.73	0.78	0.73
Rated power	$P_n$ [W]	110	210	315	395
Phase to phase stator resistance	$R_{pp}$ [Ω]	106	54	37.9	21.6
Phase to phase stator inductance	$L_{pp}$ [mH]	176.0	104.0	70.0	49.1
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.06	0.08	0.10	0.12
Electrical time constant	$\tau_{el}$ [ms]	1.7	1.9	1.8	2.3
Thermal time constant	$\tau_{th}$ [min]	13	15	20	22
Mechanical time constant	$\tau_{mec}$ [ms]	2.9	1.4	1.1	0.8
Weight without brake	$m_M$ [kg]	0.750	0.920	1.090	1.260
Weight with brake	$m_{MF}$ [kg]	1.190	1.360	1.530	1.700

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

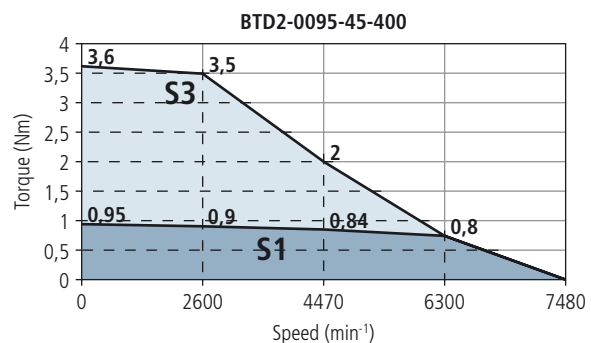
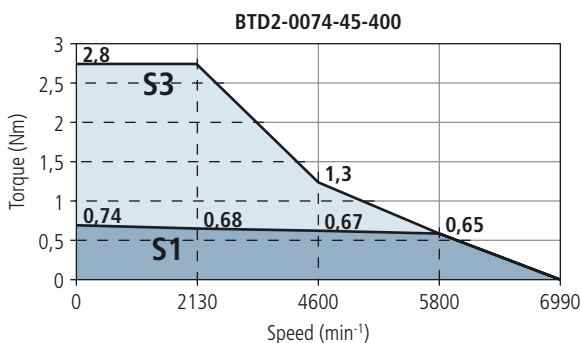
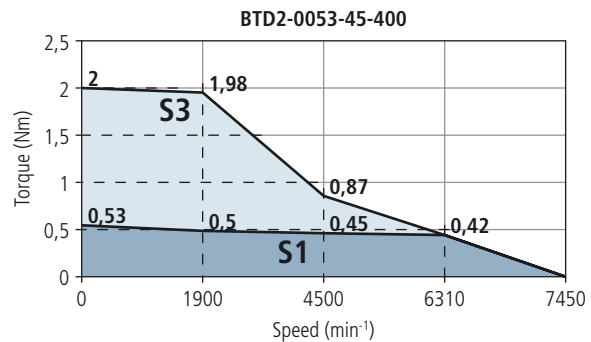
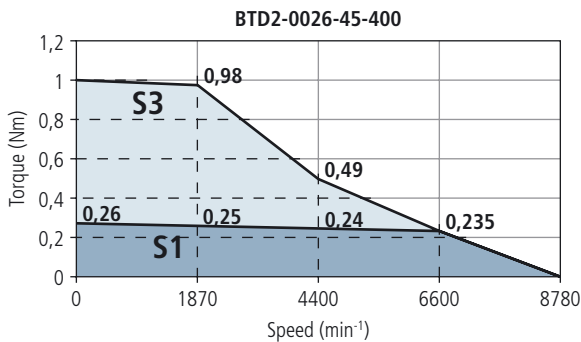
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C





Motor		BTD2-0026-45-230	BTD2-0053-45-230	BTD2-0074-45-230	BTD2-0095-45-230
Stall torque	$M_o$ [Nm]	0.26	0.53	0.74	0.95
Rated speed	$n_n$ [min <sup>-1</sup> ]	4500	4500	4500	4500
Inverter DC-bus	$V_{dc}$ [V]	320	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200	200
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.24	0.45	0.67	0.84
Rated AC current	$I_n$ [A]	0.68	1.11	1.55	1.90
Stall AC current	$I_o$ [A]	0.70	1.26	1.66	2.10
Torque peak	$M_{max}$ [Nm]	1.0	2.0	2.8	3.6
Current peak	$I_{max}$ [A]	2.9	5.1	6.7	8.5
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	21.0	25.5	27.0	27.5
Torque constant	$K_T$ [Nm/A]	0.37	0.42	0.45	0.45
Rated power	$P_n$ [W]	110	210	315	395
Phase to phase stator resistance	$R_{pp}$ [Ω]	36.8	17.4	12.1	8.4
Phase to phase stator inductance	$L_{pp}$ [mH]	62.0	34.1	22.8	19.4
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.06	0.08	0.10	0.12
Electrical time constant	$\tau_{el}$ [ms]	1.7	2.0	1.9	2.3
Thermal time constant	$\tau_{th}$ [min]	13	15	20	22
Mechanical time constant	$\tau_{mec}$ [ms]	3.2	1.4	1.0	0.8
Weight without brake	$m_M$ [kg]	0.750	0.920	1.090	1.260
Weight with brake	$m_{MF}$ [kg]	1.190	1.360	1.530	1.700

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

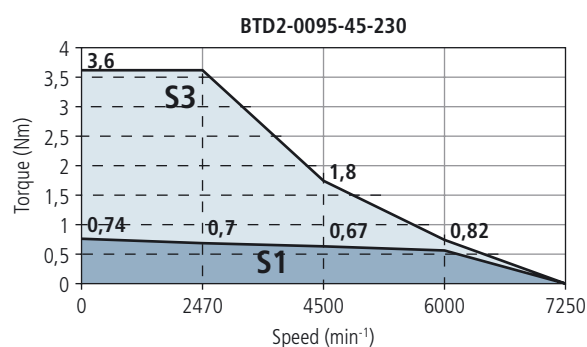
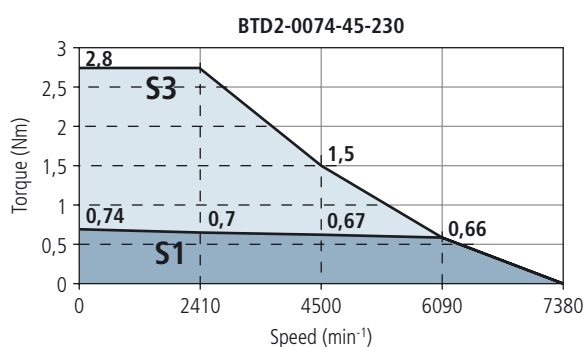
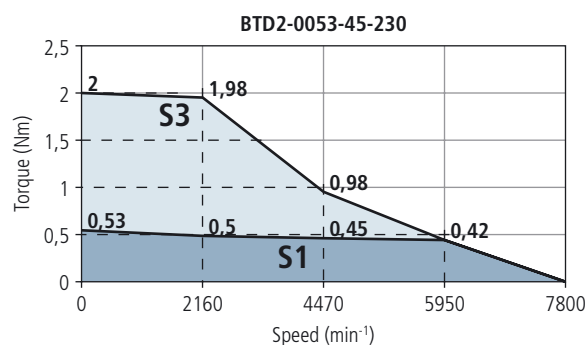
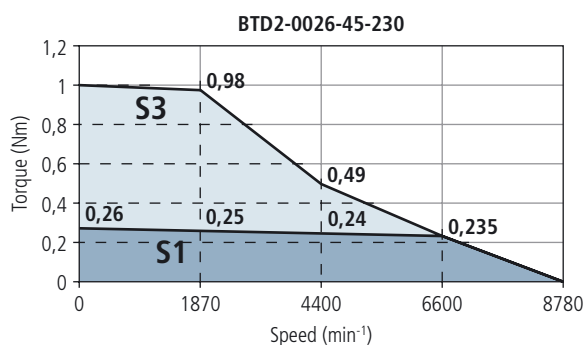
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

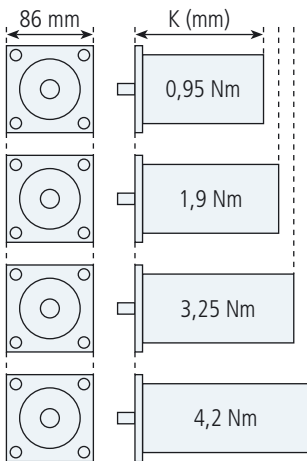
Torque-speed characteristic:

ambient temperature 40°C



All BTD servomotors belonging to size 3 are equipped by the same geometrical flange, whereas they are differentiated by the length correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

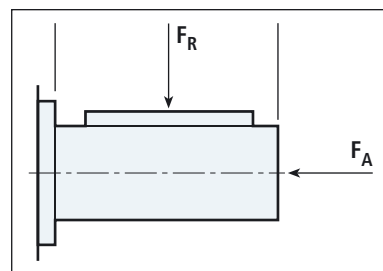


Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BTD3-0095	0,95	3000	86	95	135
BTD3-0190	1,9			113	153
BTD3-0325	3,25			149	189
BTD3-0420	4,2			185	225

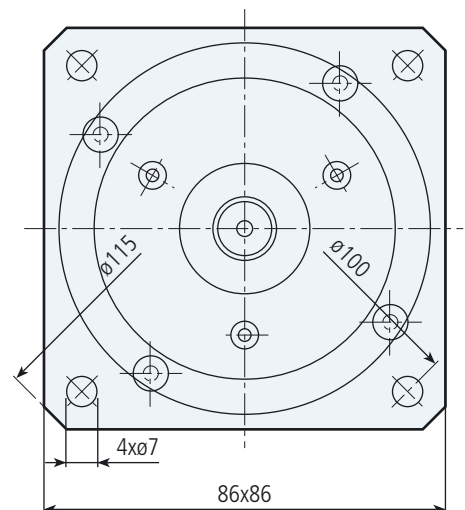
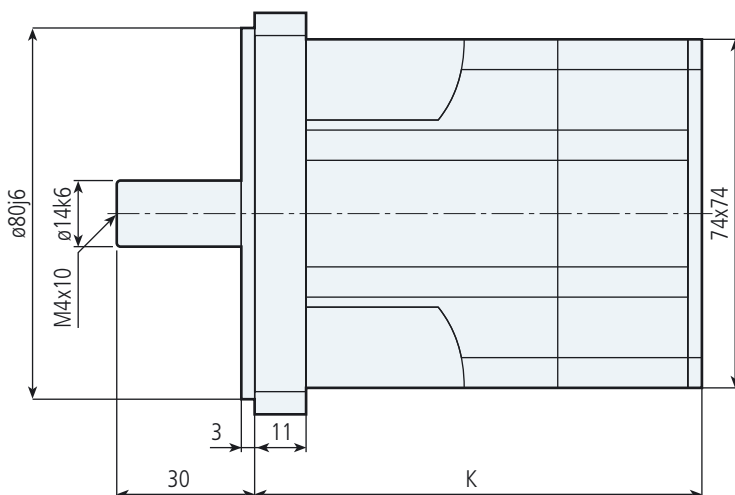
The motor size BTD3 is structured on four torque levels corresponding to different four motor lengths with nominal speed equal to 3000 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial $F_R$	Axial $F_A$
BTD3-0095	335	64
BTD3-0190	368	70
BTD3-0325	406	77
BTD3-0420	427	81



Motor		BTD3-0095-30-400	BTD3-0190-30-400	BTD3-0325-30-400	BTD3-0420-30-400
Stall torque	$M_o$ [Nm]	0.95	1.9	3.25	4.2
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330	330
Motor poles number	$p_{mot}$	10	10	10	10
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.86	1.6	2.9	3.1
Rated AC current	$I_n$ [A]	1.28	1.46	2.3	2.3
Stall AC current	$I_o$ [A]	1.32	1.66	2.4	3
Torque peak	$M_{max}$ [Nm]	2.4	5.2	9.5	12.3
Current peak	$I_{max}$ [A]	4.9	6.7	10.6	12.9
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	43.5	69	81	86
Torque constant	$K_T$ [Nm/A]	0.72	1.14	1.34	1.42
Rated power	$P_n$ [W]	270	500	910	970
Phase to phase stator resistance	$R_{pp}$ [Ω]	12.6	11.6	6.5	4.6
Phase to phase stator inductance	$L_{pp}$ [mH]	38	42.3	30.6	26.1
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.5	0.7	1.1	1.5
Electrical time constant	$\tau_{el}$ [ms]	3	3.6	4.7	5.7
Thermal time constant	$\tau_{th}$ [min]	25	30	33	36
Mechanical time constant	$\tau_{mec}$ [ms]	2.1	1.1	0.7	0.6
Weight without brake	$m_M$ [kg]	1.525	2.090	3.220	4.350
Weight with brake	$m_{MF}$ [kg]	2.115	2.680	3.810	4.940

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

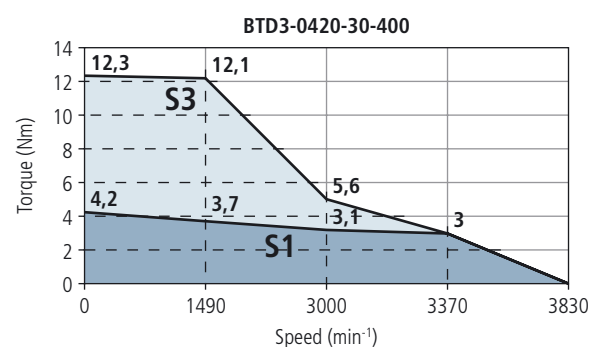
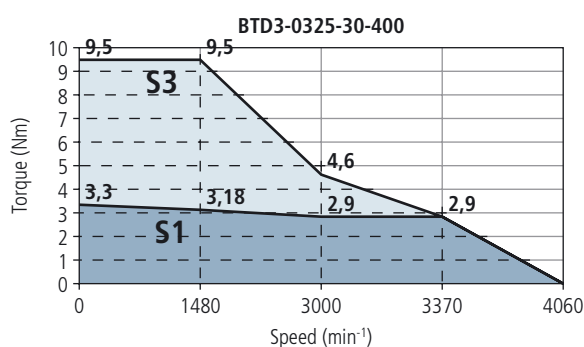
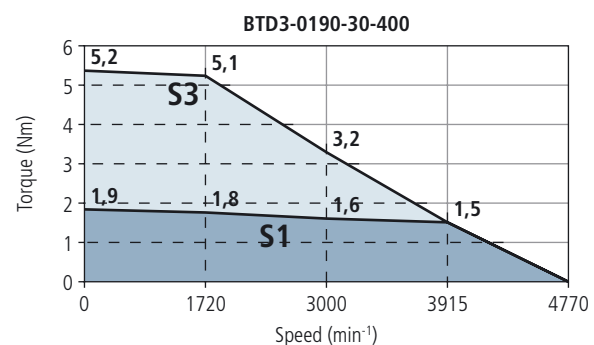
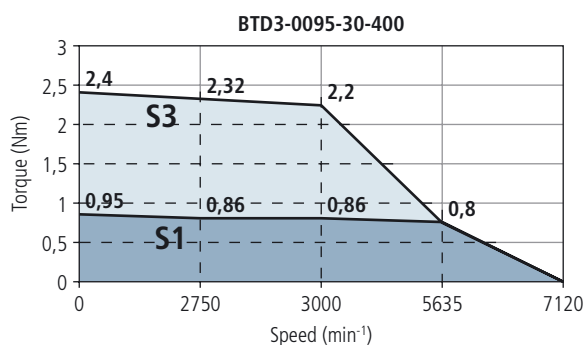
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C



# BTD3 230V

Motor		BTD3-0095-30-230	BTD3-0190-30-230	BTD3-0325-30-230	BTD3-0420-30-230
Stall torque	$M_o$ [Nm]	0.95	1.9	3.25	4.2
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	320	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200	200
Motor poles number	$p_{mot}$	10	10	10	10
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.86	1.6	2.9	3.1
Rated AC current	$I_n$ [A]	1.43	2.4	4	3.7
Stall AC current	$I_o$ [A]	1.47	2.8	4.3	4.8
Torque peak	$M_{max}$ [Nm]	2.4	5.2	9.5	12.3
Current peak	$I_{max}$ [A]	5.4	11.1	18.6	21
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	39	41.5	46	53
Torque constant	$K_T$ [Nm/A]	0.65	0.69	0.76	0.88
Rated power	$P_n$ [W]	270	500	910	970
Phase to phase stator resistance	$R_{pp}$ [Ω]	9.9	4	2.2	1.77
Phase to phase stator inductance	$L_{pp}$ [mH]	30.6	15.4	9.8	10
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.5	0.7	1.1	1.5
Electrical time constant	$\tau_{el}$ [ms]	3.1	3.9	4.5	5.6
Thermal time constant	$\tau_{th}$ [min]	25	30	33	36
Mechanical time constant	$\tau_{mec}$ [ms]	2.1	1.0	0.7	0.6
Weight without brake	$m_M$ [kg]	1.525	2.090	3.220	4.350
Weight with brake	$m_{MF}$ [kg]	2.115	2.680	3.810	4.940

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

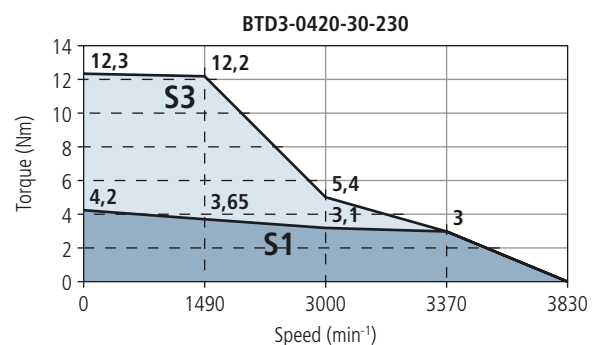
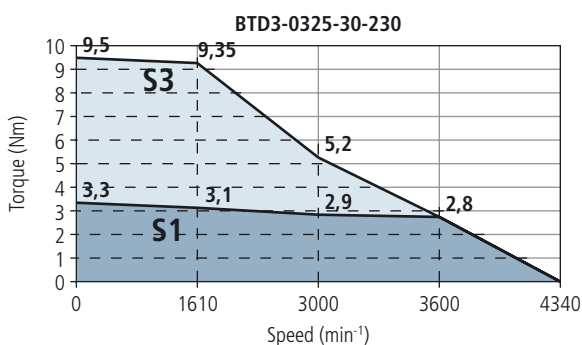
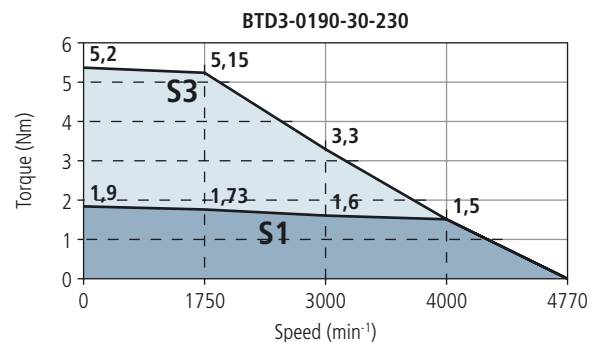
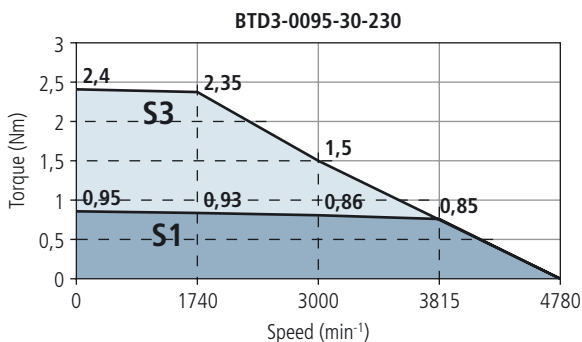
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

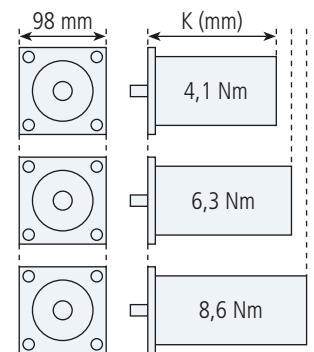
ambient temperature 40°C



All BTD servomotors belonging to size 4 are equipped by the same geometrical flange, whereas they are differentiated by the length correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

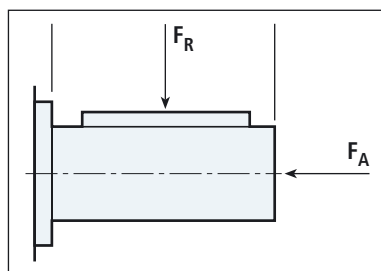
Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BTD4-0410	4,1	3000	98	125	166
BTD4-0630	6,3			155	196
BTD4-0860	8,6			185	226



