Brushless DC-Servomotors

with integrated Speed Controller
4 Pole Technology

10 mNm

For combination with
Gearheads:
22F, 22/7, 26A

Series 2232 ... BX4 S SC

			2232 S		012 BX4 S	024 BX4 S	SC
1	Nominal voltage	U_N			12	24	Volt
2	Terminal resistance, phase-phase	R			3,5	12,4	Ω
3	Output power [1]	$P_{2\ max.}$			4,4	4,5	W
4	Efficiency	$\eta_{max.}$			60,9	61,7	%
5	No-load speed	n_o			13 200	14 000	min^{-1}
6	No-load current (with shaft ø 3,0 mm)	I_o			0,163	0,088	A
7	Stall torque	M_H			27,3	29,4	mNm
8	Friction torque, static	C_o			0,6	0,6	mNm
9	Friction torque, dynamic	C_v			$5,5 \cdot 10^{-5}$	$5,5 \cdot 10^{-5}$	mNm/min^{-1}
10	Speed constant	k_n			1 173	616	min^{-1}/V
11	Back-EMF constant	k_E			0,852	1,623	mV/min^{-1}
12	Torque constant	k_M			8,14	15,50	mNm/A
13	Current constant	k_I			0,123	0,065	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$			504	493	min^{-1}/mNm
15	Terminal inductance, phase-phase	L			130	470	µH
16	Mechanical time constant	τ_m			22	22	ms
17	Rotor inertia	J			4,2	4,2	gcm^2
18	Angular acceleration	$\alpha_{max.}$			65	70	$\cdot 10^3 rad/s^2$
19	Thermal resistance	$R_{th\,1} / R_{th\,2}$	2 / 13				K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	4,1 / 274				s
21	Operating temperature range		– 40 ... + 85				°C
22	Shaft bearings		ball bearings, preloaded				
23	Shaft load max.:						
	– radial at 3 000 min^{-1} (4 mm from mounting flange)		20				N
	– axial at 3 000 min^{-1}		2				N
	– axial at standstill		20				N
24	Shaft play:						
	– radial	≤	0,015				mm
	– axial	=	0				mm
25	Housing material		stainless steel				
26	Weight		77				g
27	Direction of rotation		electronically reversible				
28	Number of pole pairs		2				
Recommended values - mathematically independent of each other							
29	Speed up to	$n_{e\ max.}$			22 500	17 000	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$			6 / 8	7 / 10	mNm
31	Current up to [1] [2]	$I_{e\ max.}$			1 / 1,4	0,5 / 0,8	A

[1] at 5 000 min^{-1}
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

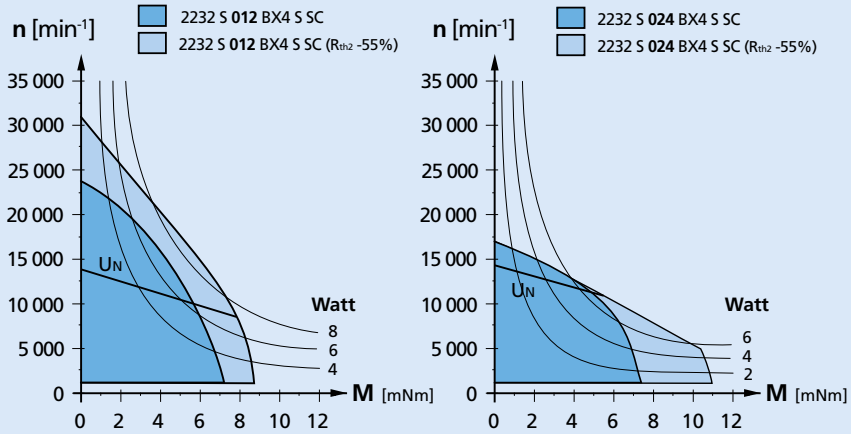
Note:

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 ($R_{th\,2}$ 55% reduced).

