

# Brushless DC-Servomotors

## 4 Pole Technology

96 mNm  
62 W

### Series 3268 ... BX4

| Values at 22°C and nominal voltage                              | 3268 G                  | 018 BX4                   | 024 BX4             | 030 BX4             | 036 BX4             | 042 BX4             | 048 BX4             |                                 |
|---|-------------------------|---------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------------------|
| 1 Nominal voltage   | $U_N$                   | 18                        | 24                  | 30                  | 36                  | 42                  | 48                  | V                               |
| 2 Terminal resistance, phase-phase                              | $R$                     | 0,92                      | 1,47                | 2,08                | 3,23                | 4,83                | 6,06                | $\Omega$                        |
| 3 Efficiency, max.  | $\eta_{max}$            | 80                        | 81                  | 80                  | 80                  | 80                  | 79                  | %                               |
| 4 No-load speed   | $n_0$                   | 5 100                     | 5 500               | 5 700               | 5 500               | 5 300               | 5 500               | min <sup>-1</sup>               |
| 5 No-load current, typ. (with shaft $\varnothing$ 5 mm)         | $I_0$                   | 0,22                      | 0,183               | 0,162               | 0,124               | 0,101               | 0,093               | A                               |
| 6 Stall torque  | $M_H$                   | 670                       | 705                 | 742                 | 716                 | 670                 | 678                 | mNm                             |
| 7 Friction torque, static                                       | $C_0$                   | 1,6                       | 1,6                 | 1,6                 | 1,6                 | 1,6                 | 1,6                 | mNm                             |
| 8 Friction torque, dynamic                                      | $C_V$                   | $1,1 \cdot 10^{-3}$       | $1,1 \cdot 10^{-3}$ | $1,1 \cdot 10^{-3}$ | $1,1 \cdot 10^{-3}$ | $1,1 \cdot 10^{-3}$ | $1,1 \cdot 10^{-3}$ | mNm/min <sup>-1</sup>           |
| 9 Speed constant  | $k_n$                   | 278                       | 220                 | 185                 | 148                 | 124                 | 111                 | min <sup>-1</sup> /V            |
| 10 Back-EMF constant  | $k_E$                   | 3,595                     | 4,534               | 5,392               | 6,741               | 8,088               | 8,987               | mV/min <sup>-1</sup>            |
| 11 Torque constant  | $k_M$                   | 34,3                      | 43,5                | 51,5                | 64,4                | 77,2                | 85,8                | mNm/A                           |
| 12 Current constant   | $k_I$                   | 0,029                     | 0,023               | 0,019               | 0,015               | 0,013               | 0,012               | A/mNm                           |
| 13 Slope of n-M curve   | $\Delta n / \Delta M$   | 7,45                      | 7,5                 | 7,48                | 7,44                | 7,73                | 7,85                | min <sup>-1</sup> /mNm          |
| 14 Terminal inductance, phase-phase                             | $L$                     | 67,6                      | 110                 | 152                 | 238                 | 342                 | 423                 | $\mu$ H                         |
| 15 Mechanical time constant                                     | $\tau_m$                | 4,9                       | 4,9                 | 4,9                 | 4,9                 | 5,1                 | 5,2                 | ms                              |
| 16 Rotor inertia  | $J$                     | 63                        | 63                  | 63                  | 63                  | 63                  | 63                  | gcm <sup>2</sup>                |
| 17 Angular acceleration   | $\alpha_{max}$          | 106                       | 112                 | 118                 | 114                 | 106                 | 108                 | $\cdot 10^3$ rad/s <sup>2</sup> |
| 18 Thermal resistance   | $R_{th1} / R_{th2}$     | 1,7 / 8,8                 |                     |                     |                     |                     |                     | K/W                             |
| 19 Thermal time constant  | $\tau_{w1} / \tau_{w2}$ | 16 / 1 080                |                     |                     |                     |                     |                     | s                               |
| 20 Operating temperature range:                                 |                         |                           |                     |                     |                     |                     |                     |                                 |
| – motor   |                         | -40 ... +100              |                     |                     |                     |                     |                     | °C                              |
| – winding, max. permissible                                     |                         | +125                      |                     |                     |                     |                     |                     | °C                              |
| 21 Shaft bearings   |                         | ball bearings, preloaded  |                     |                     |                     |                     |                     |                                 |
| 22 Shaft load max.:   |                         |                           |                     |                     |                     |                     |                     |                                 |
| – with shaft diameter   |                         | 5                         |                     |                     |                     |                     |                     | mm                              |
| – radial at 3 000 min <sup>-1</sup> (5 mm from mounting flange) |                         | 50                        |                     |                     |                     |                     |                     | N                               |
| – axial at 3 000 min <sup>-1</sup> (push / pull)                |                         | 5                         |                     |                     |                     |                     |                     | N                               |
| – axial at standstill (push / pull)                             |                         | 50                        |                     |                     |                     |                     |                     | N                               |
| 23 Shaft play:  |                         |                           |                     |                     |                     |                     |                     |                                 |
| – radial  | $\leq$                  | 0,015                     |                     |                     |                     |                     |                     | mm                              |
| – axial   | $=$                     | 0                         |                     |                     |                     |                     |                     | mm                              |
| 24 Housing material   |                         | stainless steel           |                     |                     |                     |                     |                     |                                 |
| 25 Mass   |                         | 290                       |                     |                     |                     |                     |                     | g                               |
| 26 Direction of rotation  |                         | electronically reversible |                     |                     |                     |                     |                     |                                 |
| 27 Speed up to  | $n_{max}$               | 12 000                    |                     |                     |                     |                     |                     | min <sup>-1</sup>               |
| 28 Number of pole pairs   |                         | 2                         |                     |                     |                     |                     |                     |                                 |
| 29 Hall sensors   |                         | digital                   |                     |                     |                     |                     |                     |                                 |
| 30 Magnet material  |                         | NdFeB                     |                     |                     |                     |                     |                     |                                 |
| <b>Rated values for continuous operation</b>                    |                         |                           |                     |                     |                     |                     |                     |                                 |
| 31 Rated torque   | $M_N$                   | 74,5                      | 72                  | 69,8                | 71,9                | 71,7                | 70                  | mNm                             |
| 32 Rated current (thermal limit)                                | $I_N$                   | 2,63                      | 2                   | 1,66                | 1,36                | 1,13                | 1                   | A                               |
| 33 Rated speed  | $n_N$                   | 4 550                     | 4 890               | 5 210               | 4 950               | 4 750               | 4 920               | min <sup>-1</sup>               |