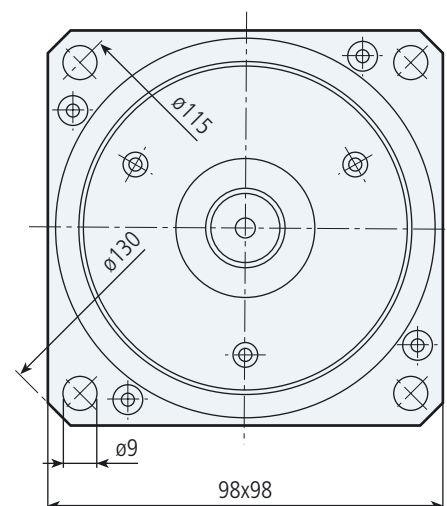
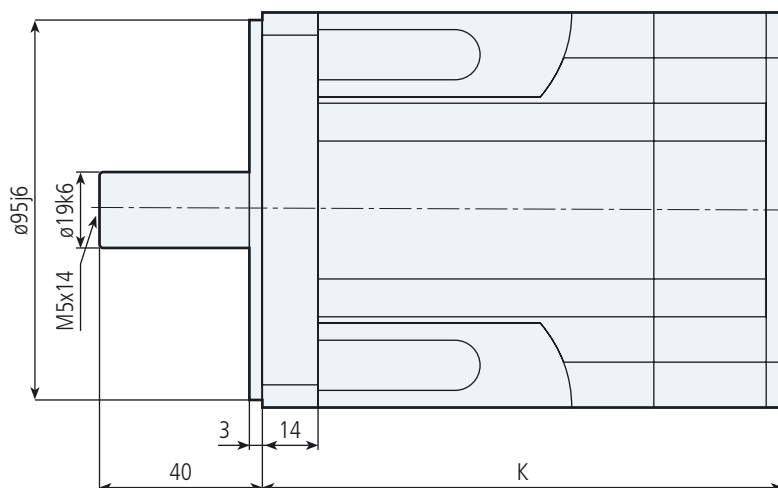
The motor size BTD4 is structured on three torque levels corresponding to different three motor lengths with nominal speed equal to 3000 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial $F_R$	Axial $F_A$
BTD4-0410	594	113
BTD4-0630	648	123
BTD4-0860	682	130



# BTD4 400V

Motor		BTD4-0410-30-400	BTD4-0630-30-400	BTD4-0860-30-400
Stall torque	$M_o$ [Nm]	4.1	6.3	8.6
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330
Motor poles number	$p_{mot}$	10	10	10
Resolver poles number	$p_{res}$	2	2	2
Rated torque	$M_n$ [Nm]	3.2	4.6	6.1
Rated AC current	$I_n$ [A]	2.8	3.6	4.8
Stall AC current	$I_o$ [A]	3.4	4.77	6.4
Torque peak	$M_{max}$ [Nm]	11.1	18.5	27
Current peak	$I_{max}$ [A]	13.6	21	31
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	72	80	81
Torque constant	$K_T$ [Nm/A]	1.19	1.32	1.34
Rated power	$P_n$ [W]	1000	1440	1910
Phase to phase stator resistance	$R_{pp}$ [Ω]	4	2.7	1.81
Phase to phase stator inductance	$L_{pp}$ [mH]	34	25	18.6
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	1.7	2.6	3.5
Electrical time constant	$\tau_{el}$ [ms]	8.5	9.9	10.3
Thermal time constant	$\tau_{th}$ [min]	29	31	33
Mechanical time constant	$\tau_{mec}$ [ms]	0.8	0.7	0.6
Weight without brake	$m_M$ [kg]	4.275	5.340	6.960
Weight with brake	$m_{MF}$ [kg]	5.095	6.160	7.780

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

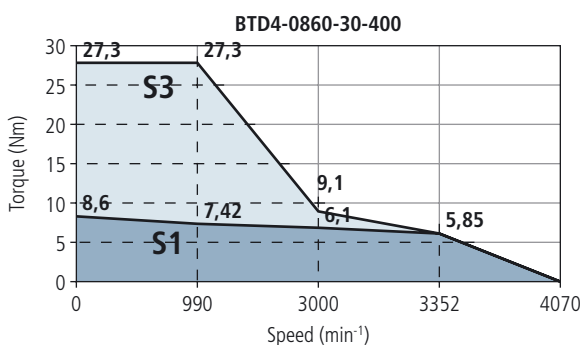
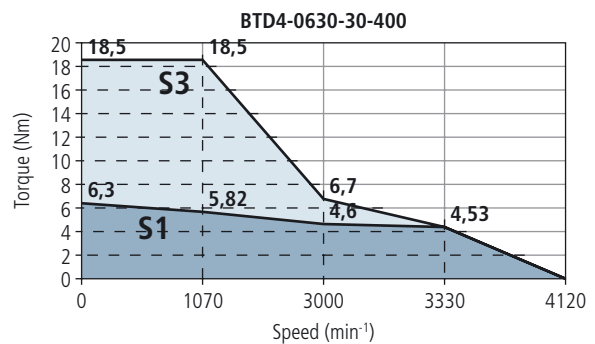
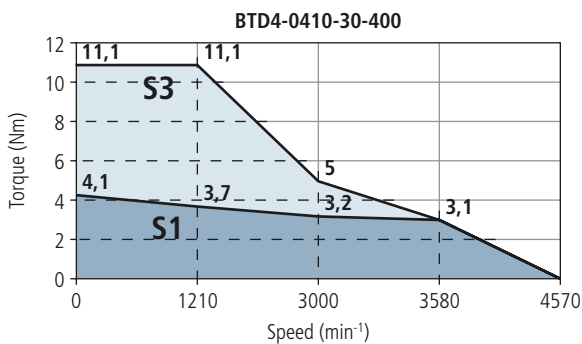
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C



Motor		BTD4-0410-30-230	BTD4-0630-30-230	BTD4-0860-30-230
Stall torque	$M_o$ [Nm]	4.1	6.3	8.6
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200
Motor poles number	$p_{mot}$	10	10	10
Resolver poles number	$p_{res}$	2	2	2
Rated torque	$M_n$ [Nm]	3.2	4.6	6.1
Rated AC current	$I_n$ [A]	5	7	8.3
Stall AC current	$I_o$ [A]	6	9.13	11.2
Torque peak	$M_{max}$ [Nm]	11.1	18.5	27
Current peak	$I_{max}$ [A]	24	40	53
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	40.5	41.5	46.5
Torque constant	$K_T$ [Nm/A]	0.67	0.69	0.77
Rated power	$P_n$ [W]	1000	1440	1910
Phase to phase stator resistance	$R_{pp}$ [Ω]	1.24	0.70	0.59
Phase to phase stator inductance	$L_{pp}$ [mH]	10.6	6.9	6.2
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	1.7	2.6	3.5
Electrical time constant	$\tau_{el}$ [ms]	8.5	9.9	10.3
Thermal time constant	$\tau_{th}$ [min]	29	31	33
Mechanical time constant	$\tau_{mec}$ [ms]	0.8	0.6	0.6
Weight without brake	$m_M$ [kg]	4.275	5.340	6.960
Weight with brake	$m_{MF}$ [kg]	5.095	6.160	7.780

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

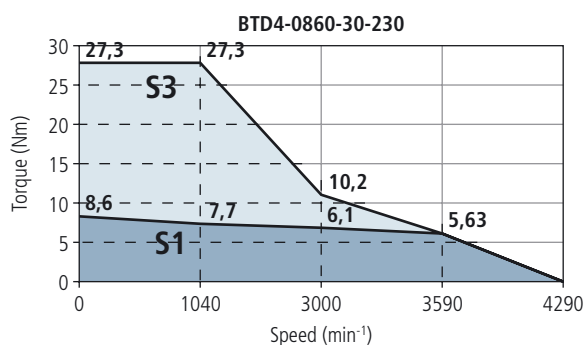
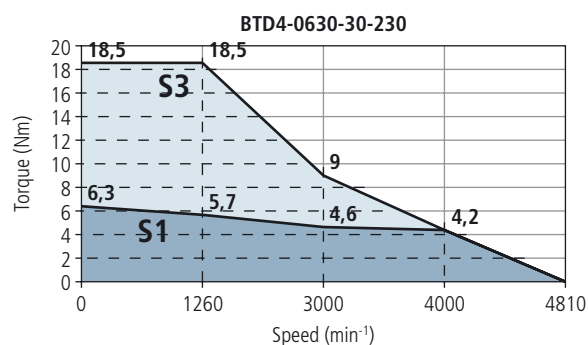
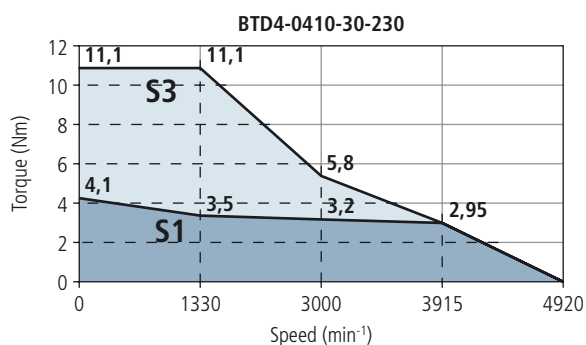
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C

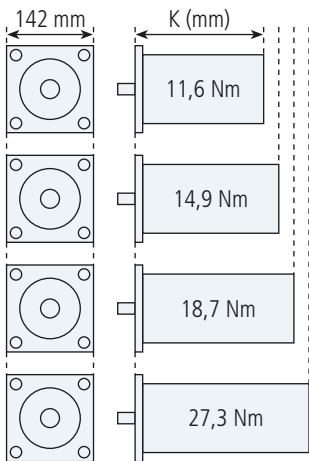


# BTD5

11.6 ÷ 27.3 Nm

All BTD servomotors belonging to size 5 are equipped by the same geometrical flange, whereas they are differentiated by the length correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

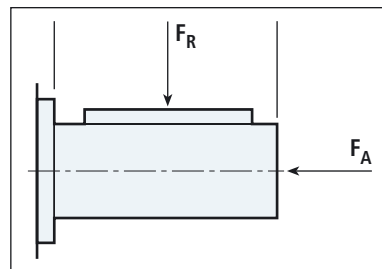


Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BTD5-1160	11,6	3000	142	173	224
BTD5-1490	14,9			201	252
BTD5-1870	18,7			231	282
BTD5-2730	27,3			291	342

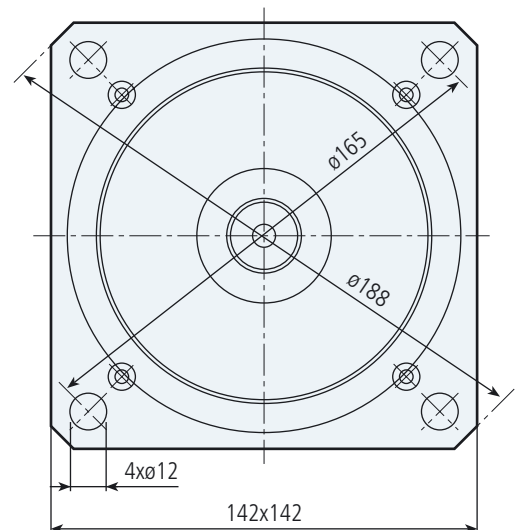
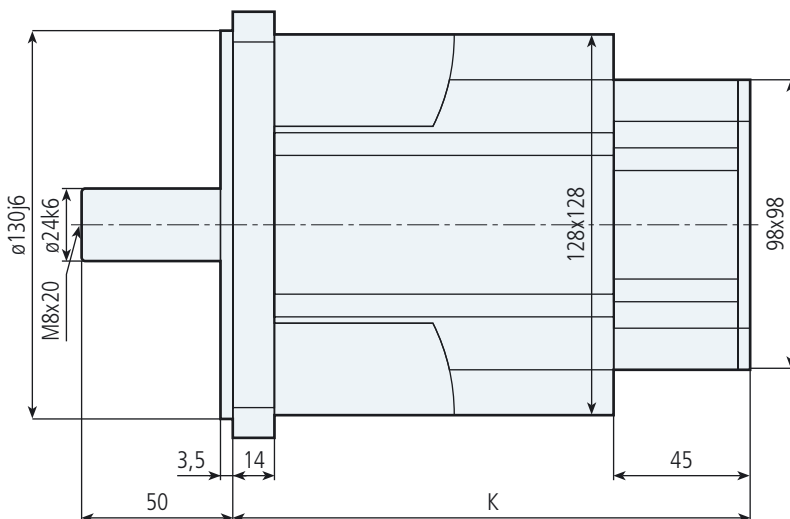
The motor size BTD5 is structured on four torque levels corresponding to different four motor lengths with nominal speed equal to 3000 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial $F_R$	Axial $F_A$
BTD5-1160	672	128
BTD5-1490	713	135
BTD5-1870	743	141
BTD5-2730	783	149





Motor		BTD5-1160-30-400	BTD5-1490-30-400	BTD5-1870-30-400	BTD5-2730-30-400
Stall torque	$M_o$ [Nm]	11.6	14.9	18.7	27.3
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330	330
Motor poles number	$p_{mot}$	10	10	10	10
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	8.4	10.9	14.3	21
Rated AC current	$I_n$ [A]	7.9	9.6	13.1	14.9
Stall AC current	$I_o$ [A]	10.4	12.5	16.4	19
Torque peak	$M_{max}$ [Nm]	32	41	51	75
Current peak	$I_{max}$ [A]	49	49	61	68
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	68	72	69	87
Torque constant	$K_T$ [Nm/A]	1.12	1.19	1.14	1.44
Rated power	$P_n$ [W]	2640	3420	4490	6600
Phase to phase stator resistance	$R_{pp}$ [Ω]	0.71	0.48	0.35	0.32
Phase to phase stator inductance	$L_{pp}$ [mH]	11.4	8.5	6.4	6.8
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	6.8	8.3	11.0	15.3
Electrical time constant	$\tau_{el}$ [ms]	16.0	16.8	18.3	21
Thermal time constant	$\tau_{th}$ [min]	50	55	60	75
Mechanical time constant	$\tau_{mec}$ [ms]	0.7	0.5	0.5	0.4
Weight without brake	$m_M$ [kg]	8.100	10.100	12.100	16.100
Weight with brake	$m_{MF}$ [kg]	9.180	11.180	13.180	17.180

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

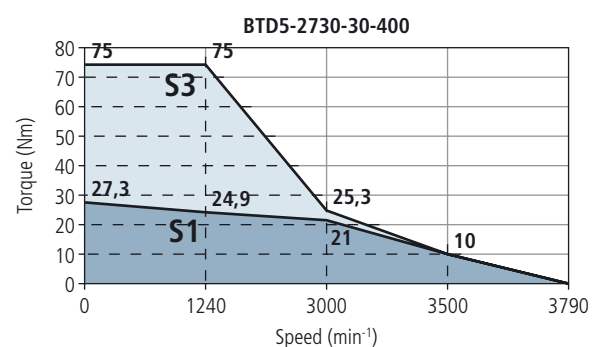
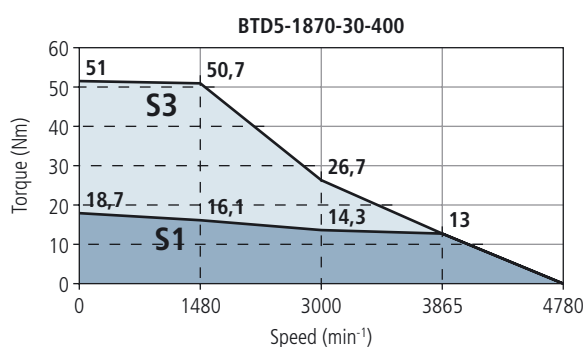
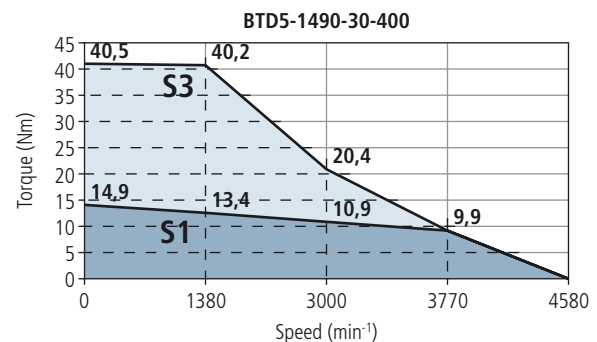
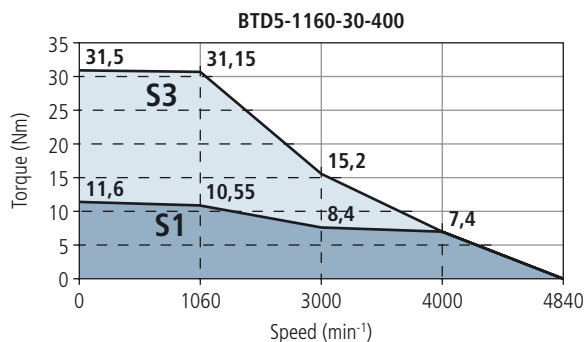
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C



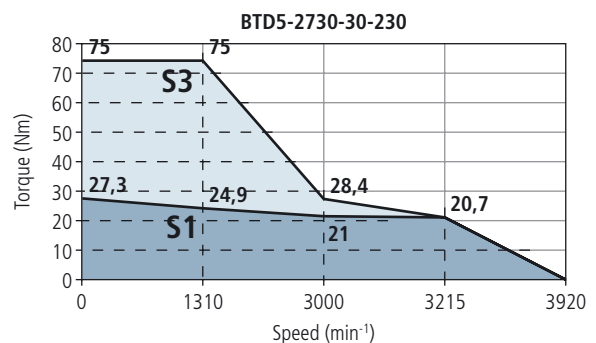
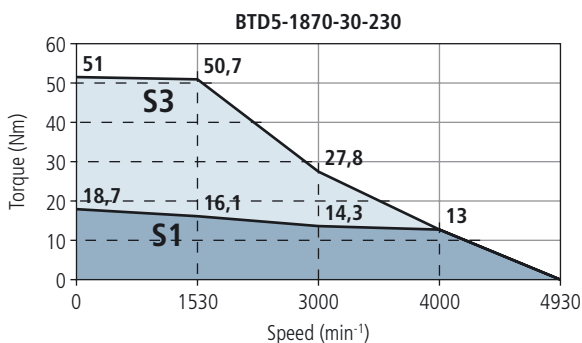
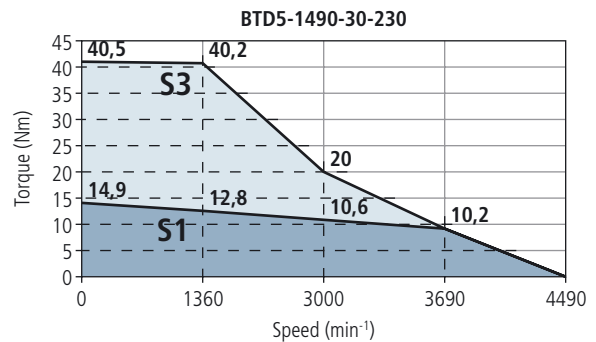
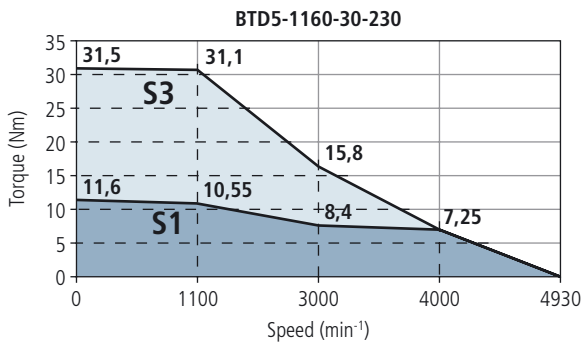
# BTD5 230V

Motor		BTD5-1160-30-230	BTD5-1490-30-230	BTD5-1870-30-230	BTD5-2730-30-230
Stall torque	$M_o$ [Nm]	11.6	14.9	18.7	27.3
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	320	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200	200
Motor poles number	$p_{mot}$	10	10	10	10
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	8.4	10.9	14.3	21.0
Rated AC current	$I_n$ [A]	13.2	15.6	22.4	25.4
Stall AC current	$I_o$ [A]	17.3	20.1	27.9	32.4
Torque peak	$M_{max}$ [Nm]	32	41	51	75
Current peak	$I_{max}$ [A]	82	80	105	116
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	40.5	44.5	40.5	51.0
Torque constant	$K_T$ [Nm/A]	0.67	0.74	0.67	0.84
Rated power	$P_n$ [W]	2640	3420	4490	6600
Phase to phase stator resistance	$R_{pp}$ [Ω]	0.25	0.19	0.12	0.12
Phase to phase stator inductance	$L_{pp}$ [mH]	4.0	3.2	2.2	2.3
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	6.8	8.3	11.0	15.3
Electrical time constant	$\tau_{el}$ [ms]	16.0	16.8	18.3	19.2
Thermal time constant	$\tau_{th}$ [min]	50	55	60	75
Mechanical time constant	$\tau_{mec}$ [ms]	0.7	0.5	0.5	0.4
Weight without brake	$m_M$ [kg]	8.100	10.100	12.100	16.100
Weight with brake	$m_{MF}$ [kg]	9.180	11.180	13.180	17.180

All motor characteristics are referred to following conditions:

- $T_{amb}$  = 40 °C (ambient temperature)
- $\Delta T$  = 105 °C (winding heating temperature)
- S1 curve = for continuous duty
- S3 curve = for intermittent duty

Torque-speed characteristic:  
ambient temperature 40°C



The architecture of magnet circuits and the winding insulation give to BCR high dynamic performances always assuring a long life time to him.

