

## Lexium® – BSH Servo Motors

BSH servo motors offer an excellent response to dynamics and precision requirements. With five flange sizes and a variety of lengths they bring a solution that is fit for most applications, covering a torque range between 0.5 and 36 Nm and speed range from 1250 to 8000 min<sup>-1</sup>.

The new technology in their windings, based upon salient poles, result in strong compactness in comparison with classical designs.

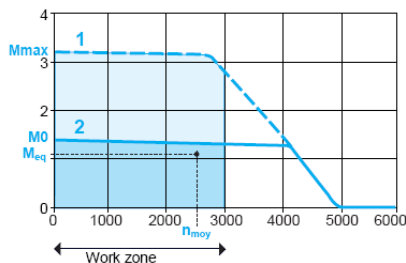
The BSH servo motors are offered with 5 possible flange sizes: 55, 70, 100, 140 and 205 mm. Thermal protection is provided by a temperature probe that is integrated into the motors. They are certified “Recognized” by the Underwriters Laboratories. They are compliant with standard UL1004 normes and with European directives (ce marking).



### Functions:

### Speed/Torque Characteristics:

BSH motors show torque/speed profiles similar to example below:



1. Peak torque, depending on the servo drive model.
2. Continuous torque, depending on the servo drive model, where:

6000 (in rpm) corresponds to the motor's maximum mechanical speed.

$M_{max}$  (in Nm) represents the peak stall torque value.

$M_n$  (in Nm) represents the continuous stall torque value.

### Determine Size of Motor by Application:

Torque/speed curves can be used to determine optimum motor size. For example, for a supply voltage of 400V, 3-phase, the graphs used are graphs 1 and 2.

- Locate the work zone of the application in terms of speed.
- Verify, using the motor cycle diagram, that the torques required by the application during the different cycle phases are located within the area bounded by graph 1 in the work zone.
- Calculate the average speed  $n_{avg}$  and the equivalent thermal torque  $M_{eq}$ .
- The point defined by  $n_{avg}$  and  $M_{eq}$  must be within the area bounded by graph 2 in the work zone.

BSH servo motors have been developed to meet the following requirements:

- Functional characteristics, robustness, safety, in compliance with IEC 60034-1.
- Ambient operating temperature: -20...+40°C in compliance with DIN 50019R14. Max. 55°C with derating from 40°C of 1% for °C
- Relative humidity: Class F in compliance with DIN 400
- Altitude: 1000 m without derating, 2000 m with  $k=0.86$ , 3000 m with  $k=0.8$ .
- Storage and transport temperature: -25...+70°C
- Winding insulation class: F (threshold temperature for windings 155°C) in compliance with VDE 0530
- Supply and sensor connections using straight connector or angled connectors rotatable
- Thermal protection by built-in PTC thermistor probe, controlled by the Lexium 05 servo drive
- Out-of-round, concentricity and perpendicularity between flange and shaft in compliance with DIN 42955, class N.
- Flange compliant with standard DIN 42948
- Permitted mounting positions: no mounting restriction for IMB5 – IMV1 and IMV3 in compliance with DIN 42950
- Polyester resin based paint: opaque black RAL 9005
- Degree of protection  
Motor casing: IP 65 in compliance with IEC/EN 60529  
Shaft end: IP 40 or IP 65 in compliance with IEC/EN 60529
- Integrated sensor, single turn or multi-turn absolute encoder SinCos Hiperface® high resolution interface.
- Standard sized smooth or keyed shaft end (in compliance with DIN 42948).

## Holding Brake:

The integral brake fitted on BSH servo motors (depending on the model) is a failsafe electro-magnetic holding brake.



**Do not use the holding brake as a dynamic brake for deceleration purposes.**

## Built-in Sensor:

The servo motor is fitted with a high resolution interface absolute encoder SinCos Hiperface® single turn (128 points) or multi-turn (128 points x 4096 turns), with an angular shaft position precise to less than  $\pm 1.3$  arc minutes.

This performs the following functions:

- Gives the angular position of the rotor in such a way that flows can be synchronized.
- Measures the servo motor speed via the associated Lexium 05 servo drive. This information is used by the speed controller of the Lexium servo drive.
- Measures position information for the Lexium servo drive position controller.
- Measures and transmits position information, in incremental format, for the position return of a motion control module (Encoder emulation output of the Lexium servo drive).



## Lexium® - BSH Servo Motor Ordering Information:

The BSH servo motors shown below are not equipped with gearboxes. For motors with GBX gearboxes, please call.