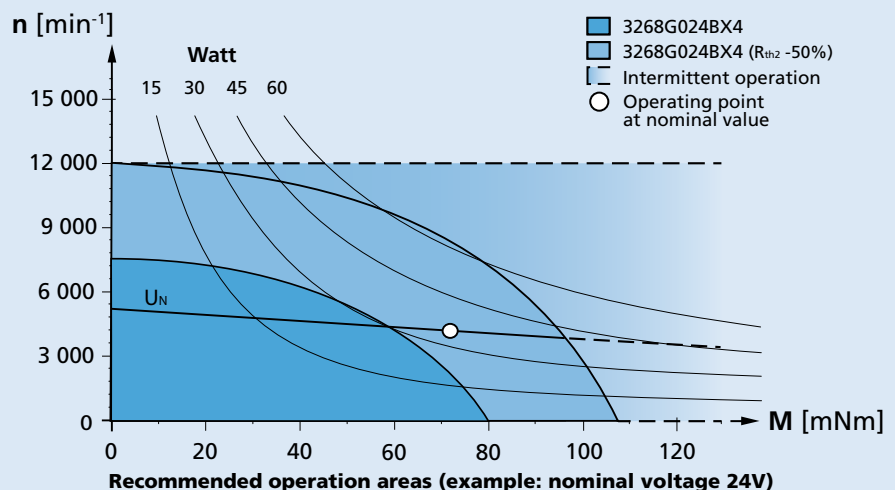
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