The BCR series is developed in 7 sizes identified by progressive digit (from 2 to 8) corresponding to identical quantity of flanges designed for defined coupling with gearboxes.

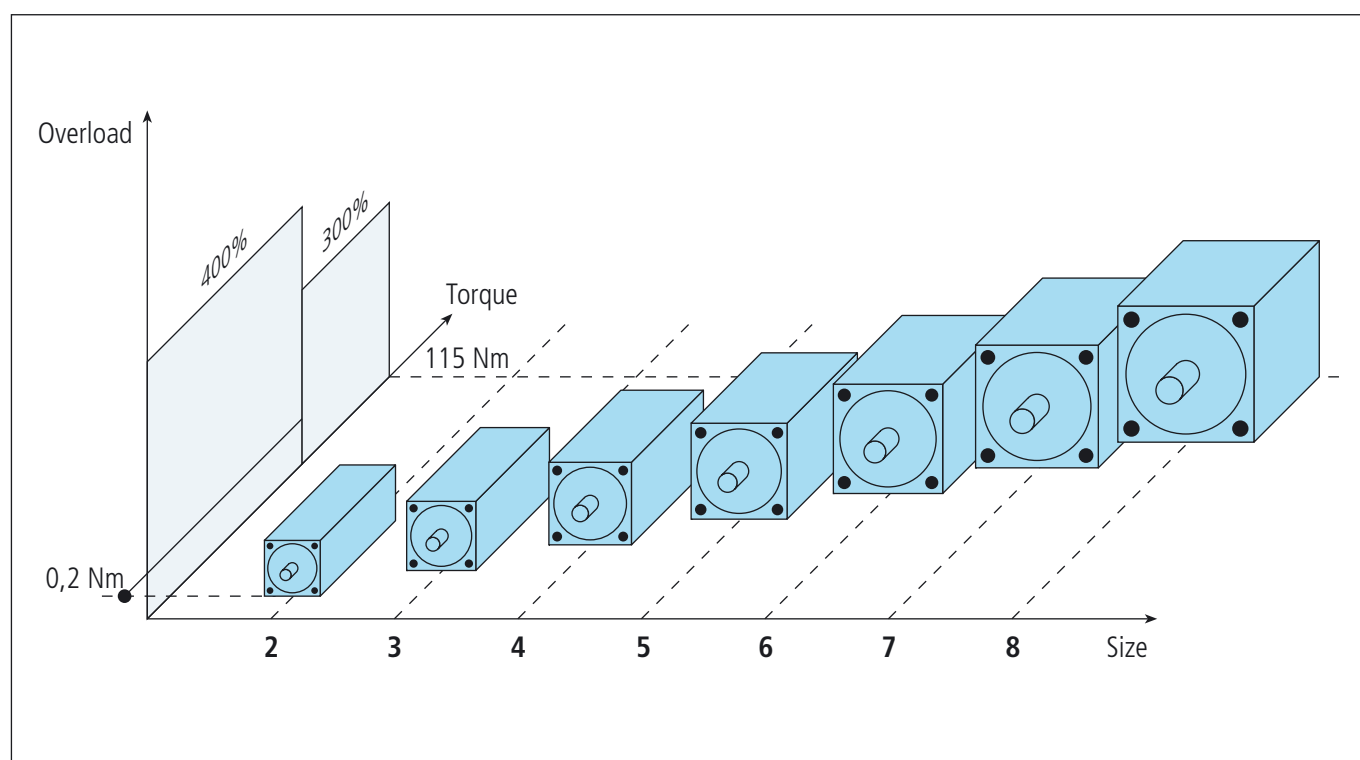
BTD alike, BCR series also makes available several torque values obtained from several motor lengths from which it is possible to extract high continuous torque and high temporary overload up to 400% of nominal levels.

The meaning of the name is the following:

BCR = **B**rushless-**C**lassic-**R**ange

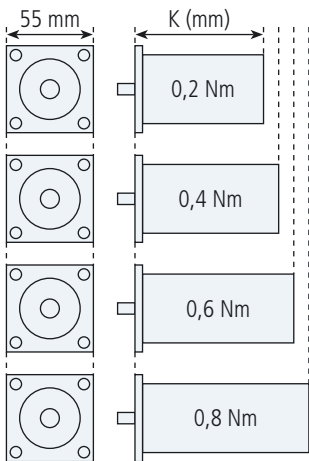
The large torque range (0.2 ÷ 115 Nm) in continuous duty and the high overload make the BCR very suitable for high dynamic applications where significant accelerations are involved.

Series	Size	Flange [mm]	Speed [min <sup>-1</sup> ]	Stall torque [Nm]					Overload %
BCR	2	55	4500	0,2	0,4	0,6	0,8	-	400
	3	86	4500	0,65	1,3	2,5	3,0	-	400
	4	98	3000	1	2,6	5,3	7,5	-	400
	5	142	3000	6,6	10,5	13,5	17,0	22,0	300
	6	190	3000	13,5	19,0	22,0	29,0	-	300
	7	190	3000	27,0	32,0	40,0	-	-	300
	8	240	3000/2000	40,0	68,0	93,0	115,0	-	300



All BCR servomotors belonging to size 2 are equipped by the same geometrical flange, whereas they are differentiated by the length (K) correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

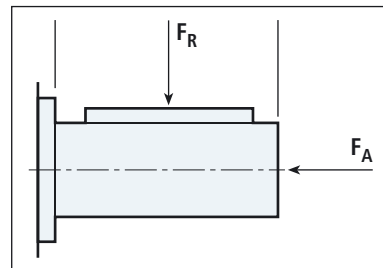


Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BCR2-0020	0,2	4500	55	98	131
BCR2-0040	0,4			113	146
BCR2-0060	0,6			128	161
BCR2-0080	0,8			143	176

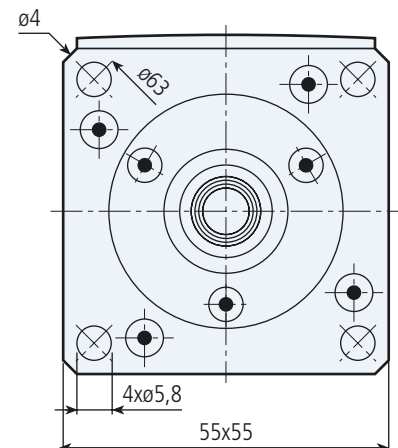
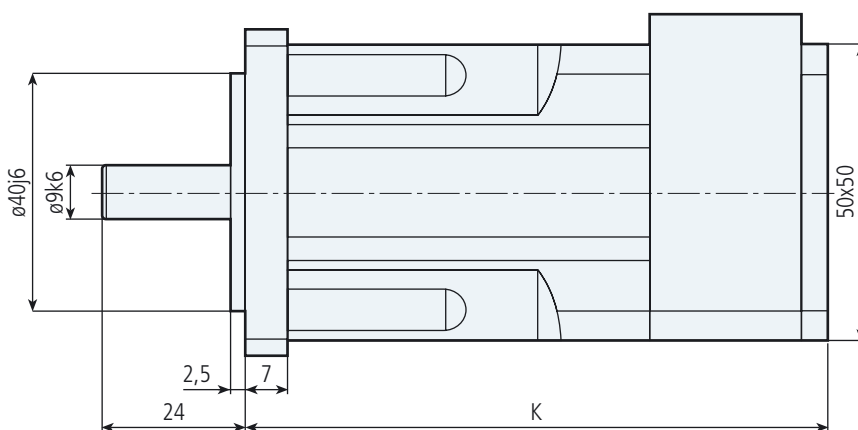
The motor size BCR2 is structured on four torque levels corresponding to different four motor lengths with nominal speed equal to 4500 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial $F_R$	Axial $F_A$
BCR2-0020	225	43
BCR2-0040	237	45
BCR2-0060	245	47
BCR2-0080	252	48



Motor		BCR2-0020-45-400	BCR2-0040-45-400	BCR2-0060-45-400	BCR2-0080-45-400
Stall torque	$M_o$ [Nm]	0.2	0.4	0.6	0.8
Rated speed	$n_n$ [min <sup>-1</sup> ]	4500	4500	4500	4500
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330	330
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.19	0.36	0.55	0.72
Rated AC current	$I_n$ [A]	0.48	0.51	0.70	0.86
Stall AC current	$I_o$ [A]	0.47	0.54	0.73	0.91
Torque peak	$M_{max}$ [Nm]	0.8	1.6	2.4	3.2
Current peak	$I_{max}$ [A]	2.0	2.3	3.1	3.9
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	25.5	45.0	50.0	53.0
Torque constant	$K_T$ [Nm/A]	0.42	0.74	0.83	0.88
Rated power	$P_n$ [W]	90	170	260	340
Phase to phase stator resistance	$R_{pp}$ [Ω]	84.0	77.0	51.0	38.4
Phase to phase stator inductance	$L_{pp}$ [mH]	50.0	62.0	45.5	39.7
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.06	0.08	0.11	0.13
Electrical time constant	$\tau_{el}$ [ms]	0.59	0.80	0.90	1.00
Thermal time constant	$\tau_{th}$ [min]	10	15	20	22
Mechanical time constant	$\tau_{mec}$ [ms]	4.9	1.9	1.4	1.1
Weight without brake	$m_M$ [kg]	0.9	1.06	1.21	1.36
Weight with brake	$m_{MF}$ [kg]	1.05	1.21	1.36	1.51

All motor characteristics are referred to following conditions:

$T_{amb} = 40\text{ °C}$  (ambient temperature)

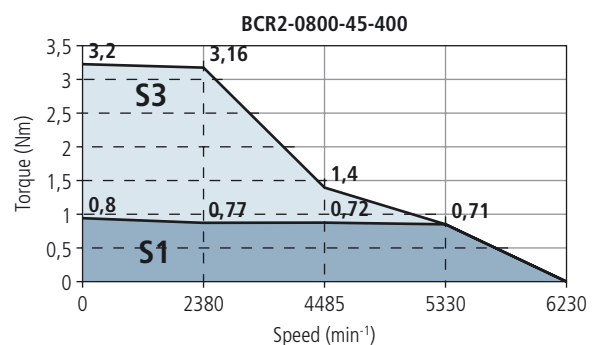
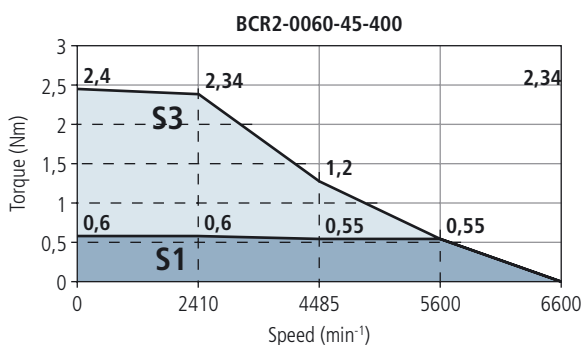
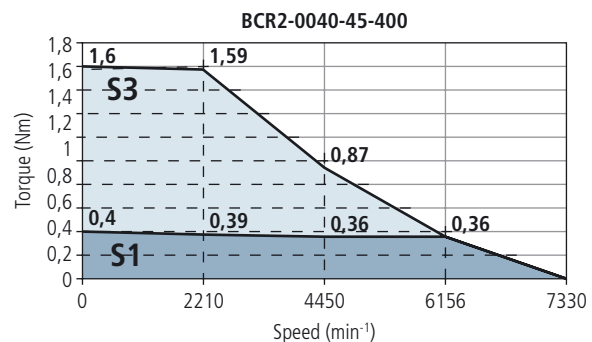
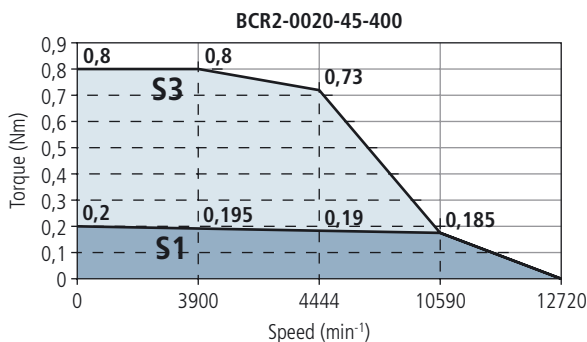
$\Delta T = 105\text{ °C}$  (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C



# BCR2 230V

Motor		BCR2-0020-45-230	BCR2-0040-45-230	BCR2-0060-45-230	BCR2-0080-45-230
Stall torque	$M_o$ [Nm]	0.2	0.4	0.6	0.8
Rated speed	$n_n$ [min <sup>-1</sup> ]	4500	4500	4500	4500
Inverter DC-bus	$V_{dc}$ [V]	320	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200	200
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.19	0.36	0.55	0.72
Rated AC current	$I_n$ [A]	0.60	0.88	1.18	1.47
Stall AC current	$I_o$ [A]	0.59	0.93	1.23	1.56
Torque peak	$M_{max}$ [Nm]	0.8	1.6	2.4	3.2
Current peak	$I_{max}$ [A]	2.5	4.0	5.3	6.7
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	20.5	26.0	30.0	31.0
Torque constant	$K_T$ [Nm/A]	0.34	0.43	0.49	0.51
Rated power	$P_n$ [W]	90	170	260	340
Phase to phase stator resistance	$R_{pp}$ [Ω]	54.0	26.3	19.9	14.6
Phase to phase stator inductance	$L_{pp}$ [mH]	32.0	21.4	17.2	14.4
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.06	0.08	0.11	0.13
Electrical time constant	$\tau_{el}$ [ms]	0.59	0.82	0.87	0.98
Thermal time constant	$\tau_{th}$ [min]	10	15	20	22
Mechanical time constant	$\tau_{mec}$ [ms]	4.9	2.0	1.5	1.3
Weight without brake	$m_M$ [kg]	0.9	1.06	1.21	1.36
Weight with brake	$m_{MF}$ [kg]	1.05	1.21	1.36	1.51

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

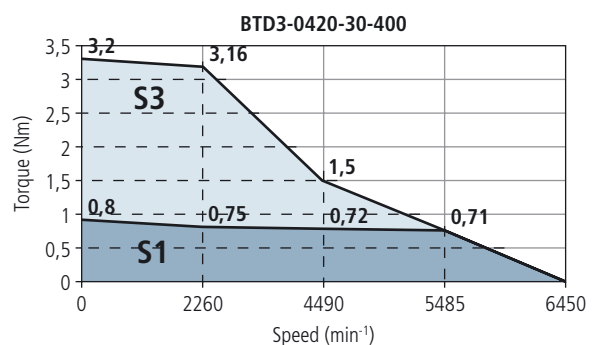
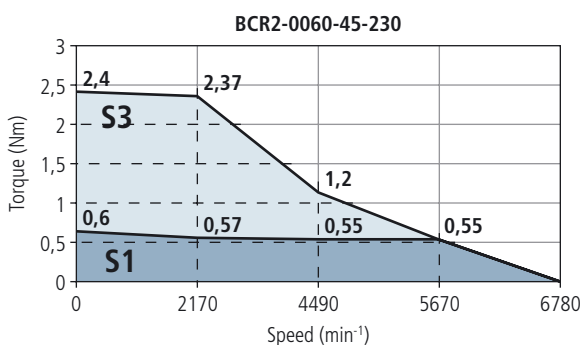
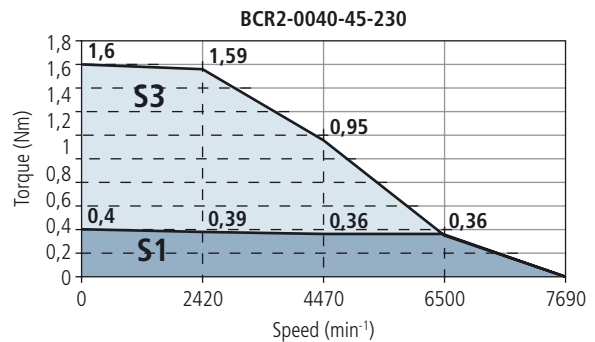
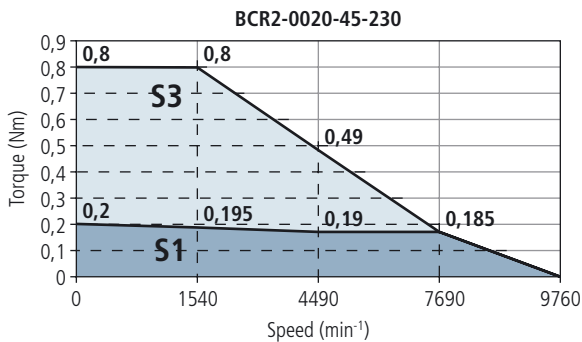
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

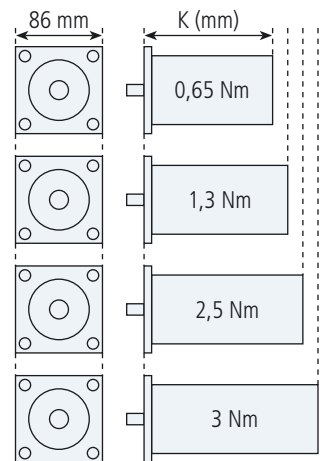
ambient temperature 40°C



All BCR servomotors belonging to size 3 are equipped by the same geometrical flange, whereas they are differentiated by the length (K) correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

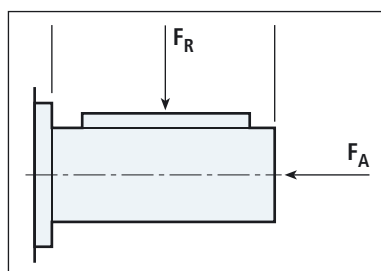
Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BCR3-0065	0,65	4500	86	109	142
BCR3-0130	1,3			127	160
BCR3-0250	2,5			163	196
BCR3-0300	3,0			181	214



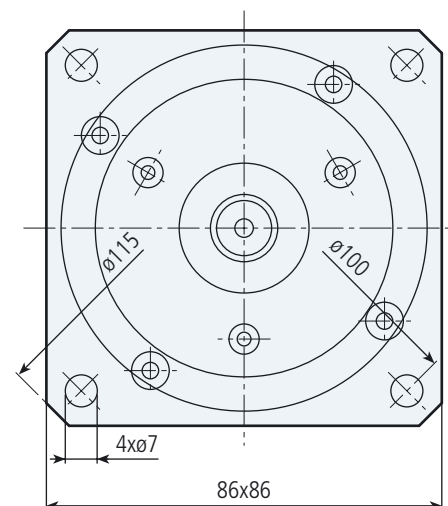
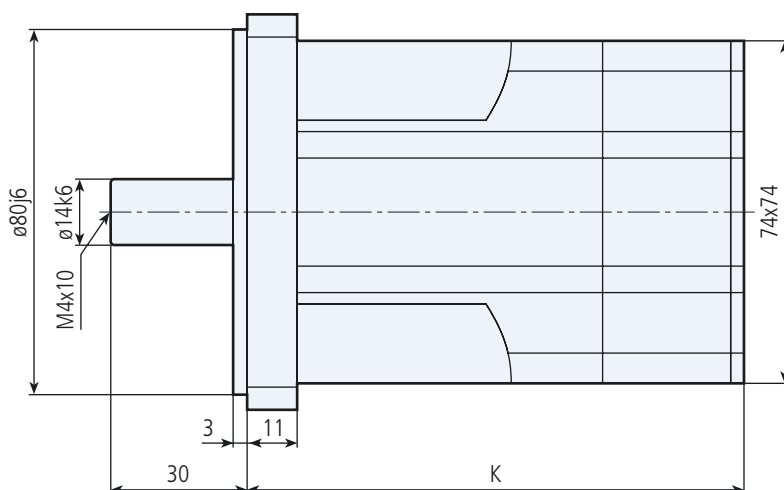
The motor size BCR3 is structured on four torque levels corresponding to different four motor lengths with nominal speed equal to 4500 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial F <sub>R</sub>	Axial F <sub>A</sub>
BCR3-0065	370	70
BCR3-0130	393	75
BCR3-0250	422	80
BCR3-0300	431	82



