

# Brushless DC-Servomotors

## with integrated Speed Controller

### 4 Pole Technology

## 58 mNm

For combination with

Gearheads:

32A, 32ALN, 32/3, 32/3 S, 38/1, 38/1S, 38/2, 38/2 S

### Series 3268 ... BX4 SCDC

|  | 3268 G                              |                           | 024 BX4             | SCDC                         |
|--|-------------------------------------|---------------------------|---------------------|------------------------------|
| 1 Nominal voltage  | $U_N$                               |                           | 24                  | Volt                         |
| 2 Terminal resistance, phase-phase                                   | R                                   |                           | 1,45                | $\Omega$                     |
| 3 Output power <sup>1)</sup>   | $P_{2 \text{ max.}}$                |                           | 32,7                | W                            |
| 4 Efficiency   | $\eta_{\text{ max.}}$               |                           | 79,5                | %                            |
| 5 No-load speed  | $n_0$                               |                           | 5 300               | rpm                          |
| 6 No-load current  | $I_0$                               |                           | 0,210               | A                            |
| 7 Stall torque   | $M_H$                               |                           | 137                 | mNm                          |
| 8 Friction torque, static  | $C_0$                               |                           | 1,7                 | mNm                          |
| 9 Friction torque, dynamic   | $C_v$                               |                           | $1,3 \cdot 10^{-3}$ | mNm/rpm                      |
| 10 Speed constant  | $k_n$                               |                           | 220                 | rpm/V                        |
| 11 Back-EMF constant   | $k_E$                               |                           | 4,555               | mV/rpm                       |
| 12 Torque constant   | $k_M$                               |                           | 43,5                | mNm/A                        |
| 13 Current constant  | $k_I$                               |                           | 0,0230              | A/mNm                        |
| 14 Slope of n-M curve  | $\Delta n / \Delta M$               |                           | 7,3                 | rpm/mNm                      |
| 15 Terminal inductance, phase-phase                                  | L                                   |                           | 110                 | $\mu\text{H}$                |
| 16 Mechanical time constant  | $\tau_m$                            |                           | 4,6                 | ms                           |
| 17 Rotor inertia   | J                                   |                           | 60                  | $\text{gcm}^2$               |
| 18 Angular acceleration  | $\alpha_{\text{ max.}}$             |                           | 23                  | $\cdot 10^3 \text{ rad/s}^2$ |
| 19 Thermal resistance  | $R_{\text{th} 1} / R_{\text{th} 2}$ | 1,9 / 9,6                 |                     | K/W                          |
| 20 Thermal time constant   | $\tau_{w1} / \tau_{w2}$             | 17 / 1 060                |                     | s                            |
| 21 Operating temperature range                                       |                                     | - 40 ... + 85             |                     | $^{\circ}\text{C}$           |
| 22 Shaft bearings  |                                     | ball bearings, preloaded  |                     |                              |
| 23 Shaft load max.:  |                                     |                           |                     |                              |
| – radial at 3 000 rpm (4,5 mm from mounting flange)                  |                                     | 50                        |                     | N                            |
| – axial at 3 000 rpm   |                                     | 5                         |                     | N                            |
| – axial at standstill  |                                     | 50                        |                     | N                            |
| 24 Shaft play:   |                                     |                           |                     |                              |
| – radial   | $\leq$                              | 0,015                     |                     | mm                           |
| – axial  | $=$                                 | 0                         |                     | mm                           |
| 25 Housing material  |                                     | stainless steel           |                     |                              |
| 26 Weight  |                                     | 305                       |                     | g                            |
| 27 Direction of rotation   |                                     | electronically reversible |                     |                              |
| 28 Number of pole pairs  |                                     | 2                         |                     |                              |
| <b>Recommended values - mathematically independent of each other</b> |                                     |                           |                     |                              |
| 29 Speed up to   | $n_{e \text{ max.}}$                |                           | 6 500               | rpm                          |
| 30 Torque up to <sup>1) 2)</sup>                                     | $M_{e \text{ max.}}$                |                           | 37 / 58             | mNm                          |
| 31 Current up to <sup>1) 2)</sup>                                    | $I_{e \text{ max.}}$                |                           | 1,11 / 1,60         | A                            |

<sup>1)</sup> at 5000 rpm

<sup>2)</sup> thermal resistance  $R_{\text{th} 2}$  not reduced / thermal resistance  $R_{\text{th} 2}$  by 55% reduced

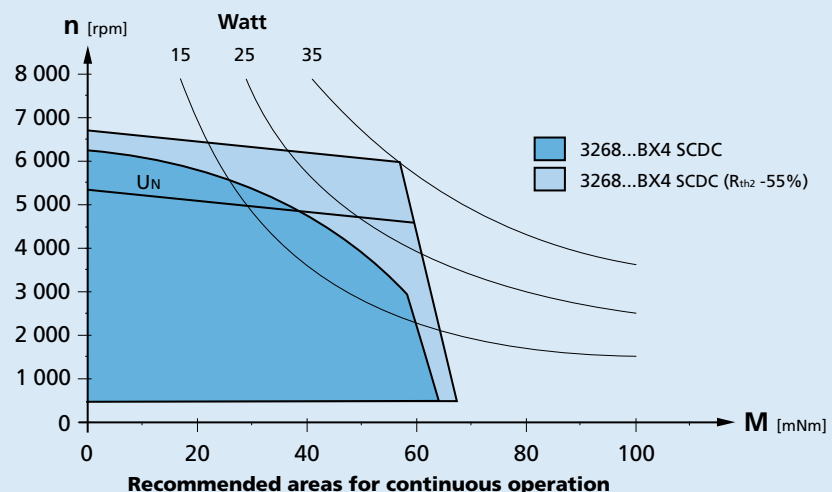
#### Note:

