

# Brushless DC-Servomotors

## 2 Pole Technology

217 mNm  
282 W

### Series 4490 ... BS

Values at 22°C and nominal voltage	4490 H	024 BS	036 BS	048 BS	
1 Nominal voltage	$U_N$	24	36	48	V
2 Terminal resistance, phase-phase	$R$	0,66	1,31	2,1	$\Omega$
3 Efficiency, max.	$\eta_{max}$	87	87	88	%
4 No-load speed	$n_0$	5 500	5 900	6 100	min <sup>-1</sup>
5 No-load current, typ. (with shaft $\varnothing$ 6 mm)	$I_0$	0,161	0,119	0,094	A
6 Stall torque	$M_H$	1 523	1 612	1 724	mNm
7 Friction torque, static	$C_0$	3,86	3,86	3,86	mNm
8 Friction torque, dynamic	$C_V$	$5,2 \cdot 10^{-4}$	$5,2 \cdot 10^{-4}$	$5,2 \cdot 10^{-4}$	mNm/min <sup>-1</sup>
9 Speed constant	$k_n$	227	162	126	min <sup>-1</sup> /V
10 Back-EMF constant	$k_E$	4,4	6,16	7,92	mV/min <sup>-1</sup>
11 Torque constant	$k_M$	42	58,8	75,6	mNm/A
12 Current constant	$k_I$	0,024	0,017	0,013	A/mNm
13 Slope of n-M curve	$\Delta n / \Delta M$	3,6	3,6	3,5	min <sup>-1</sup> /mNm
14 Terminal inductance, phase-phase	$L$	219	430	711	$\mu$ H
15 Mechanical time constant	$\tau_m$	4,9	4,9	4,8	ms
16 Rotor inertia	$J$	130	130	130	gcm <sup>2</sup>
17 Angular acceleration	$\alpha_{max}$	117	124	133	$\cdot 10^3$ rad/s <sup>2</sup>
18 Thermal resistance	$R_{th1} / R_{th2}$	0,96 / 3,9			K/W
19 Thermal time constant	$\tau_{w1} / \tau_{w2}$	23 / 1 222			s
20 Operating temperature range:					
– motor		-30 ... +125			°C
– winding, max. permissible		+125			°C
21 Shaft bearings		ball bearings, preloaded			
22 Shaft load max.:					
– with shaft diameter		6			mm
– radial at 3 000 min <sup>-1</sup> (5 mm from mounting flange)		113			N
– axial at 3 000 min <sup>-1</sup> (push only)		45			N
– axial at standstill (push only)		135			N
23 Shaft play:					
– radial	$\leq$	0,015			mm
– axial	$=$	0			mm
24 Housing material		aluminium, black anodized			
25 Mass		742			g
26 Direction of rotation		electronically reversible			
27 Speed up to	$n_{max}$	16 000			min <sup>-1</sup>
28 Number of pole pairs		1			
29 Hall sensors		digital			
30 Magnet material		NdFeB			
<b>Rated values for continuous operation</b>					
31 Rated torque	$M_N$	183	181	183	mNm
32 Rated current (thermal limit)	$I_N$	5,1	3,59	2,83	A
33 Rated speed	$n_N$	4 940	5 380	5 650	min <sup>-1</sup>

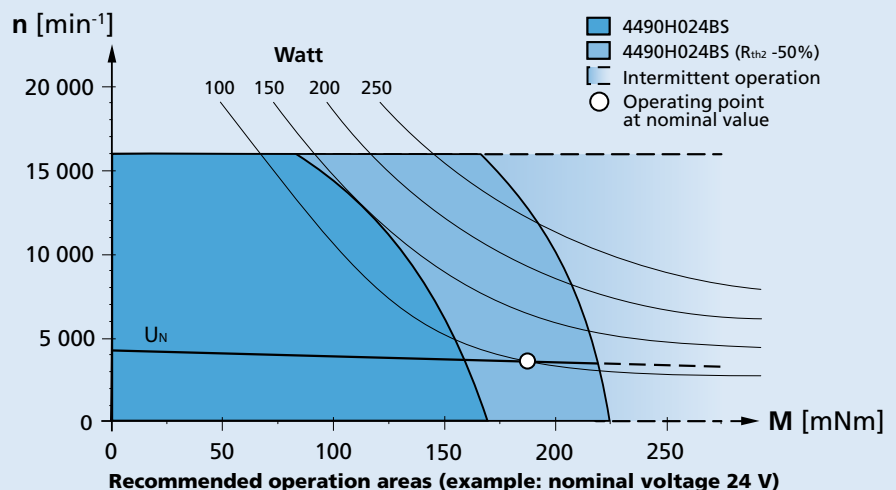
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