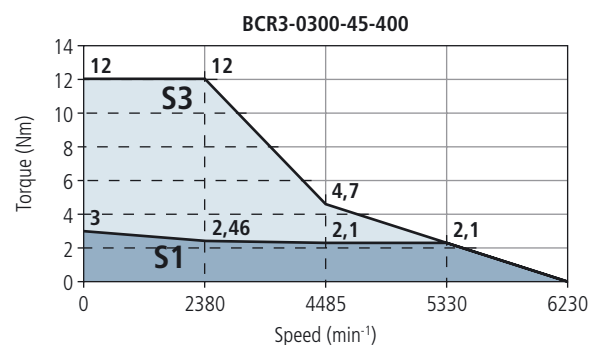
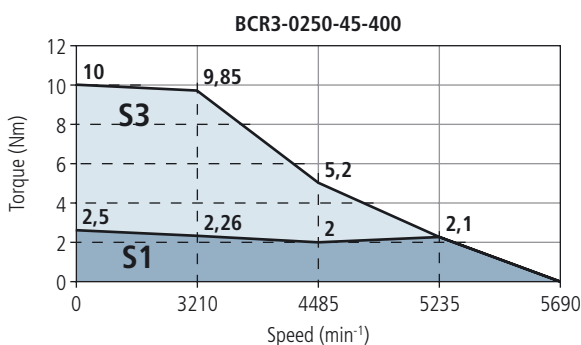
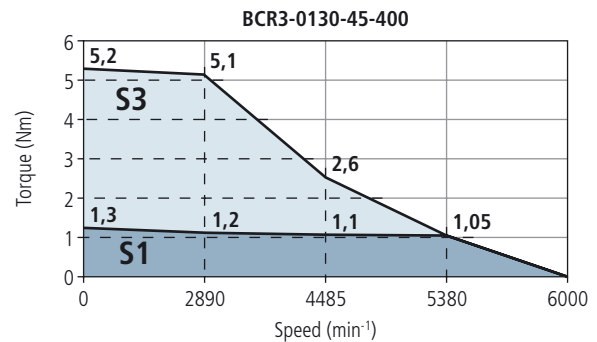
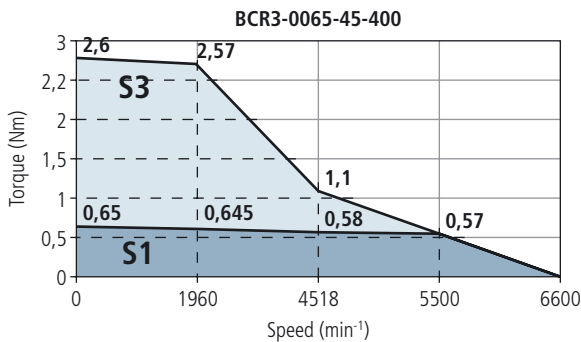
# BCR3 400V

Motor		BCR3-0065-45-400	BCR3-0130-45-400	BCR3-0250-45-400	BCR3-0300-45-400
Stall torque	$M_o$ [Nm]	0.65	1.3	2.5	3
Rated speed	$n_n$ [min <sup>-1</sup> ]	4500	4500	4500	4500
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330	330
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.58	1.05	2.0	2.1
Rated AC current	$I_n$ [A]	0.75	1.24	2.2	2.0
Stall AC current	$I_o$ [A]	0.79	1.43	2.6	2.6
Torque peak	$M_{max}$ [Nm]	2.6	5.2	10.0	12.0
Current peak	$I_{max}$ [A]	3.4	6.1	11.2	12.4
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	50.0	55.0	58.0	63.0
Torque constant	$K_T$ [Nm/A]	0.83	0.91	0.96	1.04
Rated power	$P_n$ [W]	220	495	940	990
Phase to phase stator resistance	$R_{pp}$ [Ω]	50.0	17.0	7.0	6.0
Phase to phase stator inductance	$L_{pp}$ [mH]	62.0	29.9	15.4	14.2
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.50	0.65	1.4	1.5
Electrical time constant	$\tau_{el}$ [ms]	1.2	1.8	2.2	2.3
Thermal time constant	$\tau_{th}$ [min]	25	30	32	33
Mechanical time constant	$\tau_{mec}$ [ms]	6.4	2.3	1.8	1.4
Weight without brake	$m_M$ [kg]	1.75	2.25	3.20	3.65
Weight with brake	$m_{MF}$ [kg]	2.22	2.72	3.67	4.12

All motor characteristics are referred to following conditions:

- $T_{amb}$  = 40 °C (ambient temperature)
- $\Delta T$  = 105 °C (winding heating temperature)
- S1 curve = for continuous duty
- S3 curve = for intermittent duty

Torque-speed characteristic:  
ambient temperature 40°C





Motor		BCR3-0065-45-230	BCR3-0130-45-230	BCR3-0250-45-230	BCR3-0300-45-230
Stall torque	$M_o$ [Nm]	0.65	1.3	2.5	3
Rated speed	$n_n$ [min <sup>-1</sup> ]	4500	4500	4500	4500
Inverter DC-bus	$V_{dc}$ [V]	320	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200	200
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.58	1.05	2.0	2.1
Rated AC current	$I_n$ [A]	1.31	2.0	3.4	3.6
Stall AC current	$I_o$ [A]	1.38	2.4	4.0	4.8
Torque peak	$M_{max}$ [Nm]	2.6	5.2	10.0	12.0
Current peak	$I_{max}$ [A]	5.9	10.1	17.3	21.0
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	28.5	33.5	37.5	37.5
Torque constant	$K_T$ [Nm/A]	0.47	0.55	0.62	0.62
Rated power	$P_n$ [W]	220	495	940	990
Phase to phase stator resistance	$R_{pp}$ [Ω]	15.6	6.5	3.0	2.1
Phase to phase stator inductance	$L_{pp}$ [mH]	20.0	11.1	6.0	5.0
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.50	0.65	1.4	1.5
Electrical time constant	$\tau_{el}$ [ms]	1.3	1.7	2.0	2.4
Thermal time constant	$\tau_{th}$ [min]	25	30	32	33
Mechanical time constant	$\tau_{mec}$ [ms]	6.1	2.4	1.9	1.4
Weight without brake	$m_M$ [kg]	1.75	2.25	3.20	3.65
Weight with brake	$m_{MF}$ [kg]	2.22	2.72	3.67	4.12

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

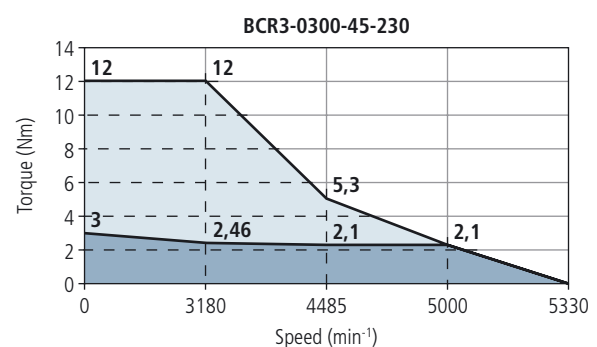
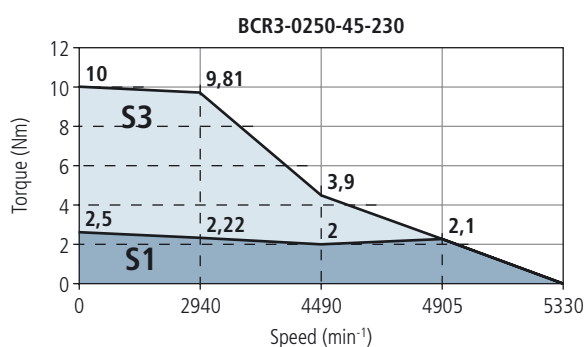
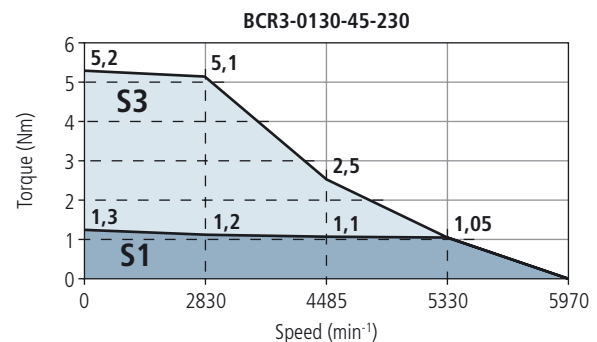
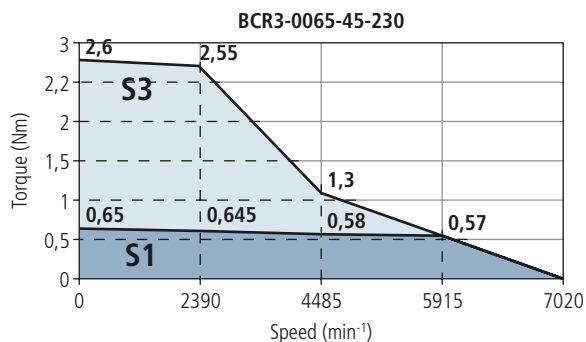
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C

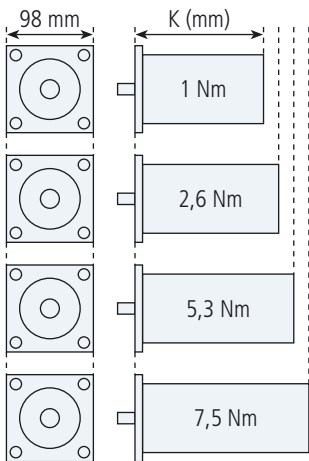


# BCR4

1 ÷ 7.5 Nm

All BCR servomotors belonging to size 4 are equipped by the same geometrical flange, whereas they are differentiated by the length (K) correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

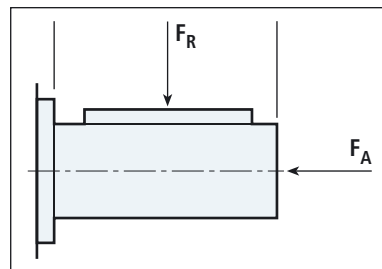


Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BCR4-0100	1	3000	98	116	148
BCR4-0260	2,6			146	178
BCR4-0530	5,3			176	208
BCR4-0750	7,5			221	253

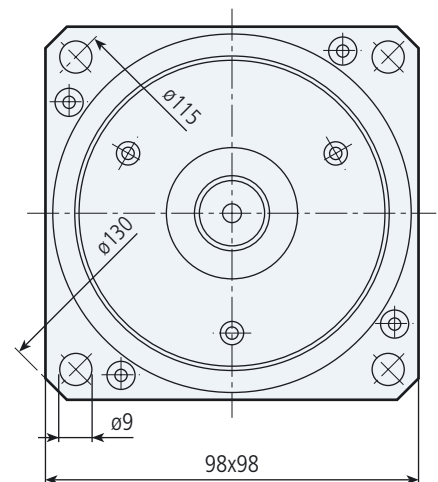
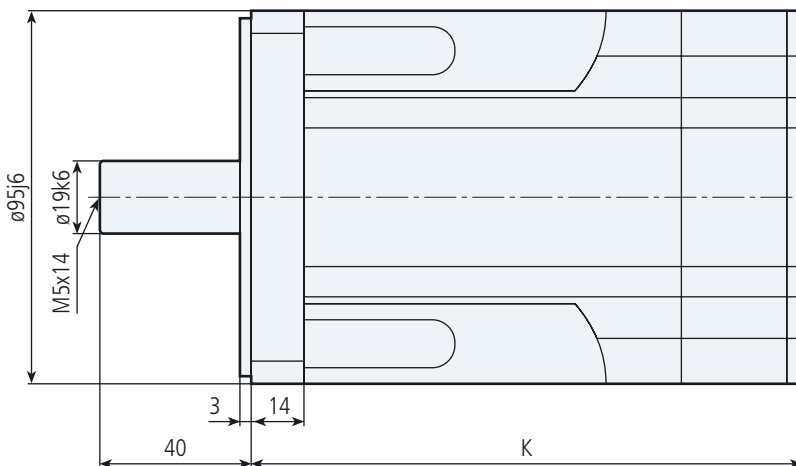
The motor size BCR4 is structured on four torque levels corresponding to different four motor lengths with nominal speed equal to 3000 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial F <sub>R</sub>	Axial F <sub>A</sub>
BCR4-0100	328	62
BCR4-0260	638	121
BCR4-0530	676	128
BCR4-0750	711	135



Motor		BCR4-0100-30-400	BCR4-0260-30-400	BCR4-0530-30-400	BCR4-0750-30-400
Stall torque	$M_o$ [Nm]	1.0	2.6	5.3	7.5
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330	330
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.98	2.3	4.6	6.4
Rated AC current	$I_n$ [A]	1.05	1.85	3.8	4.4
Stall AC current	$I_o$ [A]	1.06	1.92	4.1	4.8
Torque peak	$M_{max}$ [Nm]	4	10.4	21.0	30.0
Current peak	$I_{max}$ [A]	6.4	11.5	25.0	29.0
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	57	82.0	78.0	94.0
Torque constant	$K_T$ [Nm/A]	0.94	1.36	1.29	1.55
Rated power	$P_n$ [W]	280	720	1440	2010
Phase to phase stator resistance	$R_{pp}$ [Ω]	16.3	9.6	4.2	3.0
Phase to phase stator inductance	$L_{pp}$ [mH]	75	41.5	24.0	19.2
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.79	1.9	2.7	4.2
Electrical time constant	$\tau_{el}$ [ms]	2.1	4.3	5.7	6.4
Thermal time constant	$\tau_{th}$ [min]	45	60	64	66
Mechanical time constant	$\tau_{mec}$ [ms]	5.6	1.7	1.2	0.9
Weight without brake	$m_M$ [kg]	2.7	4.5	5.6	7.7
Weight with brake	$m_{MF}$ [kg]	3.52	5.32	6.42	8.52

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

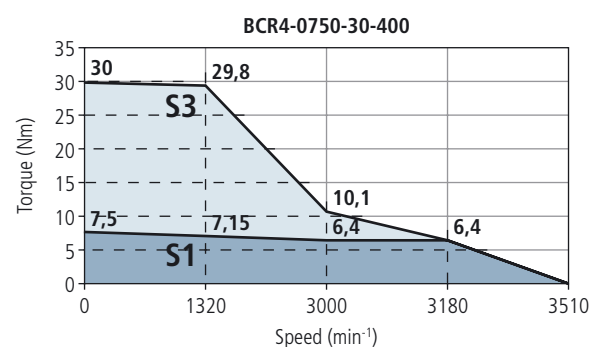
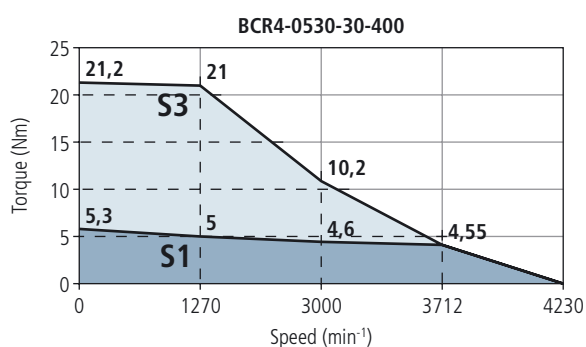
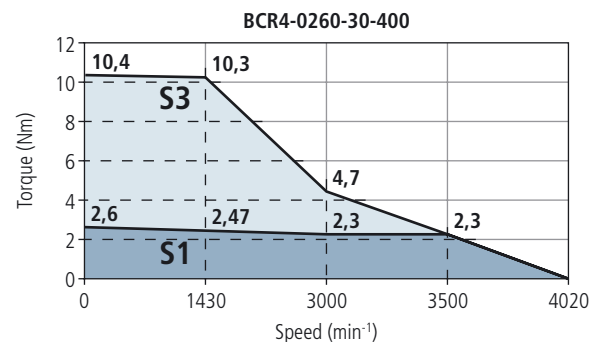
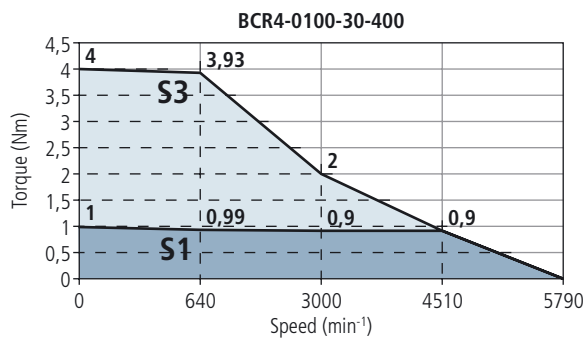
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C



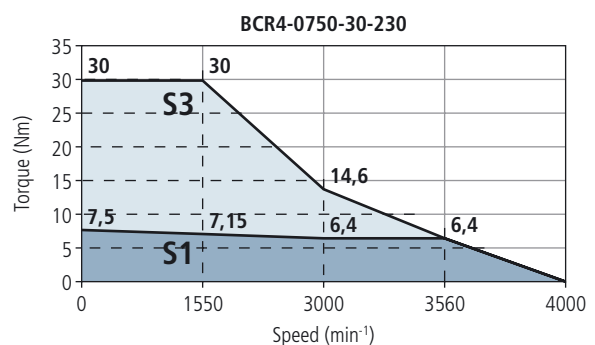
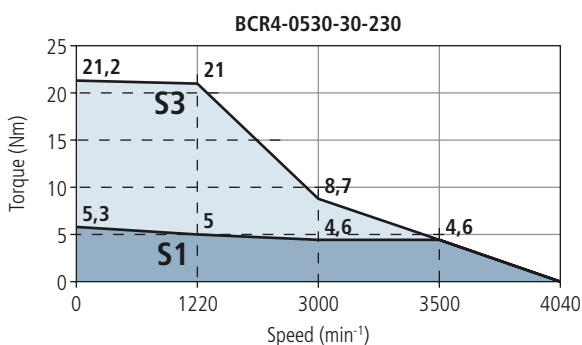
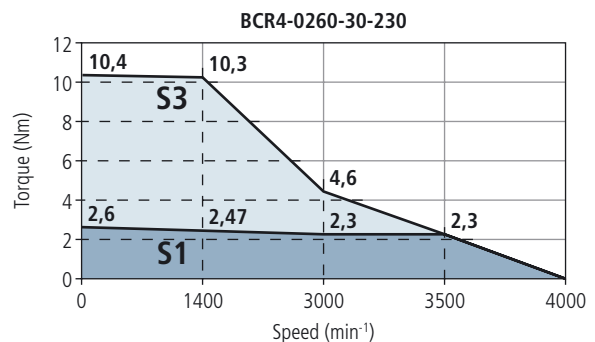
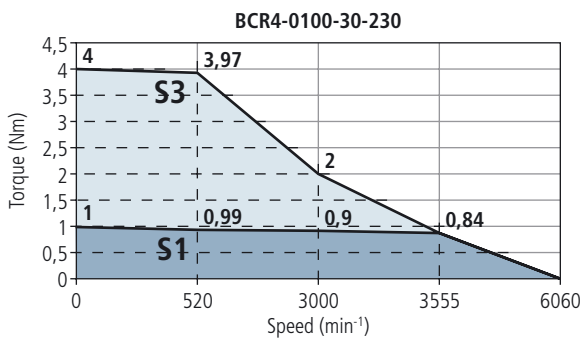
# BCR4 230V

Motor		BCR4-0100-30-230	BCR4-0260-30-230	BCR4-0530-30-230	BCR4-0750-30-230
Stall torque	$M_o$ [Nm]	1.0	2.6	5.3	7.5
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	320	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200	200
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	0.98	2.3	4.6	6.4
Rated AC current	$I_n$ [A]	1.8	3.0	5.9	8.1
Stall AC current	$I_o$ [A]	1.83	3.1	6.5	9.1
Torque peak	$M_{max}$ [Nm]	4	10.4	21.0	30.0
Current peak	$I_{max}$ [A]	11	18.9	39.0	54.0
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	33	50.0	49.5	50.0
Torque constant	$K_T$ [Nm/A]	0.55	0.83	0.82	0.83
Rated power	$P_n$ [W]	280	720	1440	2010
Phase to phase stator resistance	$R_{pp}$ [Ω]	13.5	3.6	1.66	0.87
Phase to phase stator inductance	$L_{pp}$ [mH]	25.7	15.9	9.8	5.6
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	0.79	1.9	2.7	4.2
Electrical time constant	$\tau_{el}$ [ms]	1.9	4.4	5.9	6.4
Thermal time constant	$\tau_{th}$ [min]	45	60	64	66
Mechanical time constant	$\tau_{mec}$ [ms]	6.2	1.7	1.1	0.9
Weight without brake	$m_M$ [kg]	2.7	4.5	5.6	7.7
Weight with brake	$m_{MF}$ [kg]	3.52	5.32	6.42	8.52

All motor characteristics are referred to following conditions:

- $T_{amb}$  = 40 °C (ambient temperature)
- $\Delta T$  = 105 °C (winding heating temperature)
- S1 curve = for continuous duty
- S3 curve = for intermittent duty

