

**NEW**

# Brushless DC-Servomotor

with integrated Motion Controller  
and RS232 interface

**56 mNm**

For combination with  
Gearheads:  
32A

## Series 3242 ... BX4 CS

	3242 G		024 BX4 CS	
1 Nominal voltage	$U_N$		24	Volt
2 Terminal resistance, phase-phase	R		3,6	$\Omega$
3 Output power <sup>1)</sup>	$P_{2 \text{ max.}}$		18,2	W
4 Efficiency	$\eta_{\text{ max.}}$		77,3	%
5 No-load speed	$n_o$		5 200	rpm
6 No-load current <sup>3)</sup>	$I_o$		0,098	A
7 Stall torque at 1,58A	$M_H$		199	mNm
8 Friction torque, static	$C_o$		1,3	mNm
9 Friction torque, dynamic	$C_v$		$5,2 \cdot 10^{-4}$	mNm/rpm
10 Speed constant	$k_n$		227	rpm/V
11 Back-EMF constant	$k_E$		4,409	mV/rpm
12 Torque constant	$k_M$		42,1	mNm/A
13 Current constant	$k_i$		0,0238	A/mNm
14 Slope of n-M curve	$\Delta n / \Delta M$		19,4	rpm/mNm
15 Terminal inductance, phase-phase	L		240	$\mu\text{H}$
16 Mechanical time constant	$\tau_m$		6,1	ms
17 Rotor inertia	J		30	$\text{gcm}^2$
18 Angular acceleration	$\alpha_{\text{ max.}}$		66	$\cdot 10^3 \text{rad/s}^2$
19 Thermal resistance	$R_{\text{th} 1} / R_{\text{th} 2}$	1,6 / 12,4		K/W
20 Thermal time constant	$\tau_{w1} / \tau_{w2}$	9 / 810		s
21 Operating temperature range		- 20 ... +100		$^{\circ}\text{C}$
22 Shaft bearings		ball bearings, preloaded		
23 Shaft load max.:				
- radial at 3 000 rpm <sup>(4,5 mm from mounting flange)</sup>		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		370		g
27 Direction of rotation		electronically reversible		
<b>Recommended values - mathematically independent of each other</b>				
28 Speed up to	$n_{e \text{ max.}}$		5 - 6 500	rpm
29 Torque up to <sup>1) 2)</sup>	$M_{e \text{ max.}}$		35 / 56	mNm
30 Current up to <sup>1) 2) 3)</sup>	$I_{e \text{ max.}}$		1,00 / 1,58	A

<sup>1)</sup> at 4 000 rpm      <sup>2)</sup> thermal resistance  $R_{\text{th} 2}$  not reduced / thermal resistance  $R_{\text{th} 2}$  by 55% reduced  
<sup>3)</sup> total standby current 0,08 A

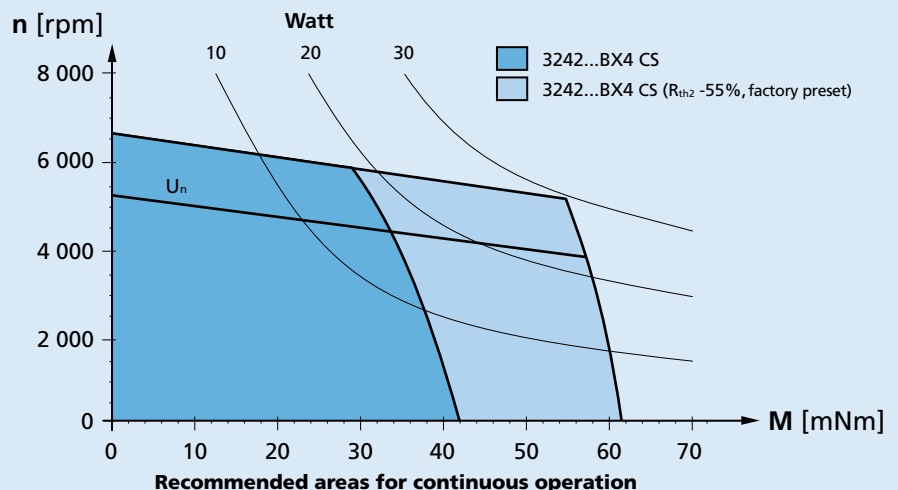
**Note:**

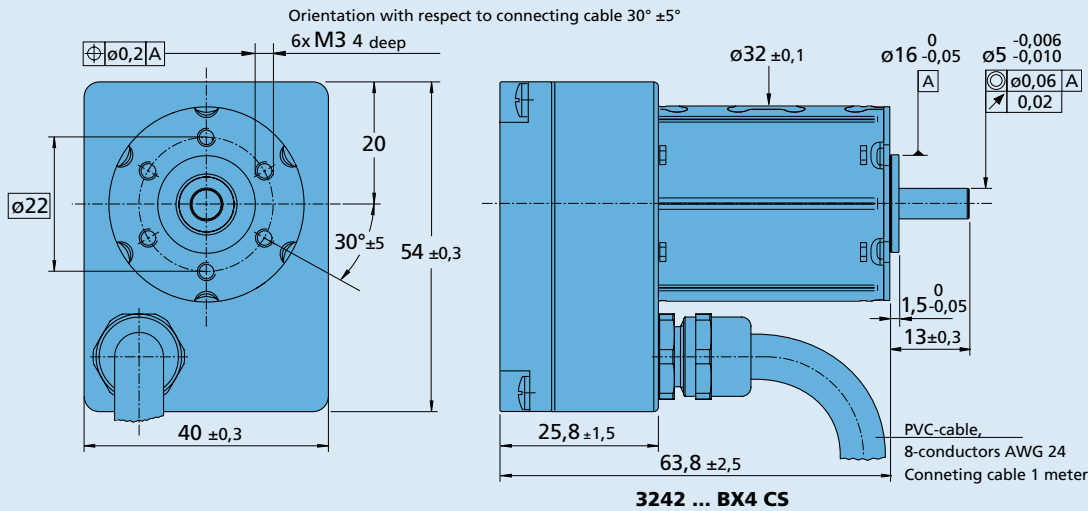

The diagram indicates the maximum speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

The motor can provide more power with adequate cooling (for ex.  $R_{\text{th} 2}$  reduction of -55%).