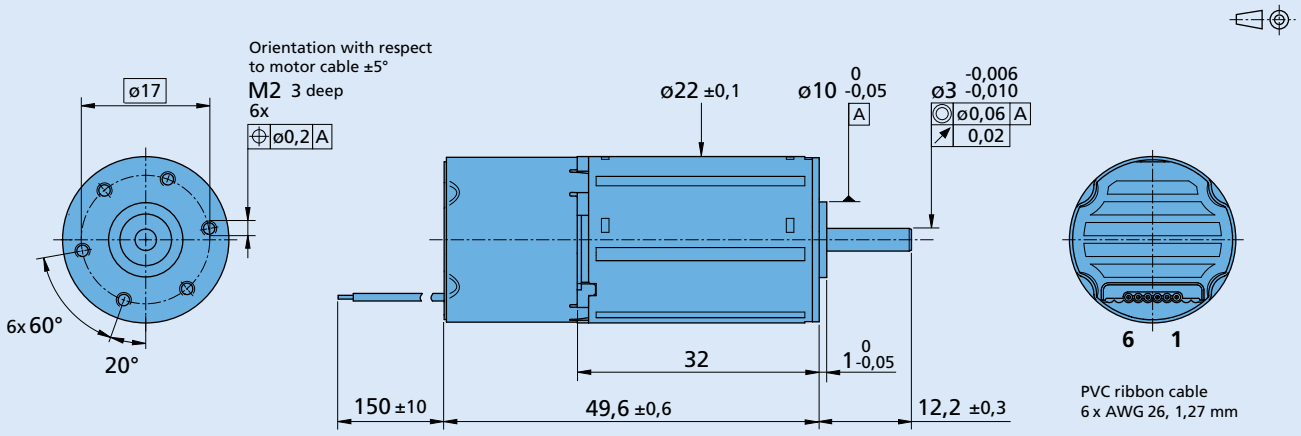
The motor is factory pre-configured to a continuous current for the thermally insulated condition. The controller must be reconfigured with the easy to use Motion Manager Software for use with other parameter settings.

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.



Recommended areas for continuous operation

Dimensional drawing



2232 S ... BX4 S SC

Speed Controller			012 BX4 S	024 BX4 S	SC
Power supply electronic	U_P	5 ... 28			V DC
Power supply motor	U_{mot}	6 ... 28			V DC
PWM switching frequency	f_{PWM}	96			kHz
Efficiency	η	95			%
Max. continuous output current [1]	I_{dauer}		1,4	0,8	A
Max. peak output current [1]	I_{max}		2,8	1,6	A
Total standby current at U_N	I_{el}	0,020			A
Speed range:					
– standard » Hall sensors (digital)		400 ... 50 000 [2]			min^{-1}
– optional » Hall sensors (analog)		50 ... 50 000 [2]			min^{-1}
Scanning range		500			µs

[1] at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics
[2] speed depend on motor operating voltage

Connection information		
Connection 1 "U_P":	power supply electronic	U_P
Connection 2 "U_{mot}":	power supply electronic coil	U_{mot}
Connection 3 "GND":	ground	ground
Connection 4 "U_{nsoll}":		
– analog input	input voltage	U_{in} = 0 ... 10 V | > 10 V ... U_P » set speed value not defined
	input resistance	R_{in} ≥ 5 kΩ
	set speed value	per 1 V, 2 000 min^{-1}
		U_{in} < 0,15 V » motor stops
		U_{in} > 0,3 V » motor starts
Connection 5 "DIR":		
– digital input	direction of rotation	to ground or level < 0,5 V » counterclockwise
		open or level > 3 V » clockwise
	input resistance	R_{in} ≥ 10 kΩ
Connection 6 "FG":		max. U_P; I_{max} = 15 mA; open collector with 22 kΩ pull-up resistor
– digital output	frequency output	6 lines per revolution

Features

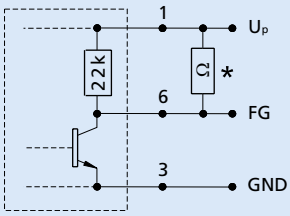
In this variant, the brushless DC servomotors have an integrated Speed Controller. The motor is commutated using Hall sensors integrated into the motor. Speed control is via a PI regulator.

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.

Using the **"FAULHABER Motion Manager"** software, the customer can modify the Speed Controller to special conditions of use. The following parameters can be changed: current limit and regulator parameters.

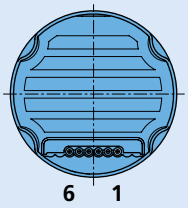
Circuit diagram / Connection information

Output circuit



* An additional external pull-up resistor can be added to improve the rise time.
Caution: I_{OUT} max. 15 mA must not be exceeded!