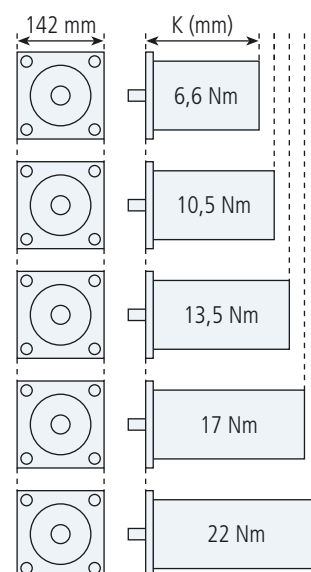
Torque-speed characteristic:  
ambient temperature 40°C



All BCR servomotors belonging to size 5 are equipped by the same geometrical flange, whereas they are differentiated by the length (K) correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

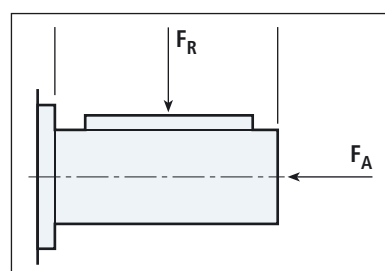
Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BCR5-0660	6,6	3000	142	185	228
BCR5-1050	10,5			219	262
BCR5-1350	13,5			236	279
BCR5-1700	17			270	313
BCR5-2200	22			304	347



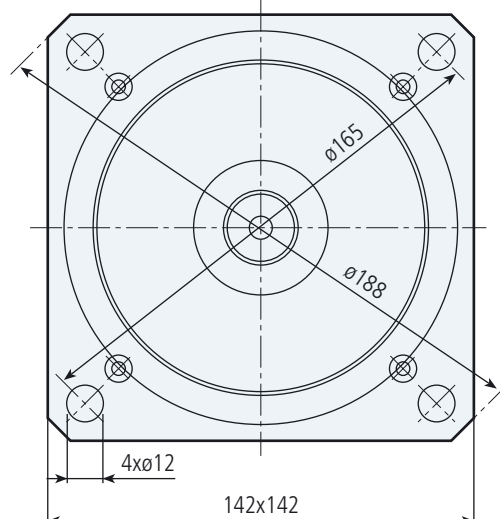
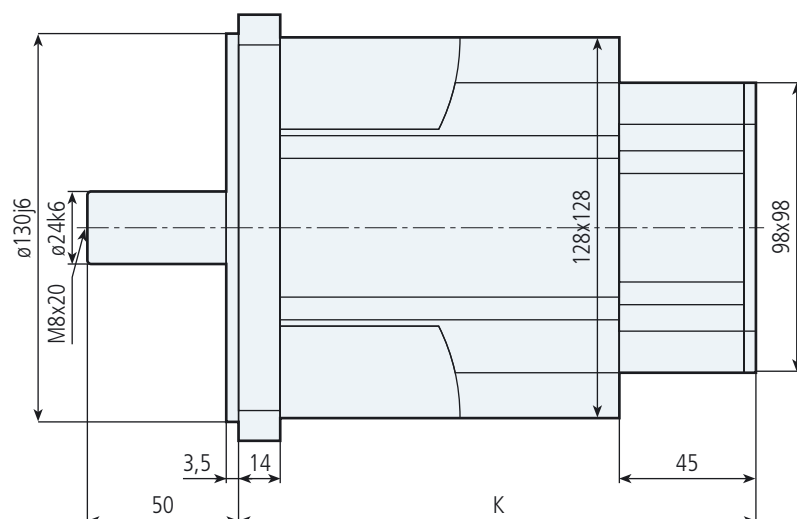
The motor size BCR5 is structured on five torque levels corresponding to different five motor lengths with nominal speed equal to 3000 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial $F_R$	Axial $F_A$
BCR5-0660	693	132
BCR5-1050	733	139
BCR5-1350	748	142
BCR5-1700	772	147
BCR5-2200	790	150



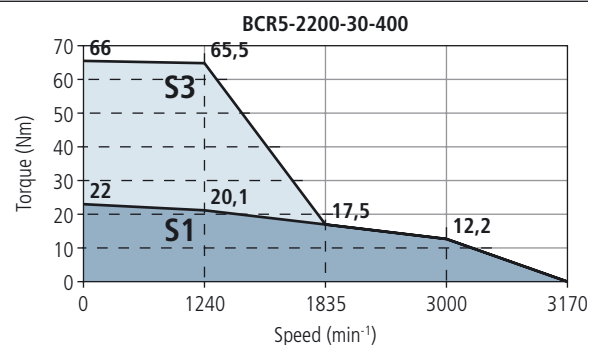
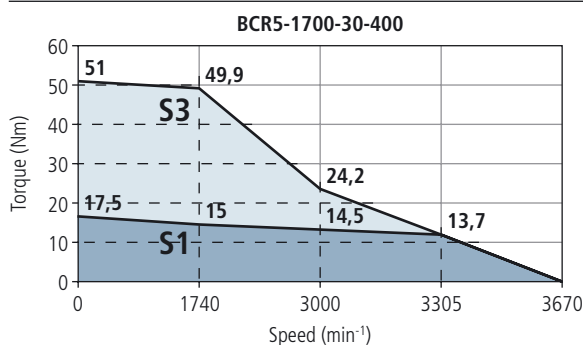
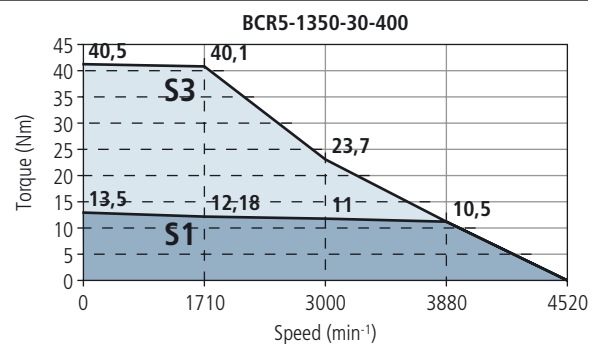
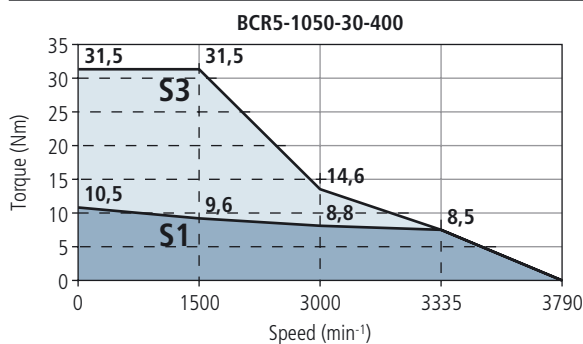
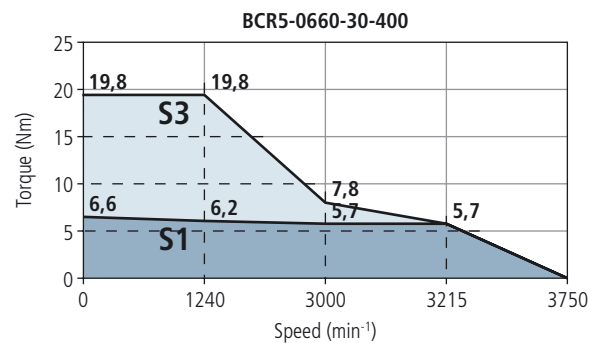
# BCR5 400V

Motor		BCR5-0660-30-400	BCR5-1050-30-400	BCR5-1350-30-400	BCR5-1700-30-400	BCR5-2200-30-400
Stall torque	$M_o$ [Nm]	6.6	10.5	13.5	17.0	22.0
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330	330	330
Motor poles number	$p_{mot}$	6	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2	2
Rated torque	$M_n$ [Nm]	5.7	8.8	11.0	14.5	17.5
Rated AC current	$I_n$ [A]	4.0	6.3	9.5	10.0	10.5
Stall AC current	$I_o$ [A]	4.5	7.3	11.2	11.4	12.8
Torque peak	$M_{max}$ [Nm]	19.8	32.0	41.0	51.0	66.0
Current peak	$I_{max}$ [A]	23	36	56	57	64
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	88.0	87.0	73.0	90.0	104.0
Torque constant	$K_T$ [Nm/A]	1.46	1.44	1.21	1.49	1.72
Rated power	$P_n$ [W]	1790	2760	3450	4550	5500
Phase to phase stator resistance	$R_{pp}$ [Ω]	4.2	1.70	0.95	0.95	0.95
Phase to phase stator inductance	$L_{pp}$ [mH]	27.8	15.2	9.0	10.0	10.5
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	4.0	6.2	7.3	9.5	11.7
Electrical time constant	$\tau_{el}$ [ms]	6.7	9.0	9.5	10.6	11.1
Thermal time constant	$\tau_{th}$ [min]	45	50	55	60	75
Mechanical time constant	$\tau_{mec}$ [ms]	1.4	0.9	0.8	0.7	0.7
Weight without brake	$m_M$ [kg]	7.5	10.0	11.2	13.7	16.2
Weight with brake	$m_{MF}$ [kg]	9.3	11.8	13.0	15.5	18.0

**All motor characteristics are referred to following conditions:**

- $T_{amb} = 40\text{ °C}$  (ambient temperature)
- $\Delta T = 105\text{ °C}$  (winding heating temperature)
- S1 curve = for continuous duty
- S3 curve = for intermittent duty

**Torque-speed characteristic:**  
ambient temperature 40°C



Motor		BCR5-0660-30-230	BCR5-1050-30-230	BCR5-1350-30-230	BCR5-1700-30-230	BCR5-2200-30-230
Stall torque	$M_o$ [Nm]	6.6	10.5	13.5	17.0	22.0
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	320	320	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200	200	200
Motor poles number	$p_{mot}$	6	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2	2
Rated torque	$M_n$ [Nm]	5.7	8.8	11.0	14.5	17.5
Rated AC current	$I_n$ [A]	6.8	11.5	14.5	16.0	20.2
Stall AC current	$I_o$ [A]	7.7	13.4	17.4	18.4	25.6
Torque peak	$M_{max}$ [Nm]	19.8	32.0	41.0	51.0	66.0
Current peak	$I_{max}$ [A]	38	67	87	91	127
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	52.0	47.5	47.0	56.0	52.0
Torque constant	$K_T$ [Nm/A]	0.86	0.79	0.78	0.93	0.86
Rated power	$P_n$ [W]	1790	2760	3450	4550	5500
Phase to phase stator resistance	$R_{pp}$ [Ω]	1.44	0.51	0.38	0.36	0.24
Phase to phase stator inductance	$L_{pp}$ [mH]	9.6	4.6	3.6	3.8	2.6
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	4.0	6.2	7.3	9.5	11.7
Electrical time constant	$\tau_{el}$ [ms]	6.7	9.0	9.5	10.6	10.8
Thermal time constant	$\tau_{th}$ [min]	45	50	55	60	75
Mechanical time constant	$\tau_{mec}$ [ms]	1.3	0.9	0.8	0.7	0.7
Weight without brake	$m_M$ [kg]	7.5	10.0	11.2	13.7	16.2
Weight with brake	$m_{MF}$ [kg]	9.3	11.8	13.0	15.5	18.0

All motor characteristics are referred to following conditions:

$T_{amb} = 40\text{ °C}$  (ambient temperature)

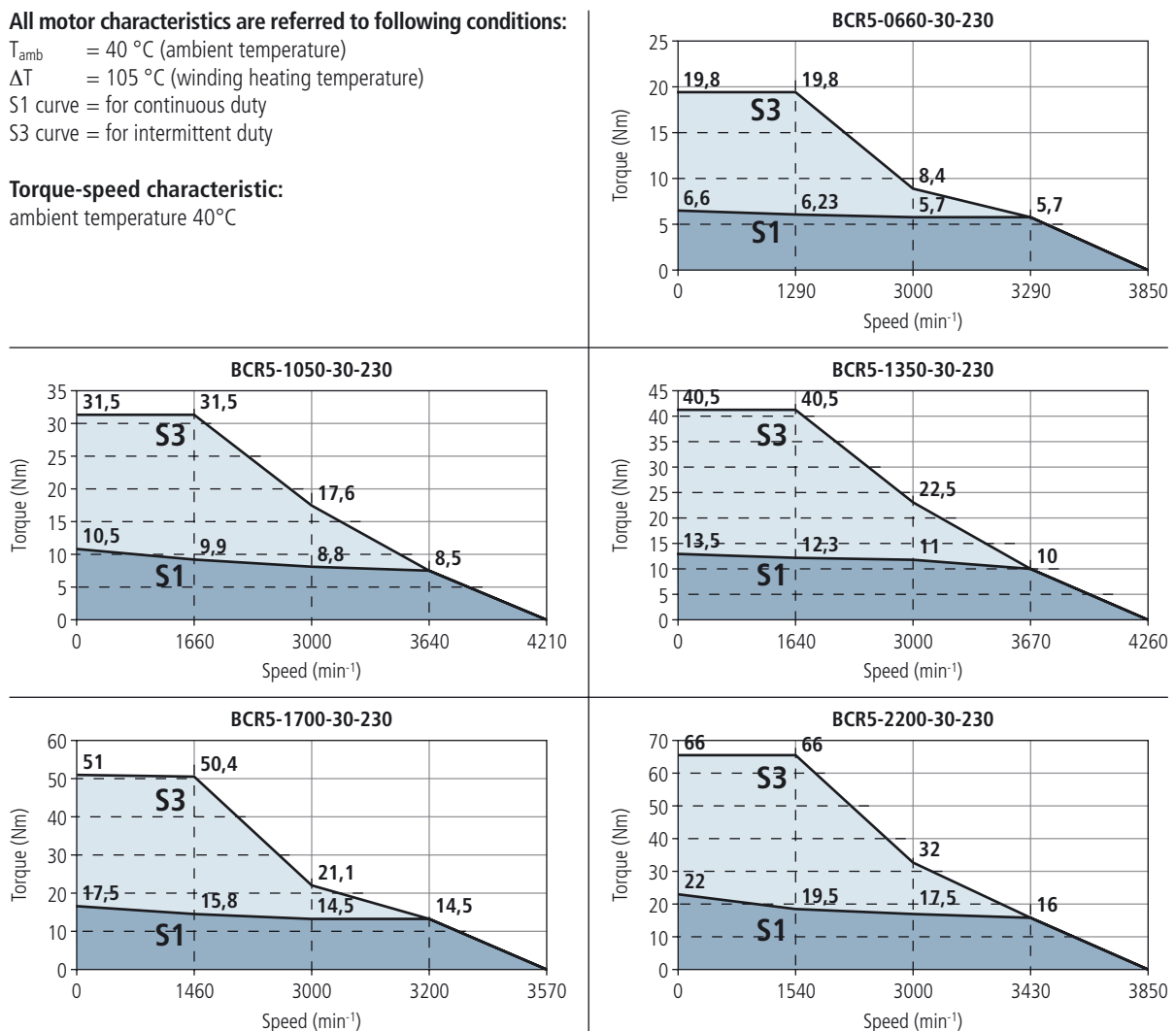
$\Delta T = 105\text{ °C}$  (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

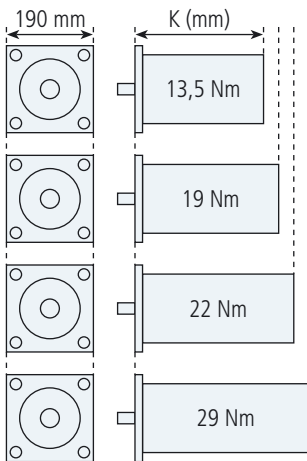
**Torque-speed characteristic:**

ambient temperature 40°C



All BCR servomotors belonging to size 6 are equipped by the same geometrical flange, whereas they are differentiated by the length (K) correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

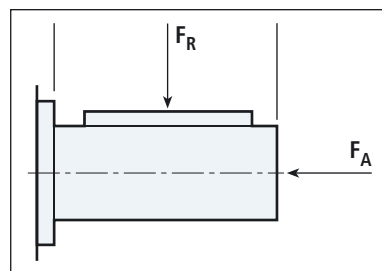


Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BCR6-1350	13,5	3000	190	201	254
BCR6-1900	19			235	288
BCR6-2200	22			250	303
BCR6-2900	29			310	363

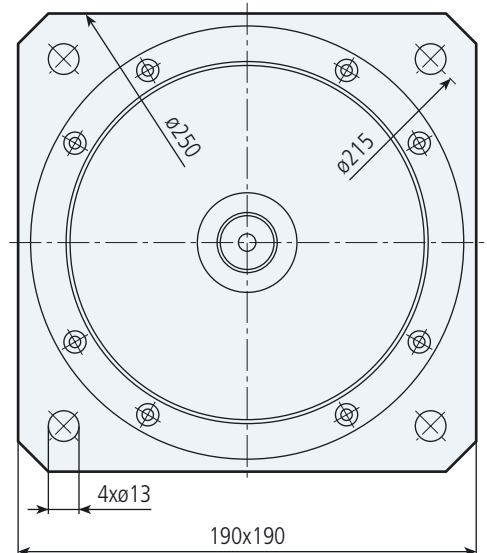
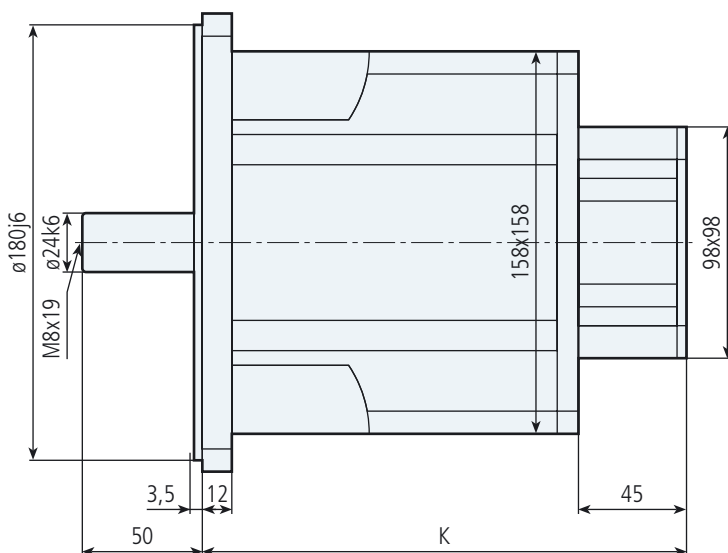
The motor size BCR6 is structured on four torque levels corresponding to different four motor lengths with nominal speed equal to 3000 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial F <sub>R</sub>	Axial F <sub>A</sub>
BCR6-1350	708	135
BCR6-1900	743	141
BCR6-2200	756	144
BCR6-2900	794	151





Motor		BCR6-1350-30-400	BCR6-1900-30-400	BCR6-2200-30-400	BCR6-2900-30-400
Stall torque	$M_o$ [Nm]	13.5	19	22	29
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330	330
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	13.0	17.0	19.0	24.0
Rated AC current	$I_n$ [A]	8.2	12.8	13.1	14.7
Stall AC current	$I_o$ [A]	8.2	13.8	14.6	17.2
Torque peak	$M_{max}$ [Nm]	41.0	57.0	66.0	87.0
Current peak	$I_{max}$ [A]	35	59	62	73
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	100.0	83.0	91.0	102.0
Torque constant	$K_T$ [Nm/A]	1.65	1.37	1.51	1.69
Rated power	$P_n$ [W]	4080	5340	5970	7540
Phase to phase stator resistance	$R_{pp}$ [Ω]	1.10	0.42	0.41	0.31
Phase to phase stator inductance	$L_{pp}$ [mH]	13.5	6.3	6.4	5.6
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	13.1	18.7	22.0	33.0
Electrical time constant	$\tau_{el}$ [ms]	12.3	15.0	15.6	18.1
Thermal time constant	$\tau_{th}$ [min]	45	53	60	70
Mechanical time constant	$\tau_{mec}$ [ms]	0.9	0.7	0.7	0.6
Weight without brake	$m_M$ [kg]	13.9	18.2	20.3	26.7
Weight with brake	$m_{MF}$ [kg]	16.76	21.06	23.16	29.56