The maximum available torque and speed will be reduced if the ambient temperature is higher than 22°C and/or the motor is thermally insulated to the ambient environment.

The characteristics of the curve diagram is determined by  $U_b$  and the control characteristics of the integrated Motion Controller.



**3242 ... BX4 CS**

 scale reduced 
**Connection**

Wires	Function
blue	GND
pink	+ 24 V
brown	Analog input
white	Fault output
grey	Analog GND
yellow	RS232 RXD
green	RS232 TXD
red	Connection No. 3

**Caution:**

be sure to connect motor supply terminals to the correct polarity. Motor electronics are protected against polarity reversal by an internal fuse. In case of damage due to polarity reversal, this internal fuse can only be replaced at the factory.

**Motion Controller**

Supply voltage <sup>1)</sup>	$U_B$		12 ... 30	V DC
Peak current <sup>2)</sup>	$I_{max}$		5	A
Input/output (see connection No. 1, 2 and 3)			3	
<b>Connection No. 1 (brown)</b>				
- Speed command analog input		voltage range	$\pm 10$	V
- Speed command PWM input		frequency range	100 ... 2 000	Hz
		pulse duty factor 50%	0	rpm
- Digital input		input resistance (at 24V)	5	k $\Omega$
- External encoder	$f_{max}$		400	kHz
- Step frequency input	$f_{max}$		400	kHz
<b>Connection No. 2 (white)</b>				
- Fault output		no error	switched to GND	
- Digital output		open collector	max. $U_B / 30$ mA	
- Digital input		input resistance	100	k $\Omega$
<b>Connection No. 3 (red)</b>				
- Digital input		input resistance	22	k $\Omega$
- Electronic supply voltage <sup>1)</sup>	$U_B$		12 ... 30	V DC
<b>Encoder:</b>				
- Scanning rate			200	$\mu$ s
- Resolution internal encoder			3 000	Inc./turn

The signal level of the digital inputs can be set using the above commands:  
 Standard (PLC): Low 0...7,0V / High 12,5V... $U_B$ , TTL: Low 0...0,5V / High 3,5V... $U_B$

<sup>1)</sup> Separate supply of motor and control electronics for safetyrelevant applications is optionally available (Option no. 2993).

In this case the 3rd input is not available for digital signals; connection 3 (red).

<sup>2)</sup> Preset value. Can be changed over the interface.

## Brushless DC-Servomotor with integrated Motion Controller

### General description

The 3242 ... BX4 CS combines an electronically commutated DC-Servomotor, a **high-resolution encoder** to determine actual position and a programmable position and speed controller, based on a high-capacity digital signal processor (DSP), within a complete drive unit.

This intelligent EC servomotor performs the following drive functions:

- **Speed control** from 5 to 6 500 rpm with superior performance specifications in respect of synchronous operation and minimal torque fluctuations. A PI controller ensures observance of set-point speeds.
- **Speed profiles** such as ramp, triangular or trapezoidal movements are possible. Gentle acceleration or deceleration can be implemented without problem.
- **Positioning mode:** Positioning with a resolution of 1/3 000 revolutions. Acquisition of **reference marks and end position switches**.
- **Stepper motor mode, electronic gear** or operation with external **incremental encoder** for high-precision applications.
- **Torque control** through current regulation.
- **Self-protection** against excess temperature in the case of high loading, against over-voltage during generator operation and against under-voltage.
- **Storage** of the desired functions.
- **Storage** and execution of motion programs.

Various inputs and outputs are available for implementation of these functions:

- **Set-point input** for speed presetting.  
Analogue or PWM signal can be used. The input can also read in a reference mark signal. Depending on mode, a frequency signal or external incremental encoder can also be connected.
- **Error output** (Open Collector).  
Can also be reprogrammed as a rotational direction or reference mark input.
- **RS232 interface** for connection to a PC with a transfer rate of up to 115k baud. The information can be stored in the integrated memory (FLASH). The interface also offers the facility to retrieve online operating data and values.
- **Additional digital input.**

An extensive ASCII command set is available for **programming** and operation. This can be preset from the PC, e.g. via any terminal program, as contained in Windows, or via any other control computer.

For Windows 95/98/ME/NT/2000/XP/7, the "**Faulhaber Motion Manager**" program is available; this considerably simplifies operation and configuration of the units via the RS232 interface and also enables graphic online analysis of the operating data.

Once programmed as a speed or position controller via the analogue input, as a stepper motor or electronic gear, the drive can be operated independently of the RS232 interface.

### Fields of application

Thanks to the integrated technology, the drive can be used in many different areas with minimal wiring effort. The flexible connection options open up a broad field of application in all areas, for example in decentralised systems of automation technology, as well as in pick-and-place machines and machine tools.

### Options

An adapter board and serial null modem cable can also be ordered, to enable immediate commissioning of the 3242 ... BX4 CS.

Separate supply of motor and control electronics is possible (important for safety-relevant applications); in this case the 3rd input is not required.

Special preconfiguration of modes and parameters is possible on request.

The Motion Manager program is available on request or on the Internet.

### Note

A detailed instruction manual for installation and operation are provided with the brushless DC-Servomotor.

## Position control

