

## Brushless DC-Servomotors

2 Pole Technology, High Speed for Autoclave  
Sterilisation

18,7 mNm

91,2 W

### Series 2057 ... BA

Values at 22°C and nominal voltage	2057 S	024 BA	
1 Nominal voltage	$U_N$	24	V
2 Terminal resistance, phase-phase	$R$	0,427	$\Omega$
3 Efficiency, max.	$\eta_{max.}$	90	%
4 No-load speed	$n_0$	44 300	$min^{-1}$
5 No-load current, typ. (with shaft ø 3 mm)	$I_0$	0,178	A
6 Stall torque	$M_H$	309	mNm
7 Friction torque, static	$C_0$	0,0559	mNm
8 Friction torque, dynamic	$C_V$	1,95·10 <sup>-5</sup>	mNm/min <sup>-1</sup>
9 Speed constant	$k_n$	1 740	$min^{-1}/V$
10 Back-EMF constant	$k_E$	0,576	$mV/min^{-1}$
11 Torque constant	$k_M$	5,5	mNm/A
12 Current constant	$k_I$	0,182	A/mNm
13 Slope of n-M curve	$\Delta n / \Delta M$	135	$min^{-1}/mNm$
14 Terminal inductance, phase-phase	$L$	36,2	$\mu H$
15 Mechanical time constant	$\tau_m$	4,2	ms
16 Rotor inertia	$J$	3	$gcm^2$
17 Angular acceleration	$\alpha_{max.}$	1 030	$\cdot 10^3 rad/s^2$
18 Thermal resistance	$R_{th1} / R_{th2}$	1,1 / 15	K/W
19 Thermal time constant	$\tau_{th1} / \tau_{th2}$	5 / 630	s
20 Operating temperature range:			
- motor		-30 ... +140	°C
- winding, max. permissible		+140	°C
21 Shaft bearings		ball bearings, preloaded	
22 Shaft load max.:			
- with shaft diameter		3	mm
- radial at 40 000 min <sup>-1</sup> (5 mm from mounting flange)		22	N
- axial at 40 000 min <sup>-1</sup> (push only)		12	N
- axial at standstill (push only)		75	N
23 Shaft play:			
- radial	$\leq$	0,05	mm
- axial	$=$	0	mm
24 Housing material		stainless steel	
25 Mass		100	g
26 Direction of rotation		electronically reversible	
27 Speed up to	$n_{max.}$	65 000	$min^{-1}$
28 Number of pole pairs		1	
29 Hall sensors		digital	
30 Magnet material		NdFeB	

#### Rated values for continuous operation

31 Rated torque	$M_N$	13,7	mNm
32 Rated current (thermal limit)	$I_N$	3	A
33 Rated speed	$n_N$	43 200	$min^{-1}$

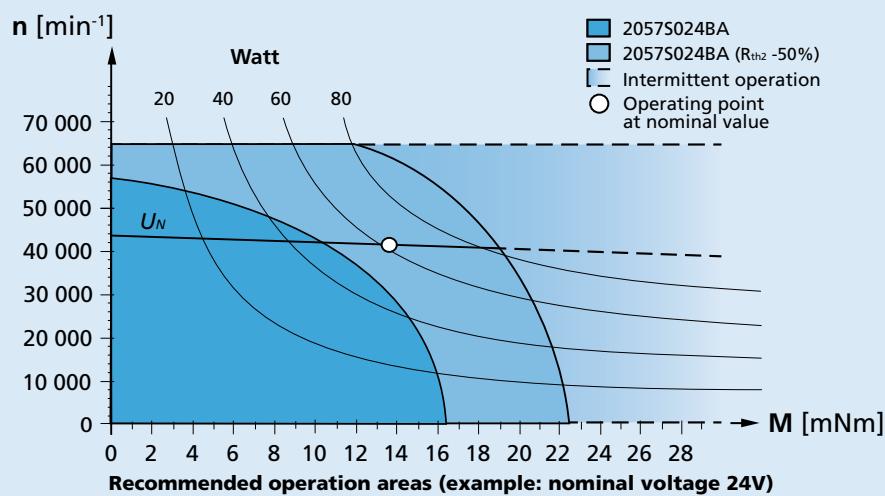
Note: Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