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

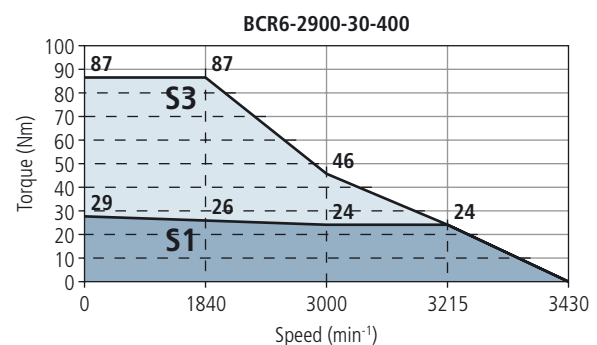
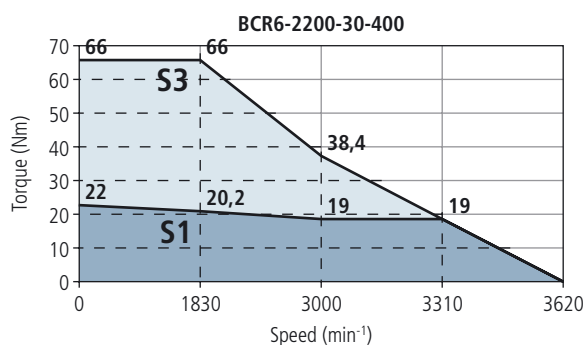
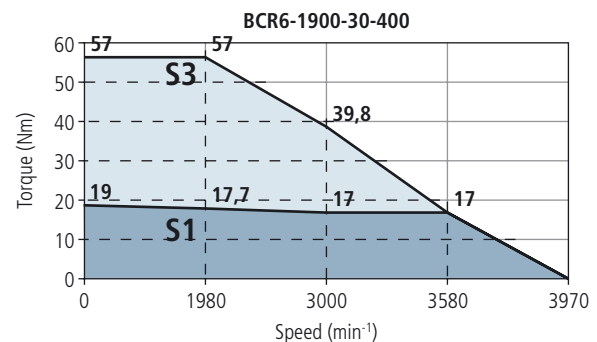
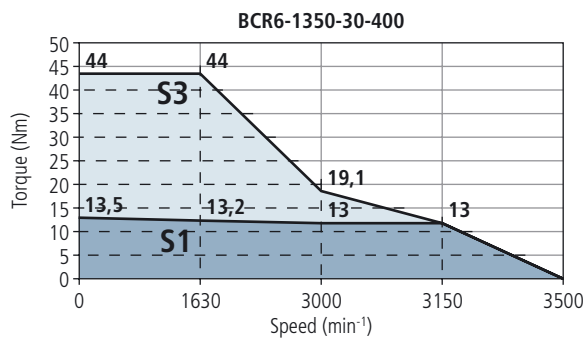
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C



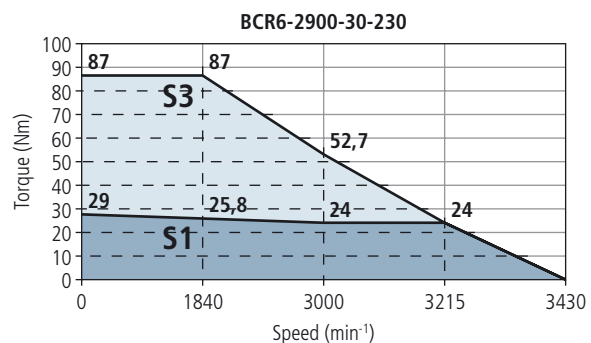
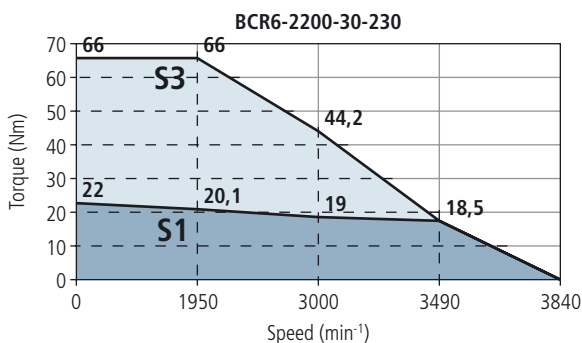
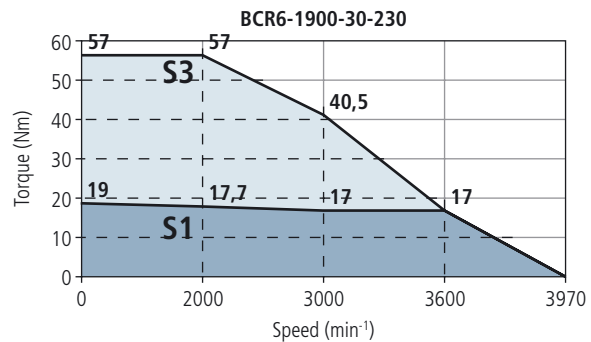
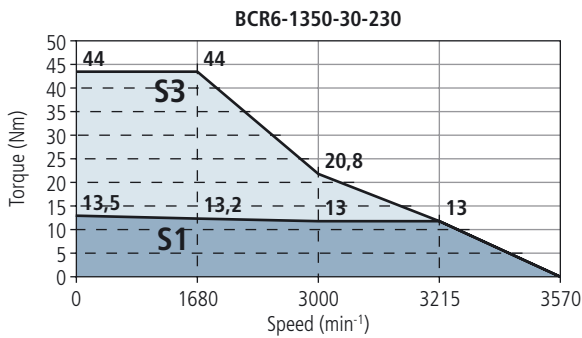
# BCR6 230V

Motor		BCR6-1350-30-230	BCR6-1900-30-230	BCR6-2200-30-230	BCR6-2900-30-230
Stall torque	$M_o$ [Nm]	13.5	19	22	29
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	320	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200	200
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	13.0	17.0	19.0	24.0
Rated AC current	$I_n$ [A]	14.6	21.3	22.9	26.8
Stall AC current	$I_o$ [A]	14.6	23.0	25.6	31.3
Torque peak	$M_{max}$ [Nm]	41.0	57.0	66.0	87.0
Current peak	$I_{max}$ [A]	62	97	108	132
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	56.0	50.0	52.0	56.0
Torque constant	$K_T$ [Nm/A]	0.93	0.83	0.86	0.93
Rated power	$P_n$ [W]	4080	5340	5970	7540
Phase to phase stator resistance	$R_{pp}$ [Ω]	0.34	0.15	0.13	0.09
Phase to phase stator inductance	$L_{pp}$ [mH]	4.2	2.3	2.1	1.7
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	13.1	18.7	22.0	33.0
Electrical time constant	$\tau_{el}$ [ms]	12.4	15.3	16.2	18.9
Thermal time constant	$\tau_{th}$ [min]	45	53	60	70
Mechanical time constant	$\tau_{mec}$ [ms]	0.9	0.7	0.7	0.6
Weight without brake	$m_M$ [kg]	13.9	18.2	20.3	26.7
Weight with brake	$m_{MF}$ [kg]	16.76	21.06	23.16	29.56

All motor characteristics are referred to following conditions:

- $T_{amb}$  = 40 °C (ambient temperature)
- $\Delta T$  = 105 °C (winding heating temperature)
- S1 curve = for continuous duty
- S3 curve = for intermittent duty

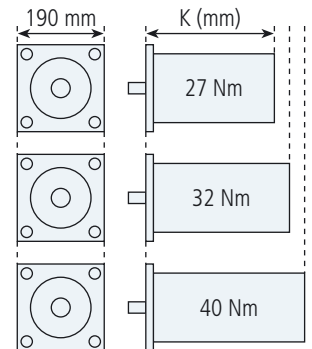
Torque-speed characteristic:  
ambient temperature 40°C



All BCR servomotors belonging to size 7 are equipped by the same geometrical flange, whereas they are differentiated by the length (K) correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

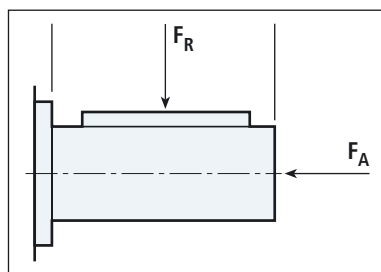
Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Flange (mm)	Length K (mm)	
				Without brake	With brake
BCR7-2700	27	3000	190	242	296
BCR7-3200	32			257	311
BCR7-4000	40			287	341



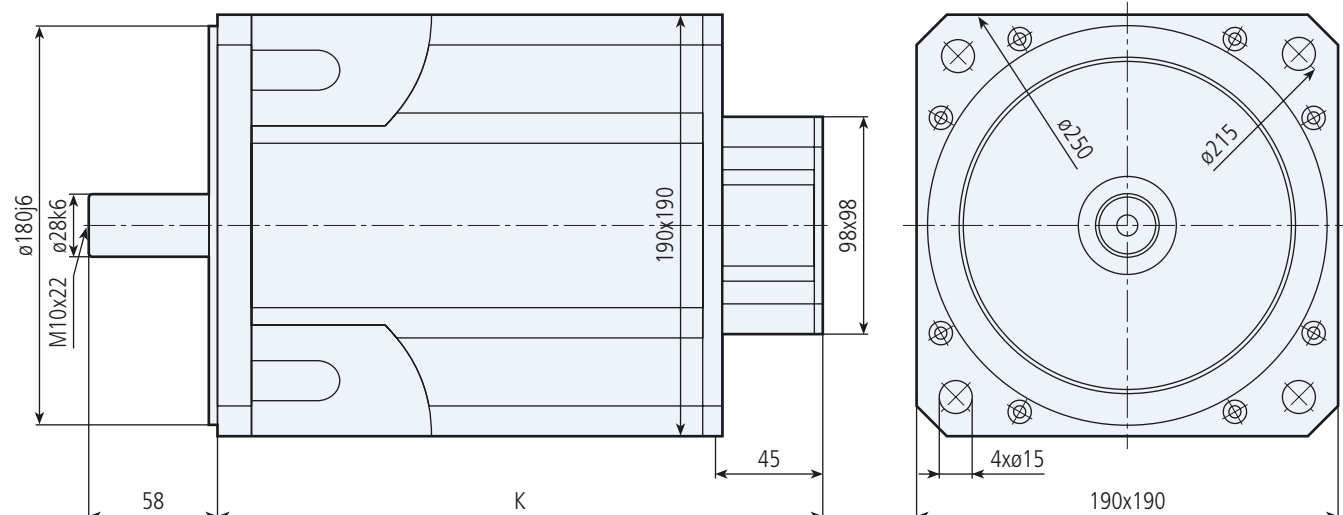
The motor size BCR7 is structured on three torque levels corresponding to different three motor lengths with nominal speed equal to 3000 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances.

On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial $F_R$	Axial $F_A$
BCR7-2700	1348	256
BCR7-3200	1370	260
BCR7-4000	1406	267



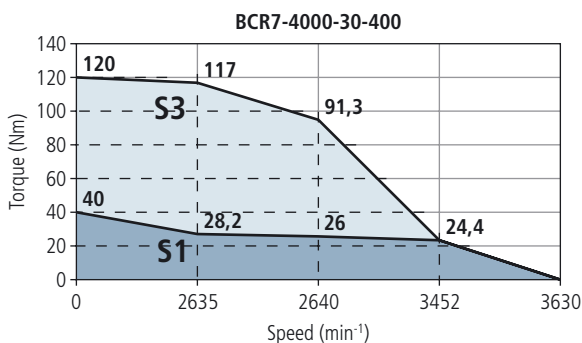
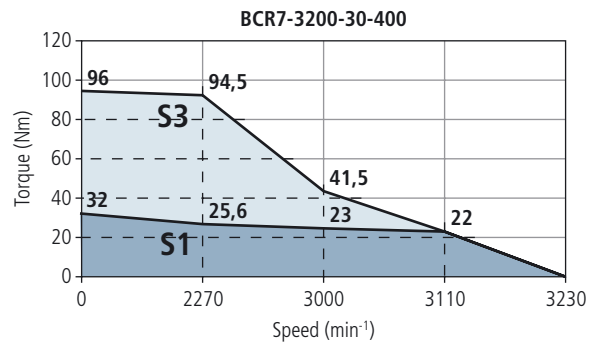
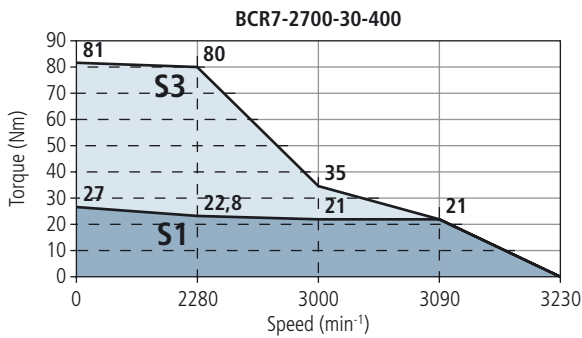
# BCR7 400V

Motor		BCR7-2700-30-400	BCR7-3200-30-400	BCR7-4000-30-400
Stall torque	$M_o$ [Nm]	27	32	40
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	560	560	560
Rated AC motor voltage	$V_n$ [V]	330	330	330
Motor poles number	$p_{mot}$	6	6	6
Resolver poles number	$p_{res}$	2	2	2
Rated torque	$M_n$ [Nm]	21.0	23.0	26.0
Rated AC current	$I_n$ [A]	13.5	15.0	17.9
Stall AC current	$I_o$ [A]	16.0	19.0	24.7
Torque peak	$M_{max}$ [Nm]	81.0	96.0	120.0
Current peak	$I_{max}$ [A]	62	74	96
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	102	102	98
Torque constant	$K_T$ [Nm/A]	1.69	1.69	1.62
Rated power	$P_n$ [W]	6600	7160	8170
Phase to phase stator resistance	$R_{pp}$ [Ω]	0.43	0.35	0.23
Phase to phase stator inductance	$L_{pp}$ [mH]	4.4	3.8	2.7
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	36.1	39.0	45.5
Electrical time constant	$\tau_{el}$ [ms]	10.2	10.8	11.7
Thermal time constant	$\tau_{th}$ [min]	60	67	72
Mechanical time constant	$\tau_{mec}$ [ms]	0.9	0.8	0.7
Weight without brake	$m_M$ [kg]	23.5	26.0	31.5
Weight with brake	$m_{MF}$ [kg]	26.75	29.25	34.4

All motor characteristics are referred to following conditions:

- $T_{amb}$  = 40 °C (ambient temperature)
- $\Delta T$  = 105 °C (winding heating temperature)
- S1 curve = for continuous duty
- S3 curve = for intermittent duty

Torque-speed characteristic:  
ambient temperature 40°C



Motor		BCR7-2700-30-230	BCR7-3200-30-230	BCR7-4000-30-230
Stall torque	$M_o$ [Nm]	27	32	40
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	3000	3000
Inverter DC-bus	$V_{dc}$ [V]	320	320	320
Rated AC motor voltage	$V_n$ [V]	200	200	200
Motor poles number	$p_{mot}$	6	6	6
Resolver poles number	$p_{res}$	2	2	2
Rated torque	$M_n$ [Nm]	21.0	23.0	26.0
Rated AC current	$I_n$ [A]	23.7	25.9	31.8
Stall AC current	$I_o$ [A]	28.2	32.8	44.0
Torque peak	$M_{max}$ [Nm]	81.0	96.0	120.0
Current peak	$I_{max}$ [A]	110	128	172
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	58	59	55
Torque constant	$K_T$ [Nm/A]	0.96	0.98	0.91
Rated power	$P_n$ [W]	6600	7160	8170
Phase to phase stator resistance	$R_{pp}$ [Ω]	0.15	0.12	0.07
Phase to phase stator inductance	$L_{pp}$ [mH]	2.2	3.0	0.8
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	36.1	39.0	45.5
Electrical time constant	$\tau_{el}$ [ms]	14.7	10.8	11.4
Thermal time constant	$\tau_{th}$ [min]	60	67	72
Mechanical time constant	$\tau_{mec}$ [ms]	1.0	0.9	0.7
Weight without brake	$m_M$ [kg]	23.5	26.0	31.5
Weight with brake	$m_{MF}$ [kg]	26.75	29.25	34.4

All motor characteristics are referred to following conditions:

$T_{amb}$  = 40 °C (ambient temperature)

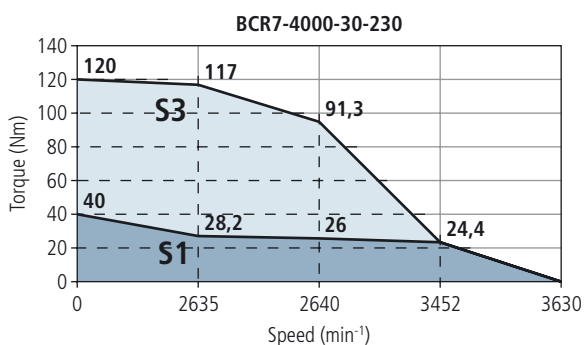
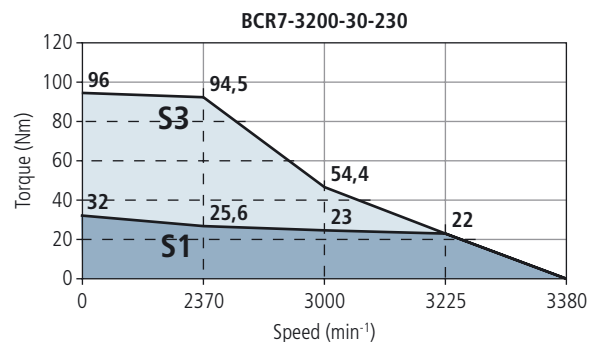
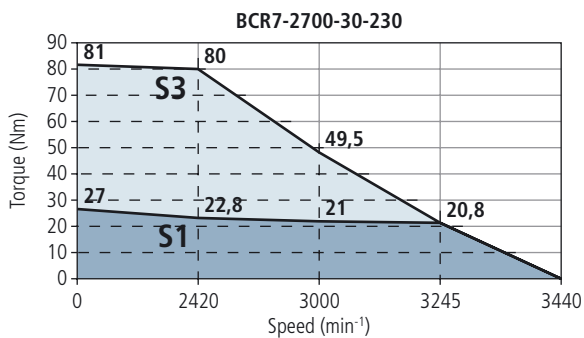
$\Delta T$  = 105 °C (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

ambient temperature 40°C



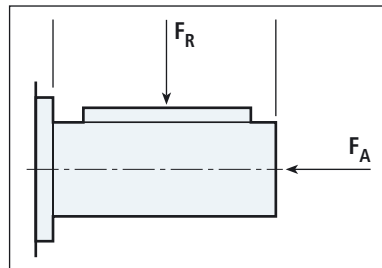
All BCR servomotors belonging to size 8 are equipped by the same geometrical flange, whereas they are differentiated by the length (K) correlated to torque capacity.

The basic motor configuration does not provide the electromechanical brake which is an option. When the brake is installed the motor length is increased.

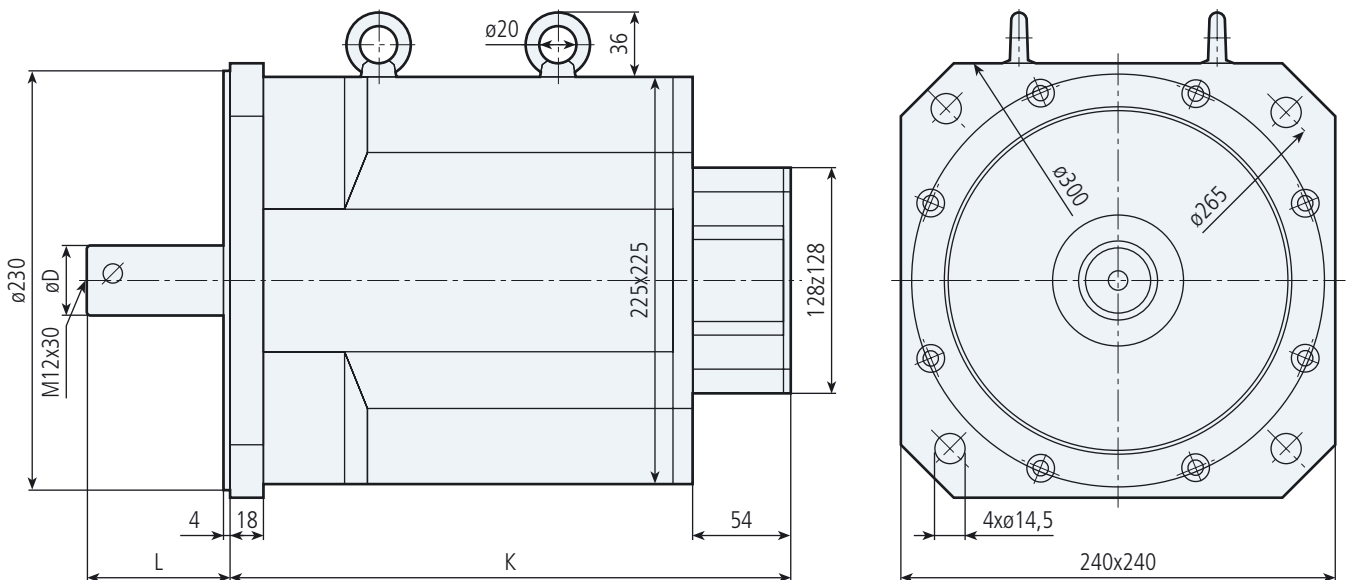
Motor	Stall torque (Nm)	Rated speed (min <sup>-1</sup> )	Shaft (mm)		Flange (mm)	Length K (mm)	
			Diameter $\phi$	Length L		Without brake	With brake
<b>BCR8-0400</b>	40	3000	38	80	240	311	379
<b>BCR8-0680</b>	68	2000	38	80		379	447
<b>BCR8-0930</b>	93	2000	42	110		447	515
<b>BCR8-1150</b>	115	2000	42	110		515	583

The motor size BCR8 is structured on four torque levels corresponding to different four motor lengths with nominal speed equal to 2000/3000 min<sup>-1</sup>.