Continuous stall torque	Peak stall torque	Max. mechanical speed	Associated servo drive LXM 05	Nominal speed	Reference (1)	Weight kg (2)	
<b>0.50 Nm</b>	1.40 Nm	9000 min <sup>-1</sup>	D10F1	3000 min <sup>-1</sup>	BSH 0551T●●●●A	0.800	
			▲	D10M2	6000 min <sup>-1</sup>		
				D10M3X	6000 min <sup>-1</sup>		
<b>0.90 Nm</b>	1.77 Nm	9000 min <sup>-1</sup>	D10F1	3000 min <sup>-1</sup>	BSH 0552T●●●●A	1.100	
			▲	D10M2	6000 min <sup>-1</sup>		
				D10M3X	6000 min <sup>-1</sup>		
		2.25 Nm	9000 min <sup>-1</sup>	D10M2	1500 min <sup>-1</sup>	BSH 0552M●●●●A	1.100
				D10M3X	1500 min <sup>-1</sup>		
		2.70 Nm	9000 min <sup>-1</sup>	D17F1	3000 min <sup>-1</sup>	BSH 0552T●●●●A	1.100
				D10M2	4000 min <sup>-1</sup>	BSH 0552P●●●●A	
			D10M3X	4000 min <sup>-1</sup>			
			D14N4	6000 min <sup>-1</sup>			
<b>1.3 Nm</b>	3.18 Nm	9000 min <sup>-1</sup>	D10M2	4000 min <sup>-1</sup>	BSH 0553F●●●●A	1.400	
			▲	D10M3X	4000 min <sup>-1</sup>		
		3.31 Nm	9000 min <sup>-1</sup>	D17F1	3000 min <sup>-1</sup>	BSH 0553T●●●●A	1.400
				D17M2	6000 min <sup>-1</sup>		
				D17M3X	6000 min <sup>-1</sup>		
	3.50 Nm	9000 min <sup>-1</sup>	D10M2	1500 min <sup>-1</sup>	BSH 0553M●●●●A	1.400	
			D10M3X	1500 min <sup>-1</sup>			
	3.87 Nm	9000 min <sup>-1</sup>	D14N4	6000 min <sup>-1</sup>	BSH 0553F●●●●A	1.400	
<b>1.41 Nm</b>	2.42 Nm	8000 min <sup>-1</sup>	AD10F1	3000 min <sup>-1</sup>	BSH 0701T●●●●A	2.100	
				D10M3X	6000 min <sup>-1</sup>		
		2.66 Nm	8000 min <sup>-1</sup>	D10M3X	1500 min <sup>-1</sup>	BSH 0701M●●●●A	2.100
				D10M2	3000 min <sup>-1</sup>	BSH 0701F●●●●A	
				D10M3X	3000 min <sup>-1</sup>		
	3.19 Nm	8000 min <sup>-1</sup>	D17M2	6000 min <sup>-1</sup>	BSH 0701T●●●●A	2.100	
			D17M3X	6000 min <sup>-1</sup>			

**Lexium® - BSH Servo Motor Ordering Information (Cont'd):**

The BSH servo motors shown below are not equipped with gearboxes. For motors with GBX gearboxes, please call.