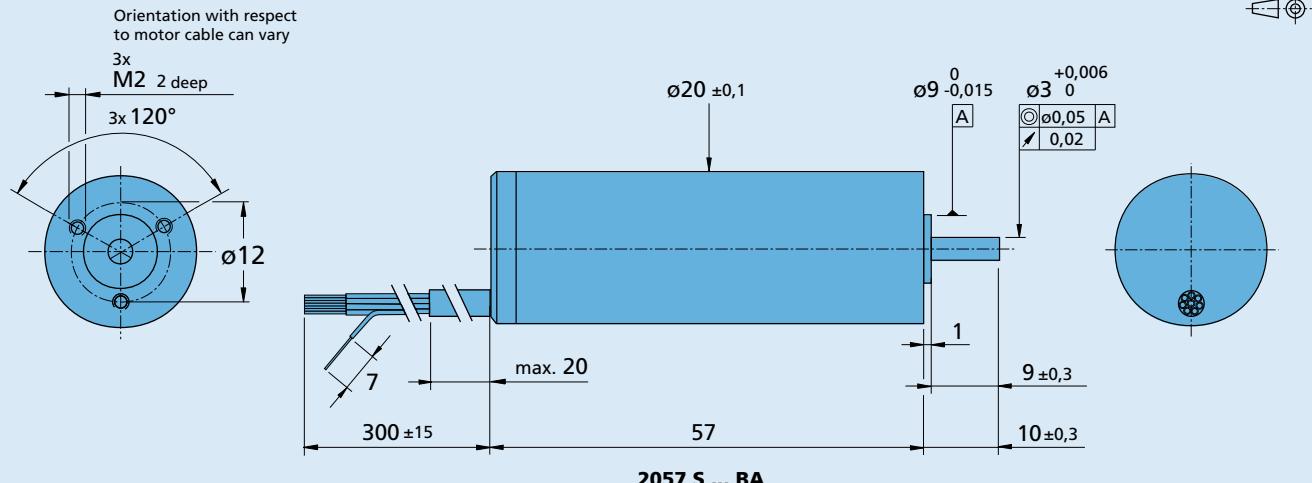
#### Note:

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**

**Option, cable and connection information**

Example product designation: **2057S024BA-K3825**

Option	Type	Description	Connection																											
K3825	Sensor	Sensorless	<table border="1"> <thead> <tr> <th>Function</th><th>Colour</th><th>Standard cable</th></tr> </thead> <tbody> <tr> <td>Phase C</td><td>yellow</td><td>Single wires, material PTFE</td></tr> <tr> <td>Phase B</td><td>orange</td><td>AWG 24:</td></tr> <tr> <td>Phase A</td><td>brown</td><td>Phase A/B/C</td></tr> <tr> <td>GND</td><td>black</td><td>AWG 26:</td></tr> <tr> <td>U<sub>DD</sub> (+5V)</td><td>red</td><td>Hall A/B/C, GND</td></tr> <tr> <td>Hall sensor C</td><td>grey</td><td></td></tr> <tr> <td>Hall sensor B</td><td>blue</td><td></td></tr> <tr> <td>Hall sensor A</td><td>green</td><td></td></tr> </tbody> </table>	Function	Colour	Standard cable	Phase C	yellow	Single wires, material PTFE	Phase B	orange	AWG 24:	Phase A	brown	Phase A/B/C	GND	black	AWG 26:	U <sub>DD</sub> (+5V)	red	Hall A/B/C, GND	Hall sensor C	grey		Hall sensor B	blue		Hall sensor A	green	
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**Autoclavable**
**Sterilisation Process**

Reference	Description	134°C
Sterilisation conditions	134°C at 2.1 bar, 100% RH	Contact your sales representative
Holding time	18 minutes	for more detailed information
Number of cycles, typical	1 000	
Number of cycles (sensorless, K3825), typical	1 500	

**Product combination**

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
		SC 5004 P SC 5008 S	To view our large range of accessory parts, please refer to the "Accessories" chapter.