The motor is available with power supply both 3ph x 400VAC and 3ph x 230VAC, keeping the same mechanical performances. On standard motor both power and control connectors are installed for electrical connection to the inverter. On demand, several connectors orientation can be supplied.



Motor	Max load on shaft (N)	
	Radial $F_R$	Axial $F_A$
<b>BCR8-0400</b>	1702	323
<b>BCR8-0680</b>	1785	339
<b>BCR8-0930</b>	1775	337
<b>BCR8-1150</b>	1823	346



Motor		BCR8-0400-30-400	BCR8-0680-20-400	BCR8-0930-20-400	BCR8-1150-20-400
Stall torque	$M_o$ [Nm]	40	68	93	115
Rated speed	$n_n$ [min <sup>-1</sup> ]	3000	2000	2000	2000
Inverter DC-bus	$V_{dc}$ [V]	560	560	560	560
Rated AC motor voltage	$V_n$ [V]	350	350	350	350
Motor poles number	$p_{mot}$	6	6	6	6
Resolver poles number	$p_{res}$	2	2	2	2
Rated torque	$M_n$ [Nm]	30.0	56.0	70.0	85.0
Rated AC current	$I_n$ [A]	17.8	22.0	25.3	32.4
Stall AC current	$I_o$ [A]	21.8	25.4	33.1	42.1
Torque peak	$M_{max}$ [Nm]	120	204	279	345
Current peak	$I_{max}$ [A]	85	99	129	164
EMF constant	$K_E$ [V/1000min <sup>-1</sup> ]	111	162	170	165
Torque constant	$K_T$ [Nm/A]	1.84	2.7	2.8	2.7
Rated power	$P_n$ [W]	9420	11730	14660	17800
Phase to phase stator resistance	$R_{pp}$ [Ω]	0.25	0.24	0.15	0.11
Phase to phase stator inductance	$L_{pp}$ [mH]	5.7	6.3	4.8	3.4
Rotor inertia	$J_m$ [kgcm <sup>2</sup> ]	76	114	153	190
Electrical time constant	$\tau_{el}$ [ms]	23	26	32	31
Thermal time constant	$\tau_{th}$ [min]	47	65	79	90
Mechanical time constant	$\tau_{mec}$ [ms]	1.0	0.7	0.5	0.5
Weight without brake	$m_M$ [kg]	41	56	73	89
Weight with brake	$m_{MF}$ [kg]	50.5	65.5	92.5	98.5

All motor characteristics are referred to following conditions:

$T_{amb} = 40\text{ °C}$  (ambient temperature)

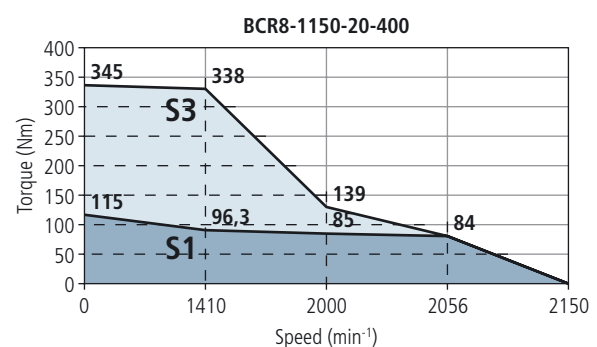
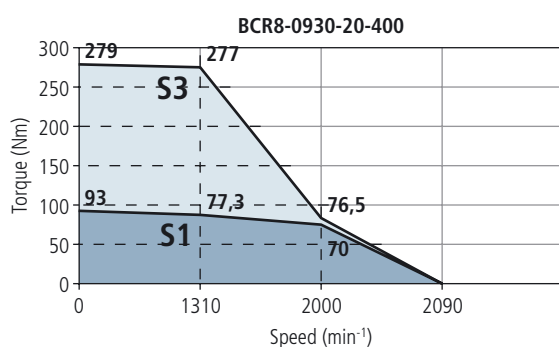
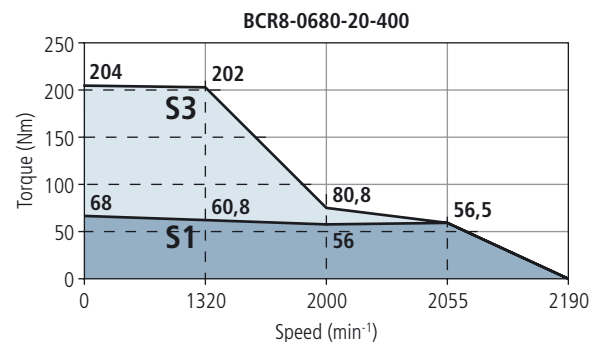
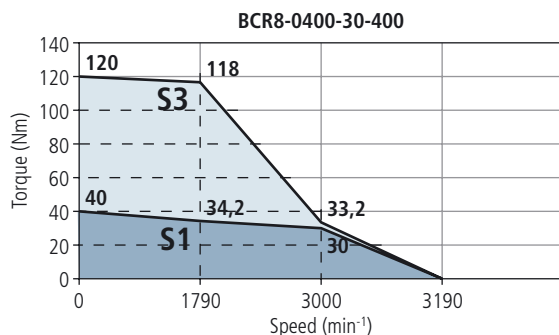
$\Delta T = 105\text{ °C}$  (winding heating temperature)

S1 curve = for continuous duty

S3 curve = for intermittent duty

Torque-speed characteristic:

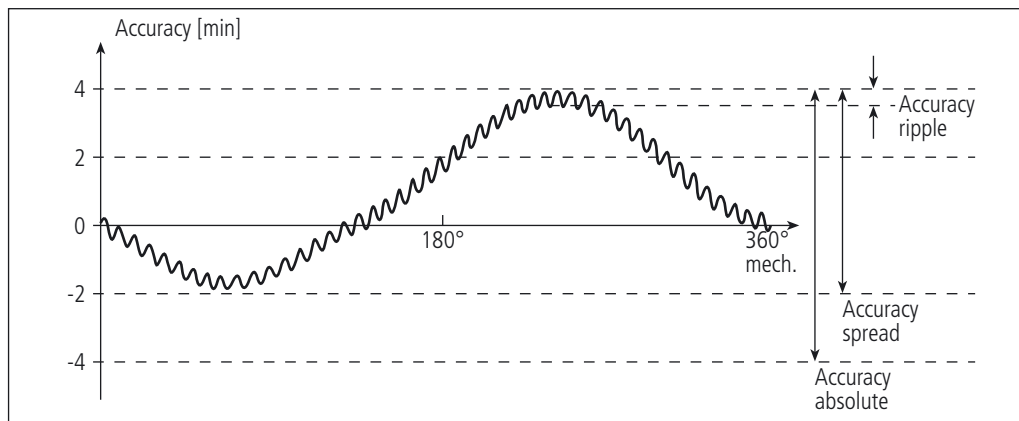
ambient temperature 40°C



All servomotors in the Bonfiglioli BCR and BTD Series use a two - pole feedback resolver to achieve a level of accuracy of 1' of ripple at the motor shaft.



Use of this type of transducer guarantees an absolute accuracy of  $\pm 4'$  at the motor shaft as well as a maximum ripple of 1'.

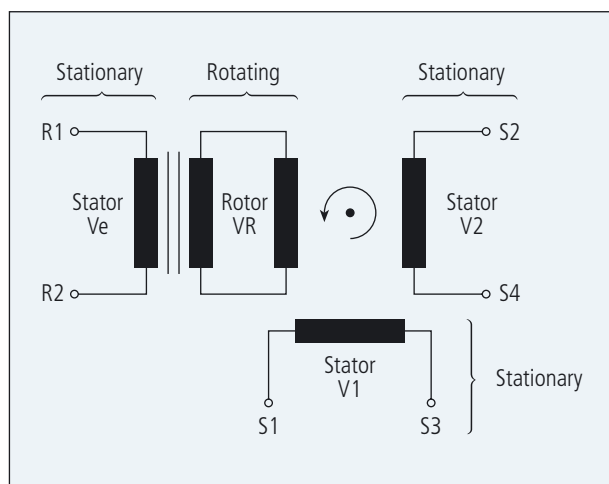


$$\text{Accuracy } (\epsilon) = \text{electrical angle } (\theta_{el}) - \text{mechanical angle } (\theta_{mech})$$

Frequency inverters from the Bonfiglioli Vectron ACTIVE series use a sophisticated electronic interface to acquire drive signals. Use of BCR and BTD servomotors with these frequency inverters dramatically reduces the effects of harmonic distortion on the sinusoidal signals and significantly improves both absolute and ripple accuracy.

On request, BCR and BTD servomotors can be fitted with absolute and sin/cos encoders. Contact the Bonfiglioli Drives Service Centre for further information.

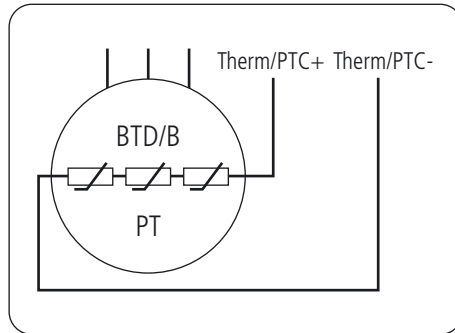




Item	Value
Poles number	2
Transformation ratio	0.5±0.05
Input voltage	7 V <sub>rms</sub>
Input current	58 mA
Input frequency	5 kHz
Phase shift	8°
Null voltage	30 mV max
Impedance Z <sub>To</sub> (Ω)	75 j 98
Impedance Z <sub>rS</sub> (Ω)	70 j 85
Impedance Z <sub>s0</sub> (Ω)	180 j 230
Impedance Z <sub>ss</sub> (Ω)	170 j 200
DC resistance (±10%) Rotor	40 Ω
DC resistance (±10%) Stator	102 Ω
Accuracy	±10'
Accuracy ripple	1' max
Operatine temperature	-55°C...+155°C
Max Speed	20,000 min <sup>-1</sup>
Shock (11ms)	≤ 100 m/s <sup>2</sup>
Vibration (10 to 500 Hz)	≤ 500 m/s <sup>2</sup>
Weight Rotor	25 g
Weight Stator	60 g
Rotor Inertia	0.02 x 10 <sup>-4</sup> kgm <sup>2</sup>
Insulation Housing/Winding	500 V min.
Insulation Winding/Winding	250 V min.
Rotor technology	Completely impregnated
Stator technology	Completely impregnated
Stator length	16.1 mm

All motors in the BCR and BTD Series are equipped with an integrated PTC temperature sensor to protect the windings against overtemperatures exceeding the capacity of the motor's class F insulation.

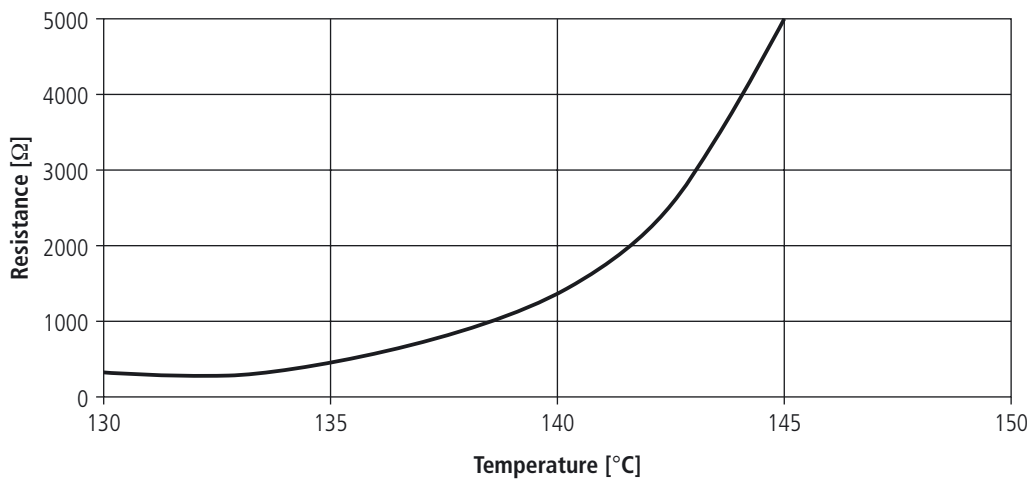
These sensors are not options but standard equipment on all Bonfiglioli servomotors, in conformity to DIN standard 44081.



The PTC sensor integrated in the BCR and BTD servomotors uses double insulation technology to ensure conformity to EN61800-5-1 safety standards when the motors are connected to a frequency inverter.

The PTC temperature sensor consists of a special ceramic resistor whose Ohmic value varies with the temperature of the electrical winding with which it is held on close contact. Each temperature value generates a known resistance, so that provided the resistor is fed at a constant voltage, the output current can be used to determine the corresponding temperature. If temperature reaches an established limit, the circuit monitoring the signal trips the necessary cutout to disconnect power to the motor and prevent damage.

**PTC 111-K13-140°C**



The output signal from the PTC sensor passes through the motor 12 - pin signal connector, on pins 2 (PTC+) and 6 (PTC-), together with the resolver signals.

BTD and BCR are used as four-quadrant actuators then they are designed to offer positive torque when they are running as motors, as well negative torque when they are running as generator.

Therefore both are able to brake dynamically and statically (standstill torque) the mechanical load in every work-point consistent with corresponding motor curve.

Anyway when an enduring downtime is required to the motor, an optional parking brake is available in order to save energy.

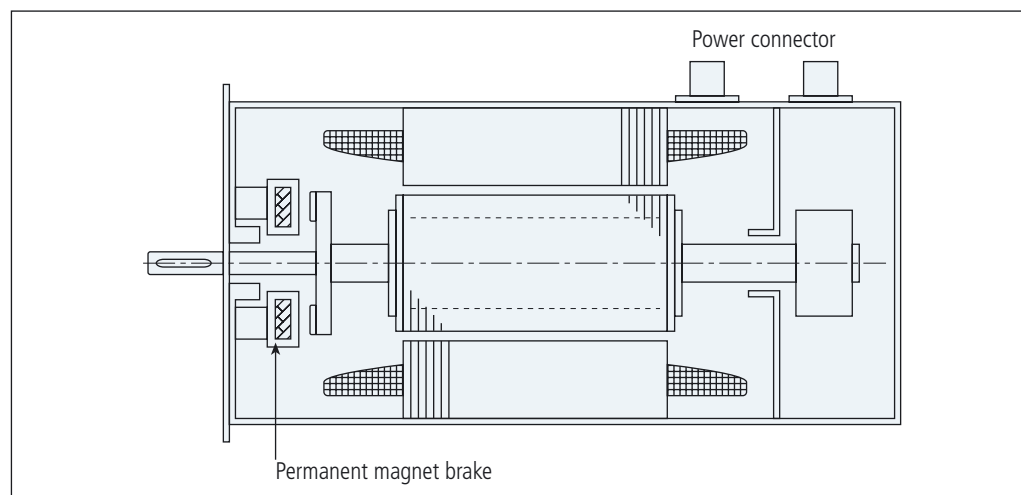
The brake option can be ordered by using the value 'FD24' into corresponding position of the servomotor designation (see page 8 and 9 of this catalogue).

When the motor is delivered without brake, the brake fitting is not possible.

The brake coil power supply must be 24V DC-voltage.

The brake option is responsible of an increment of the motor length (see K dimension in each motor drawing)

When the brake is installed, its wires are linked to power connector together motor winding.



For each motor size, a suitable electromechanical brake is fitted with different braking torque in function of motor features.

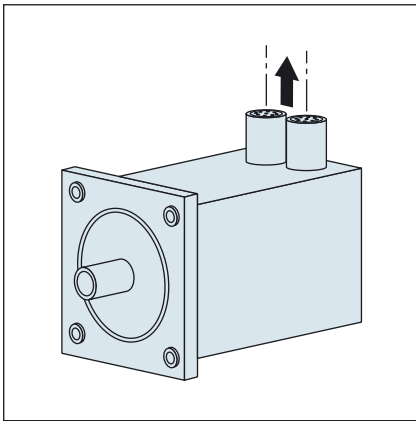
Brake data	Unit	BTD2	BTD3	BTD4	BTD5	BCR2	BCR3	BCR4	BCR5	BCR6	BCR7	BCR8
<b>Torque</b>	Nm	2	4,5	9	18	2,0	4,5	9,0	18,0	36,0	36,0	145,0
<b>Power supply</b>	VDC	24 ( + 6% - 10% )										
<b>Nominal power</b>	W	11	12	18	24	11	12	18	24	26	26	50
<b>Moment of inertia</b>	Kgcm <sup>2</sup>	0,068	0,18	0,54	1,66	0,068	0,18	0,54	1,66	5,56	5,56	53,0
<b>Weight</b>	Kg	0,440	0,590	0,820	1,080	0,15	0,47	0,650	1,350	2,860	3,250	9,500

Even in their basic configurations, BTD and BCR Series servomotors come complete with all the necessary power and signal connectors.

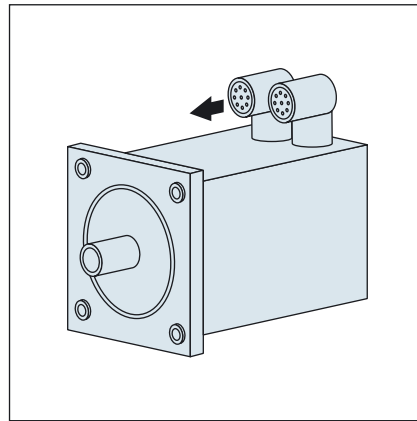
These are located at the top rear of the motor where they are easily accessible to cables.

Connectors come with vertically oriented pins as default, but are also available with horizontal pins either facing the flange (types PA and CA) or facing in the opposite direction (types PB and CB).

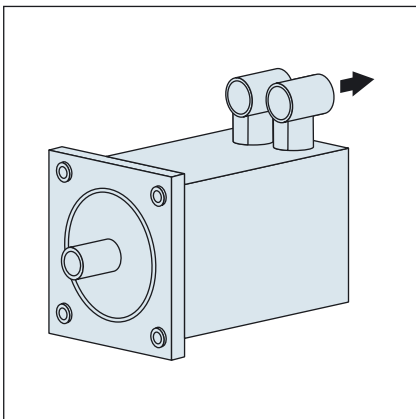
Connectors can also be horizontally oriented but able to rotate about an axis perpendicular to the surface of the motor casing (types PT and CT).



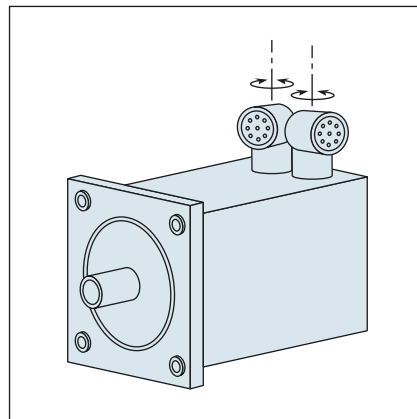
Vertical orientation (default)



Orientation facing flange  
PAxx and CAxx



Orientation opposite to flange  
PBxx and CBxx



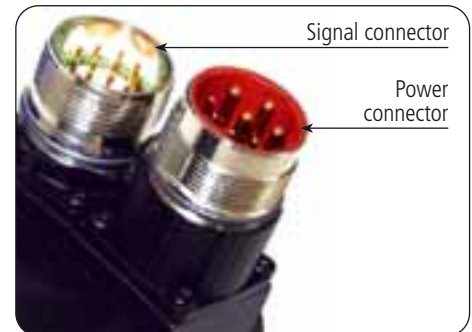
Variable orientation (rotating)  
PTxx and CTxx

**All motor connectors are male and fully compatible with the corresponding female connectors on the accessory cables.**

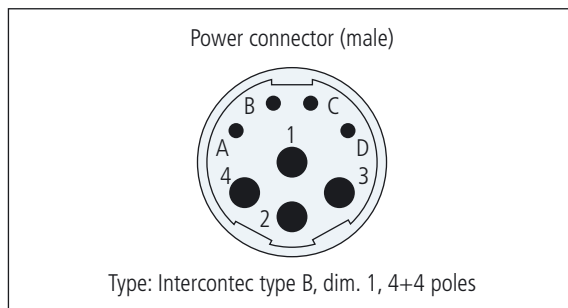
The connectors are integral part of servomotors BTD and BCR. Although the side picture is referred to vertical case, the functional layout of electrical contacts internally housed does not depend on orientation of connector.

**Power connector (motor + brake)**

The power connectors include the pins for motor supply but also the ones for brake supply even if the brake is not installed. That allows to unify the visual representation of functions relevant to each contact assembled into connector housing.