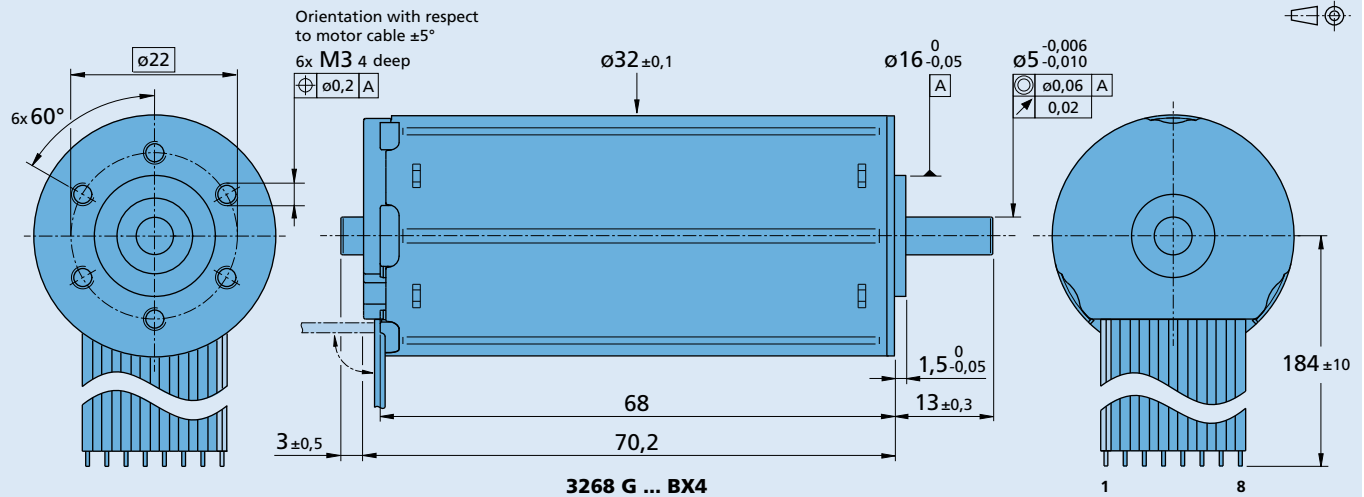
**Note:**

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**

**Option, cable and connection information**

 Example product designation: **3268G024BX4-3692**

| Option | Type                   | Description  | Connection standard |                       |
|--------|------------------------|--|---------------------|-----------------------|
|        |                        |  | No.                 | Function              |
| 3830   | Connector<br>          | AWG 26 / PVC ribbon cable with connector<br>MOLEX Microfit 3.0, 43025-0800,<br>recommended mating connector 43020-0800 | Option: 4935/4747   |                       |
| 4935   | Single wires           | Motor with single wires (PTFE), length 184 mm, AWG22   | 1                   | Phase C               |
| X4935  | Single wires           | Motor with single wires (PTFE), length 300 mm, AWG22   | 2                   | Phase B               |
| Y4935  | Single wires           | Motor with single wires (PTFE), length 600 mm, AWG22   | 3                   | Phase A               |
| 4747   | Temperature range      | Up to 150°C, winding max. 150°C, with single wires (PTFE), length 184 mm, AWG22  | 4                   | GND                   |
| X4747  | Temperature range      | Up to 150°C, winding max. 150°C, with single wires (PTFE), length 300 mm, AWG22  | 5                   | U <sub>DD</sub> (+5V) |
| Y4747  | Temperature range      | Up to 150°C, winding max. 150°C, with single wires (PTFE), length 600 mm, AWG22  | 6                   | Hall sensor C         |
| Y158   | Shaft end              | Motor without second shaft end   | 7                   | Hall sensor B         |
| 3692   | Controller combination | Analog Hall sensors for combination with Motion Controller MCBL  | 8                   | Hall sensor A         |

**Standard cable**

 Insulation: PVC  
 8 conductors, AWG 24  
 pitch 2,54 mm, wires tinned

**Product combination**

| Precision Gearheads / Lead Screws   | Encoders   | Drive Electronics   | Cables / Accessories  |
|---|--|---|---|
| 32A<br>32ALN<br>32/3<br>32/3 R<br>38A<br>38/1<br>38/1 S<br>38/2<br>38/2 S<br>BS32-2.0 | IE3-1024<br>IE3-1024 L<br>IER3-10000<br>IER3-10000 L<br>AES-4096 | SC 2804 S<br>SC 5004 P<br>SC 5008 S<br>MCBL 3003 P<br>MCBL 3006 S<br>MCBL 3003 P AES<br>MCBL 3006 S AES<br>MC 5004 P<br>MC 5004 P STO<br>MC 5005 S<br>MC 5010 S | MBZ<br><br>To view our large range of accessory parts, please refer to the "Accessories" chapter. |