Continuous stall torque	Peak stall torque	Max. mechanical speed	Associated servo drive LXM 05·	Nominal speed	Reference (1)	Weight kg (2)
<b>2.12 Nm</b>	4.14 Nm	8000 min <sup>-1</sup>	D17F1	3000 min <sup>-1</sup>	BSH 0702T●●●●A	2.800
			D17M2	6000 min <sup>-1</sup>		
	6.75 Nm	8000 min <sup>-1</sup>	D28M2	6000 min <sup>-1</sup>		
			D42M3X	6000 min <sup>-1</sup>		
	4.57 Nm	8000 min <sup>-1</sup>	D10M2	3000 min <sup>-1</sup>	BSH 0702F●●●●A	2.800
			D10M3X	3000 min <sup>-1</sup>		
	5.63 Nm	8000 min <sup>-1</sup>	D10M2	1500 min <sup>-1</sup>		
			D10M3X	1500 min <sup>-1</sup>		
			D14N4	6000 min <sup>-1</sup>	BSH 0702F●●●●A	2.800
			D17M2	3000 min <sup>-1</sup>		
			D17M3X	3000 min <sup>-1</sup>		
<b>2.83 Nm</b>	7.16 Nm	8000 min <sup>-1</sup>	D17M2	3000 min <sup>-1</sup>	BSH 0703F●●●●A	3.600
			D17M3X	3000 min <sup>-1</sup>		
	7.38 Nm	8000 min <sup>-1</sup>	D28F1	3000 min <sup>-1</sup>	BSH 0703T●●●●A	3.600
			AD28M2	6000 min <sup>-1</sup>		
	8.58 Nm	8000 min <sup>-1</sup>	D10M2	1500 min <sup>-1</sup>	BSH 0703M●●●●A	3.600
			D10M3X	1500 min <sup>-1</sup>		
			D14N4	3000 min <sup>-1</sup>		
	8.75Nm	8000 min <sup>-1</sup>	D22N4	6000 min <sup>-1</sup>	BSH 0703F●●●●A	3.600
	10.25 Nm	8000 min <sup>-1</sup>	D42M3X	6000 min <sup>-1</sup>	BSH 0703T●●●●A	3.600
	10.3 Nm	8000 min <sup>-1</sup>	D28M2	3000 min <sup>-1</sup>	BSH 0703F●●●●A	3.600
<b>3.39 Nm</b>	7.1 Nm	8000 min <sup>-1</sup>	D14N4	2000 min <sup>-1</sup>	BSH 1001M●●●●A	4.300
			D17M3X	2000 min <sup>-1</sup>	BSH 1001F●●●●A	4.300
	8.5 Nm	8000 min <sup>-1</sup>	D22N4	4000 min <sup>-1</sup>	BSH 1001T●●●●A	4.300
			D28F1	2500 min <sup>-1</sup>		
			D28M2	6000 min <sup>-1</sup>		
			D42M3X	4000 min <sup>-1</sup>		
<b>5.52 Nm</b>	11.23 Nm	6000 min <sup>-1</sup>	D17M3X	2000 min <sup>-1</sup>	BSH 1002F●●●●A	5.800
	13.33 Nm	6000 min <sup>-1</sup>	D14N4	2000 min <sup>-1</sup>	BSH 1002M●●●●A	5.800
	13.92 Nm	6000 min <sup>-1</sup>	D22N4	4000 min <sup>-1</sup>	BSH 1002F●●●●A	5.800
	16 Nm	6000 min <sup>-1</sup>	D28M2	2000 min <sup>-1</sup>		
			D42M3X	4000 min <sup>-1</sup>	BSH 1002T●●●●A	5.800
<b>7.76 Nm</b>	19.68 Nm	6000 min <sup>-1</sup>	D28M2	2000 min <sup>-1</sup>	BSH 1003F●●●●A	7.500
	23 Nm	6000 min <sup>-1</sup>	D34N4	4000 min <sup>-1</sup>		
	23.17 Nm	6000 min <sup>-1</sup>	D42M3X	2000 min <sup>-1</sup>		
			AD22N4	2000 min <sup>-1</sup>	BSH 1003M●●●●A	7.500
<b>9.31 Nm</b>	23.47 Nm	6000 min <sup>-1</sup>	D34N4	3000 min <sup>-1</sup>	BSH 1004F●●●●A	9.200
	35.70 Nm	6000 min <sup>-1</sup>	D42M3X	2000 min <sup>-1</sup>		
			D57N4	3000 min <sup>-1</sup>		
<b>11.71 Nm</b>	27.15 Nm	4000 min <sup>-1</sup>	D42M3X	3000 min <sup>-1</sup>	BSH 1401T●●●●A	11.900
	28 Nm	4000 min <sup>-1</sup>	D3N4	2500 min <sup>-1</sup>	BSH 1401F●●●●A	11.900
<b>17.16 Nm</b>	29.63 Nm	4000 min <sup>-1</sup>	D42M3X	3000 min <sup>-1</sup>	BSH 1402T●●●●A	16.600
<b>17.62 Nm</b>	38.63 Nm	4000 min <sup>-1</sup>	D34N4	2500 min <sup>-1</sup>	BSH 1402F●●●●A	16.600
	45.43 Nm	4000 min <sup>-1</sup>	D42M3X	1500 min <sup>-1</sup>		
	54.3 Nm	4000 min <sup>-1</sup>	D57N4	2000 min <sup>-1</sup>		
	57 Nm	4000 min <sup>-1</sup>	D34N4	1250 min <sup>-1</sup>	BSH 1402M●●●●A	16.600
<b>25.33 Nm</b>	62.25 Nm	4000 min <sup>-1</sup>	D57N4	3000 min <sup>-1</sup>	BSH 1403F●●●●A	21.300
	70.35 Nm	4000 min <sup>-1</sup>	D34N4	1250 min <sup>-1</sup>	BSH 1403M●●●●A	21.300
	84.30 Nm	4000 min <sup>-1</sup>	D57N4	1250 min <sup>-1</sup>		
<b>29.94 Nm</b>	63.81 Nm	4000 min <sup>-1</sup>	D57N4	3000 min <sup>-1</sup>	BSH 1404F●●●●A	26.000
	102.57 Nm	4000 min <sup>-1</sup>	D57N4	1500 min <sup>-1</sup>	BSH 1404M●●●●A	26.000
<b>36 Nm</b>	82 Nm	3000 min <sup>-1</sup>	D57N4	1500 min <sup>-1</sup>	BSH 2051M●●●●A	33.000
▲						

(1) To fill up at the end of each reference, see table below.  
 (2) Without brake, for weight of motor with holding brake, please call.



To order a BSH motor, fill out at the end of each reference:

			<b>BSH 0701P</b>	.	.	.	.	<b>A</b>
Shaft end	IP 40	Smooth		0				
		Keyed		1				
	IP 65	Smooth		2				
		Keyed		3				
Integrated sensor	Single turn, SinCos Hiperface® 128 points/turn				1			
	Multiturn, SinCos Hiperface® (no. of turns: 4096)				2			
Holding brake	Without					A		
	With					F		
Connection	Straight connectors						1	
	Rotatable 90° angled connectors						2	
Flange	International standard							A