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

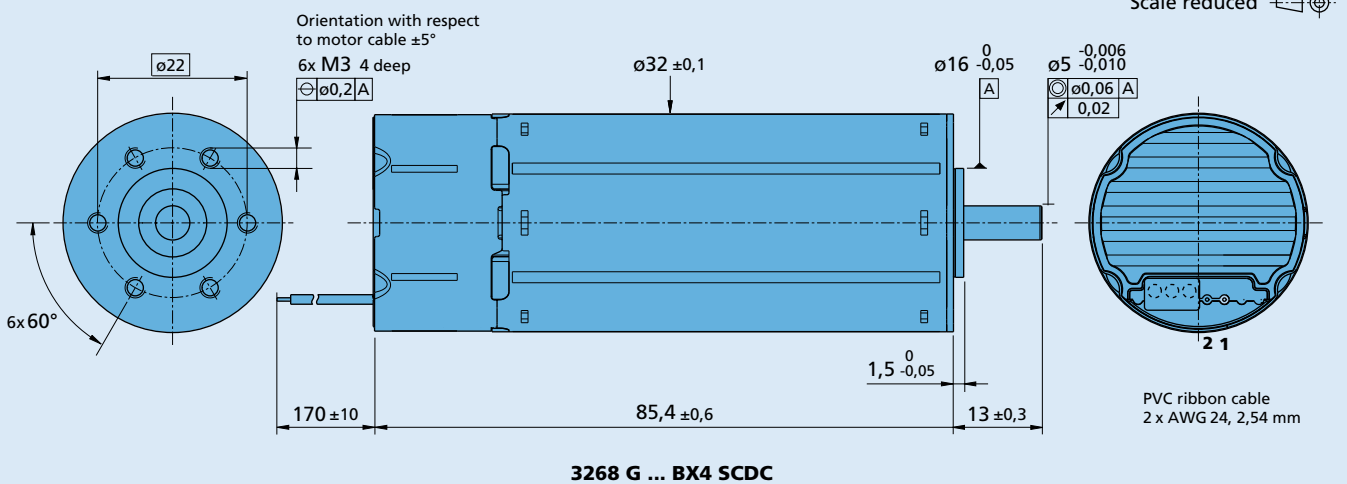
The diagram shows the motor in a completely insulated as well as thermally coupled condition ( $R_{\text{th} 2} \geq 55\%$  reduced).

The motor is factory pre-configured to perform at the recommended continuous current. Non-standard configurations are only possible upon request from the manufacturer.

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



| Speed Controller                             |             | 024 BX4                      | SCDC    |
|--|-------------|------------------------------|---------|
| Power supply electronic                      | $U_p$       | 6,5 ... 30                   | V DC    |
| Power supply motor                           | $U_{mot}$   | 6,5 ... 30                   | V DC    |
| PWM switching frequency                      | $f_{PWM}$   | 96                           | kHz     |
| Efficiency                                   | $\eta$      | 95                           | %       |
| Max. continuous output current <sup>1)</sup> | $I_{dauer}$ | 1,6                          | A       |
| Max. peak output current                     | $I_{max}$   | 4                            | A       |
| Total standby current at $U_N$               | $I_{el}$    | 10                           | mA      |
| Speed range, electronics                     |             | 400 ... 50 000 <sup>2)</sup> | rpm     |
| Scanning rate                                |             | 500                          | $\mu s$ |

<sup>1)</sup> at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics

<sup>2)</sup> speed is dependent on the motor operating voltage

### Connection information

Connection 1 "Mot +": positive power supply

Connection 2 "Mot -": negative power supply

### Features

In this version, the brushless DC servomotors have an integrated Speed Controller. The motor is commutated using the integrated digital hall sensors. Speed control is via a PI regulator.

The Speed Controller has a current limiting device which limits the maximum motor current if the thermal load is too high. Twice the continuous current is possible over a short time.

The direction of rotation is dependent on the polarity of the voltage.

### Full product description

■ Examples:  
**3268G024BX4 SCDC**

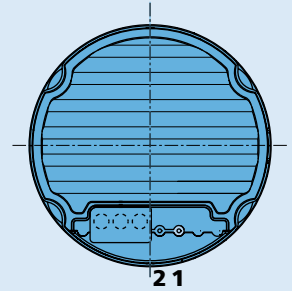
**Connection information**

**Options**

- Connector variants (Option no. 4140)  
AWG 24 / PVC ribbon cable  
with connector Micro-Fit  
connector pin assignment:



**Cable connection**



**Connection**

| No. | Function |
|-----|----------|
| 1   | Mot +    |
| 2   | Mot -    |