**Note:**


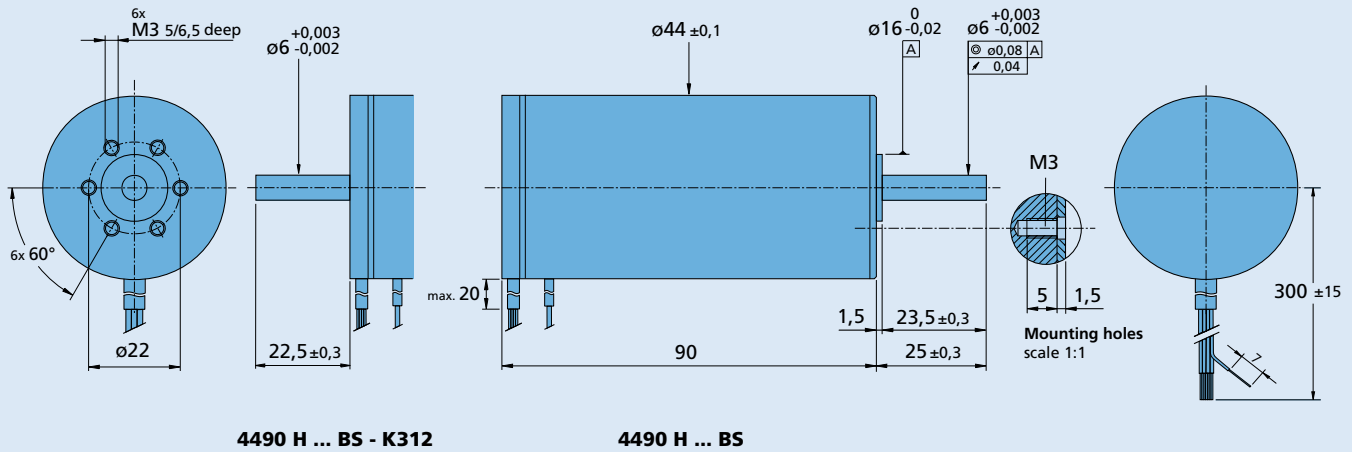
The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

The diagram shows the motor in a completely insulated as well as thermally coupled condition ( $R_{th2}$  50% reduced).

The nominal voltage ( $U_N$ ) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



**Dimensional drawing**

 Scale reduced 

**Option, cable and connection information**

 Example product designation: **4490H024BS-K1155**

Option	Type	Description	Connection	
			Function	Colour
K1155	Controller combination	Analog Hall sensors for combination with Motion Controller MCBL	Phase C	yellow
K1026	Sensorless	Motor without Hall sensors	Phase B	orange
K1838	Encoder combination	Motor with rear end shaft for combination with Encoder IE3	Phase A	brown
K312	Encoder combination	Motor with rear end shaft for combination with Encoder HEDS/HEDL/HEDM	GND	black
K179	Bearing lubrication	For vacuum of $10^{-5}$ Pa @ 22°C	U <sub>DD</sub> (+5V)	red
			Hall sensor C	grey
			Hall sensor B	blue
			Hall sensor A	green
			<b>Standard cable</b>	
			Single wires, material PTFE	
			AWG 16: Phase A/B/C	
			AWG 26: Hall A/B/C, U <sub>DD</sub> , GND	

**Product combination**

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
38A 44/1	HEDS 5500 IE3-1024 IE3-1024 L HEDL 5540	SC 5004 SC 5008 MC 5010 MCBL 3006	MBZ  To view our large range of accessory parts, please refer to the "Accessories" chapter.