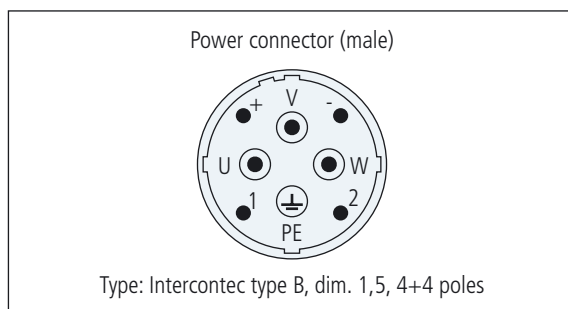
Servomotors BTD2-BTD5 / BCR2-BCR7:



Functionality description:

Motor + brake	
Pin	Description
1	Phase U
4	Phase V
3	Phase W
2	Earth / SL
C	Brake +
D	Brake -
A	nc / reserved
B	nc / reserved

Servomotors BCR8:

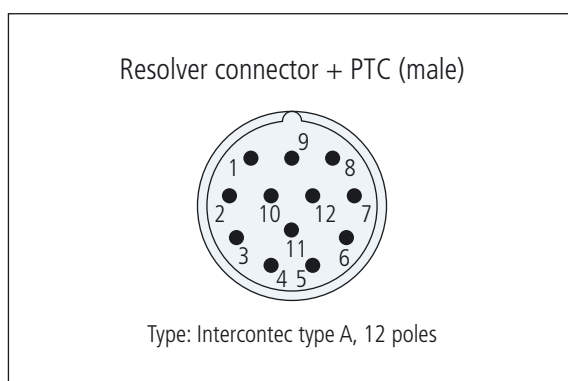


Functionality description:

Motor + brake	
Pin	Description
U	Phase U
V	Phase V
W	Phase W
PE	Earth / SL
+	Brake +
-	Brake -
1	nc / reserved
2	nc / reserved

**Signal connector (resolver + PTC)**

The signal connectors are in charge of electrical link among resolver housed into servomotor and inverter assigned to reception of him. In the same connector are also included the PTC terminals coming from motor winding where they are always installed for motor thermal protection. The pins layout is independent on motor series and motor size.



Resolver + PTC	
Pin	Description
3	Cos + (S4)
7	Cos - (S2)
4	Sin + (S1)
8	Sin - (S3)
5	Ref + (R2)
9	Ref - (R1)
2	Therm / PTC +
6	Therm / PTC -



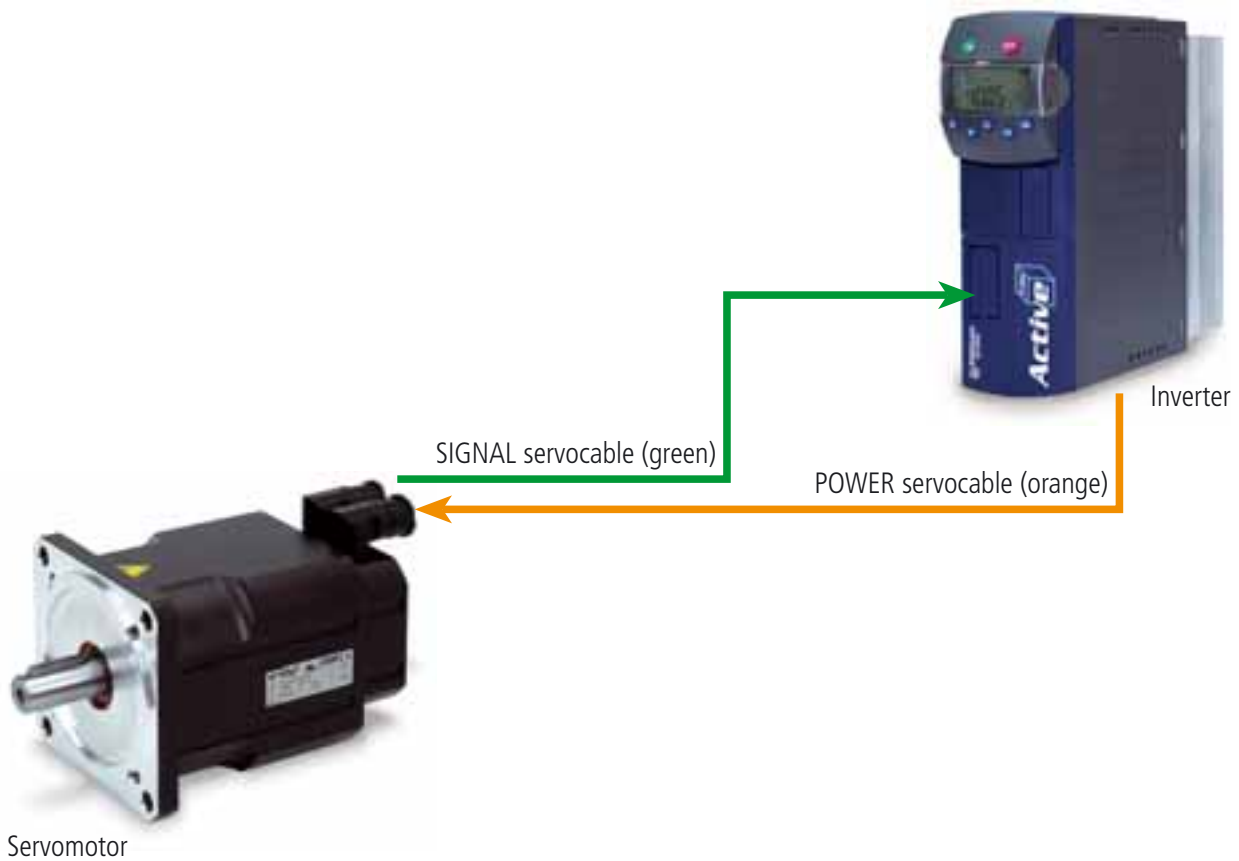
The word servocable is referred to electrical cable connecting Bonfiglioli servomotor to respective inverter.

For both BCR and BTD servomotors a servocables selection is available for power supply and sensor feed-back, justifying the distinction between power cables and signal cables.

The power cable besides providing energy to motor, also supports the brake feed-in when it is present on board as option.

The signal cables instead are in charge of transmission of electrical signals generated by feed-back equipment installed on motor. The same cable is also oriented to convey the PTC signals always installed inside the motor.

All servocables are available in three different and fixed lengths (3 meters, 5 m, 10 m) offering to user an exhaustive proposal to numerous needs of configuration.



**Signal servocables (green)**

Signal cables are recognized by the green colour according to Desina standard. The conductors number, their cross-section and their terminal type depend on transducer typology supported by the cable. Currently the cable is in charge of resolver connection.

Both cable ends are executed with two different terminations:

- on motor side the cable is equipped with metal circular connector in which twelve female contact are assembled in order to favour an easy and sure plug-in with respective male connector present on motor;
- on inverter side, instead, the cable terminates with DB9 male standard connector for easy and sure plug-in with corresponding DB9 female present on EMRES-03 interface of inverter Active Cube Bonfiglioli. The cable is also available in a second version implemented with ferrules for connection to screw terminals on the inverter.



Inverter side



Motor side

The ordering codes of the signal cables are described in the following table:

Feedback device	Cable type			Notes	
	3 meters	5 meters	10 meters	Motor side termination	Inverter side termination
Resolver	8RTC0325	8RTC0525	8RTC1025	Circular connector 12 pins female	SUB-D9
	8RTC0325L	8RTC0525L	8RTC1025L	Circular connector 12 pins female	8 flying leads

The signal cables fulfil the following technical requirement:

<b>Compliance:</b>	DESINA (ISO 23570) UL/CSA ROHS
<b>Shielding:</b>	Tinned copper netting with > 85 % covering
<b>External insulator:</b>	PUR green color
<b>Conductors:</b>	Copper strand tinned
<b>Bend radius:</b>	10 x outer diameter N° max bending cycles = 10 millions
<b>Acceleration:</b>	Max. 4 m/s <sup>2</sup>
<b>Temperature:</b>	Stocking -30°C +80°C Running 0°C +60°C

**Power servocables (orange)**



Both cable ends of the power cable are executed with two different termination typology:

- on motor side the cable is equipped with metal circular connector in which eight female contacts are assembled in order to favour an easy and sure plug-in with respective male connector present on the motor;
- on inverter side, instead, the cable terminates with flying leads covered by ferrules for plug-in into screw terminal of the inverter

All described power cables fulfil the following technical features:

<b>Compliance:</b>	DESINA (ISO 23570) UL/CSA ROHS
<b>Shielding:</b>	Tinned copper netting with > 85 % covering
<b>External insulator:</b>	PUR orange color
<b>Conductors:</b>	Copper strand tinned consistent with DIN VDE 95 Kl.6
<b>Bend radius:</b>	Not moved = 7 x outer diameter Moved = 12 x outer diameter N° max bending cycles = 10 millions
<b>Acceleration:</b>	Max. 4 m/s <sup>2</sup>
<b>Temperature:</b>	Stocking -30°C +80°C Running 0°C +60°C



**Power servocables (orange)**

In order to face different current level absorbed by different motor sizes, the power cables are executed with four conductors cross sections (1.5 mm<sup>2</sup>, 2.5 mm<sup>2</sup>, 4.0 mm<sup>2</sup>, 10.0 mm<sup>2</sup>) alternative among them. For user helping during servomotor-cable match selection, the following tables are proposed where side to each motor the optimized cable is suggested.

Servomotor BTD	Power cable types		
	3 meters	5 meters	10 meters
BTD 2 0026 45 400	42MBC0315	42MBC0515	42MBC1015
BTD 2 0053 45 400			
BTD 2 0074 45 400			
BTD 2 0095 45 400			
BTD 2 0026 45 230			
BTD 2 0053 45 230			
BTD 2 0074 45 230			
BTD 2 0095 45 230			
BTD 3 0095 30 400			
BTD 3 0190 30 400			
BTD 3 0325 30 400			
BTD 3 0420 30 400			
BTD 3 0095 30 230			
BTD 3 0190 30 230			
BTD 3 0325 30 230			
BTD 3 0420 30 230			
BTD 4 0410 30 400			
BTD 4 0630 30 400			
BTD 4 0860 30 400			
BTD 4 0410 30 230			
BTD 4 0630 30 230			
BTD 4 0860 30 230			
BTD 5 1160 30 400	42MBC0325	42MBC0525	42MBC1025
BTD 5 1490 30 400			
BTD 5 1870 30 400			
BTD 5 2730 30 400			
BTD 5 1160 30 230			
BTD 5 1490 30 230	42MBC0340	42MBC0540	42MBC1040
BTD 5 1870 30 230			
BTD 5 2730 30 230			

The cable ordering code is structured in the following mode:

**42MBCxxyy**

where the field xxyy changes in function of cable length and conductors cross section (see side table)

**Power servocables (orange)**

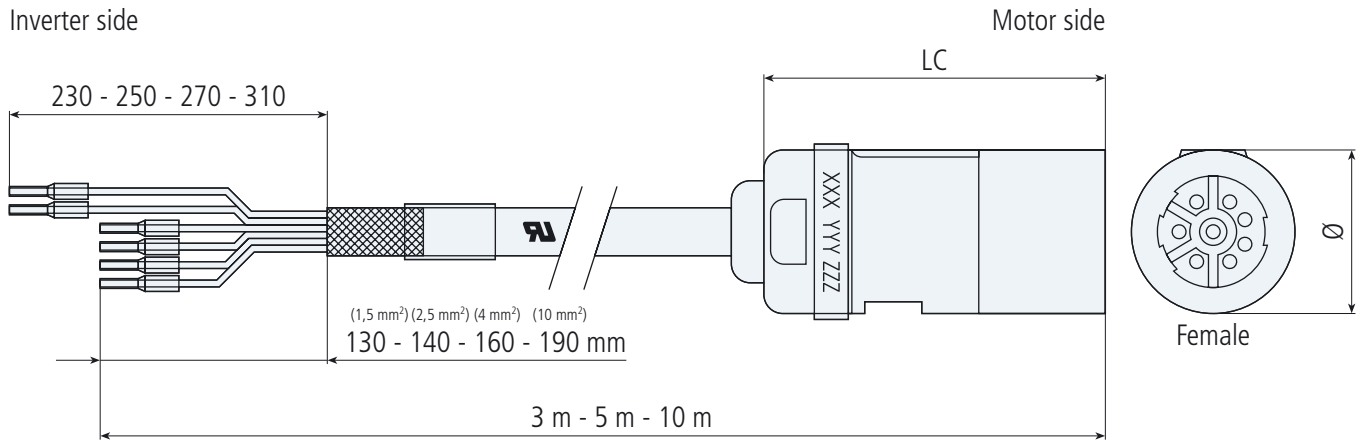
The cable ordering code is structured in the following mode:

**42MBCxxyy**

where the field xxyy changes in function of cable length and conductors cross section (see side table)

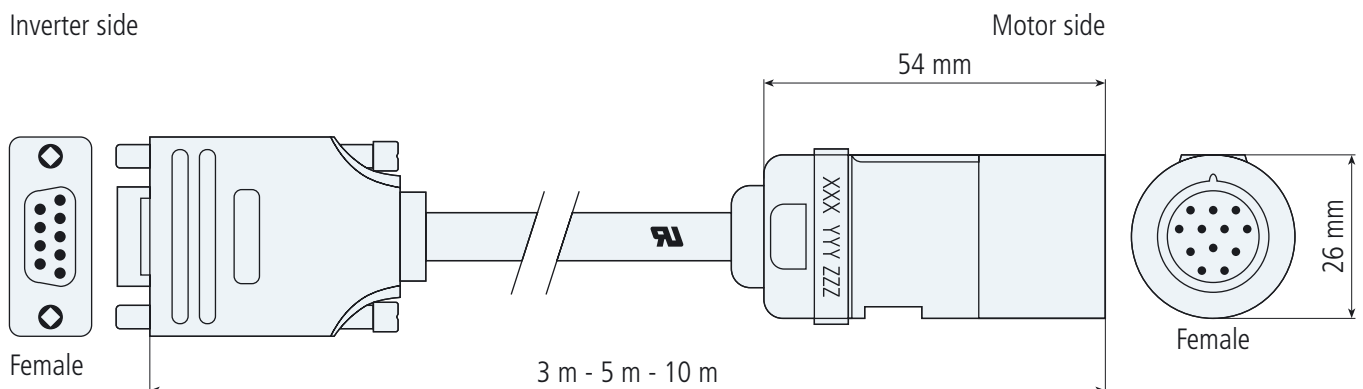
Servomotor BCR	Power cable types		
	3 meters	5 meters	10 meters
BCR 2 0020 45 400	42MBC0315	42MBC0515	42MBC1015
BCR 2 0040 45 400			
BCR 2 0060 45 400			
BCR 2 0080 45 400			
BCR 2 0020 45 230			
BCR 2 0040 45 230			
BCR 2 0060 45 230			
BCR 2 0080 45 230			
BCR 3 0065 45 400			
BCR 3 0130 45 400			
BCR 3 0250 45 400			
BCR 3 0300 45 400			
BCR 3 0065 45 230			
BCR 3 0130 45 230			
BCR 3 0250 45 230			
BCR 3 0300 45 230			
BCR 4 0100 30 400			
BCR 4 0260 30 400			
BCR 4 0530 30 400			
BCR 4 0750 30 400			
BCR 4 0100 30 230			
BCR 4 0260 30 230			
BCR 4 0530 30 230			
BCR 4 0750 30 230			
BCR 5 0660 30 400			
BCR 5 1050 30 400			
BCR 5 1350 30 400			
BCR 5 1700 30 400			
BCR 5 2200 30 400			
BCR 5 0660 30 230			
BCR 5 1050 30 230			
BCR 5 1350 30 230			
BCR 5 1700 30 230			
BCR 5 2200 30 230			
BCR 6 1350 30 400			
BCR 6 1900 30 400			
BCR 6 2200 30 400			
BCR 6 2900 30 400			
BCR 6 1350 30 230			
BCR 6 1900 30 230			
BCR 6 2200 30 230			
BCR 6 2900 30 230			
BCR 7 2700 30 400			
BCR 7 3200 30 400			
BCR 7 4000 30 400			
BCR 7 2700 30 230			
BCR 7 3200 30 230			
BCR 7 4000 30 230			
BCR 8 0400 30 400			
BCR 8 0680 20 400			
BCR 8 0930 20 400			
BCR 8 1150 20 400			

**Power cable (type 42MBCxxyy)**



Cable type	LC (mm)	Ø (mm)
42MBCXX15	75	28
42MBCXX25		
42MBCXX40		
42MBCXX100	95	45.8

**Signal cable (type 8RTCxxyy)**





### ***Bonfiglioli is a Partner Worldwide for Power Transmission and Motion Control***



The ever-growing export share has led Bonfiglioli into the most far away Countries. With expansion plans entailing a further growth of the sales network Bonfiglioli aims at improving both the competitiveness of its products and the effectiveness of the Customer service.

In every market place Bonfiglioli is committed to improve the Customer satisfaction by offering state-of-the-art technology and shorter deliveries. Nowadays branch companies and BEST Partners bearing the Bonfiglioli name are operating in seventeen Countries outside Italy, with sales and service in the other countries managed by appointed dealers.

The domestic network is made up of 30 sales office and representatives and 100 dealers operating with their own warehouse and supporting Customers locally. Throughout the World Bonfiglioli's reputed know-how and Service guarantee effective and timely assistance.



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mark@saeco.co.nz

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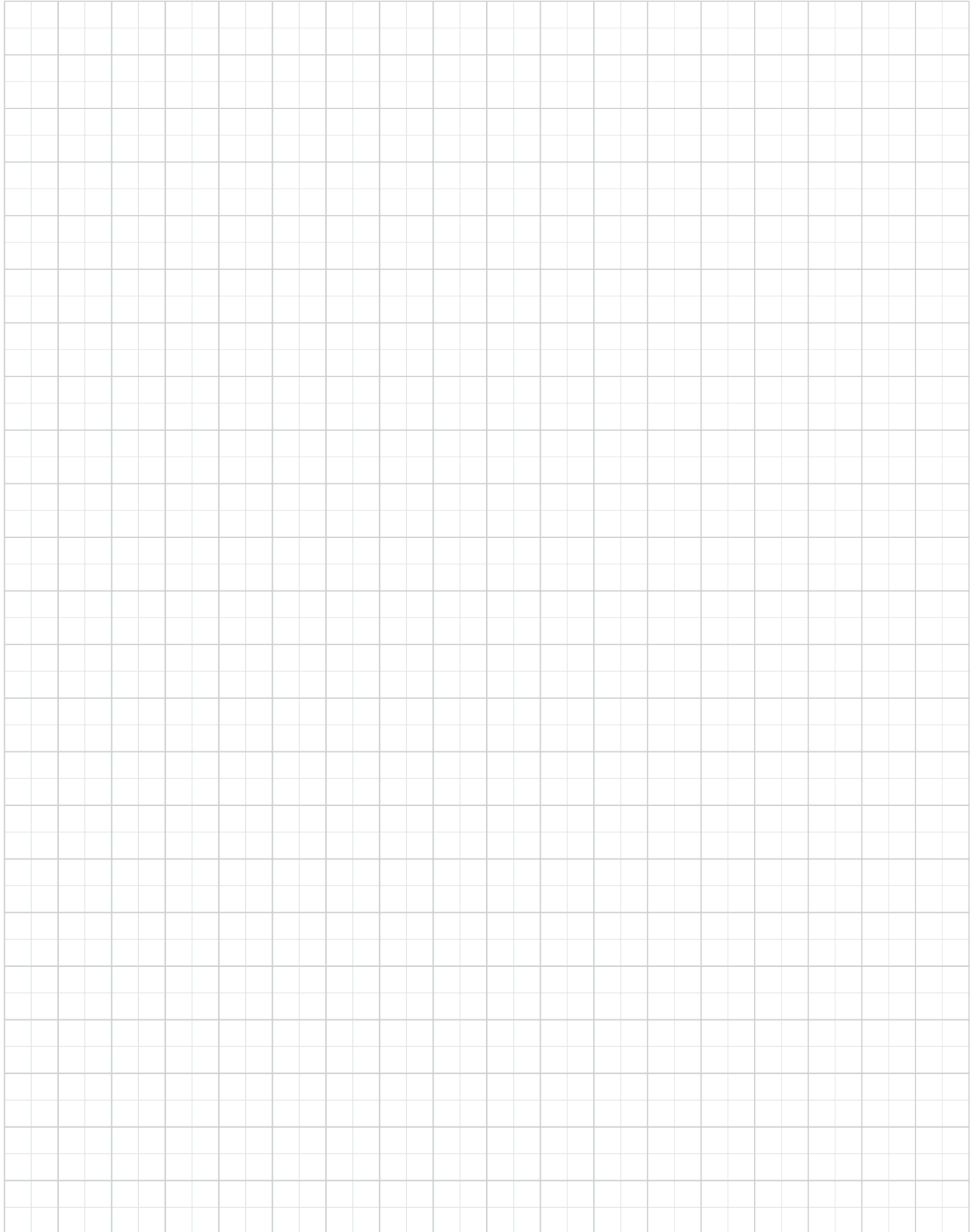
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