Cable connection



Connection

No.	Function
1	U_P
2	U_{mot}
3	GND
4	U_{nsoll}
5	DIR
6	FG

Caution:
Incorrect lead connection will damage the motor electronics!

Options

- Connector variant (Option no.: 3809)
  AWG 26 / PVC ribbon cable
  with connector Micro-Fit
- Analog Hall sensors (Option no.: 3692)

Accessories

- Programming board (Part No.: 6501.00088)

Full product description

- Example:
  2232S024BX4S SC

Brushless DC-Servomotors

with integrated Speed Controller
4 Pole Technology

16 mNm

For combination with
Gearheads:
22F, 22/7, 26A

Series 2232 ... BX4 SC

		2232 S		012 BX4	024 BX4	SC
1	Nominal voltage	U_N		12	24	Volt
2	Terminal resistance, phase-phase	R		3,5	12,4	Ω
3	Output power [1]	$P_{2\ max.}$		8,8	8,9	W
4	Efficiency	$\eta_{max.}$		66,9	67,6	%
5	No-load speed	n_o		6 600	7 000	min^{-1}
6	No-load current (with shaft ø 3,0 mm)	I_o		0,112	0,061	A
7	Stall torque	M_H		55,7	59,9	mNm
8	Friction torque, static	C_o		0,85	0,85	mNm
9	Friction torque, dynamic	C_v		$1,5 \cdot 10^{-4}$	$1,5 \cdot 10^{-4}$	mNm/min^{-1}
10	Speed constant	k_n		579	304	rpm/V
11	Back-EMF constant	k_E		1,728	3,288	mV/min^{-1}
12	Torque constant	k_M		16,50	31,40	mNm/A
13	Current constant	k_I		0,061	0,032	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$		123	120	min^{-1}/mNm
15	Terminal inductance, phase-phase	L		120	440	µH
16	Mechanical time constant	τ_m		6,7	6,5	ms
17	Rotor inertia	J		5,2	5,2	gcm^2
18	Angular acceleration	$\alpha_{max.}$		107	115	$\cdot 10^3 rad/s^2$
19	Thermal resistance	$R_{th\ 1}$ / $R_{th\ 2}$	2 / 13			K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	4,1 / 283			s
21	Operating temperature range		– 40 ... +85			°C
22	Shaft bearings		ball bearings, preloaded			
23	Shaft load max.:					
	– radial at 3 000 rpm (4 mm from mounting flange)		20			N
	– axial at 3 000 rpm		2			N
	– axial at standstill		20			N
24	Shaft play:					
	– radial	≤	0,015			mm
	– axial	=	0			mm
25	Housing material		stainless steel			
26	Weight		77			g
27	Direction of rotation		electronically reversible			
28	Number of pole pairs		2			
Recommended values - mathematically independent of each other						
29	Speed up to	$n_{e\ max.}$		14 500	8 500	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$		13 / 16	12 / 13	mNm
31	Current up to [1] [2]	$I_{e\ max.}$		1 / 1,4	0,5 / 0,8	A

[1] at 5 000 rpm
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

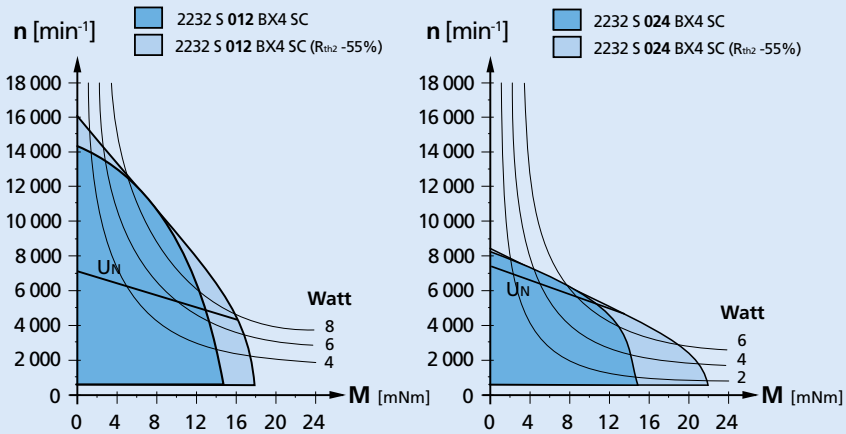
Note:

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 ($R_{th\ 2}$ 55% reduced).

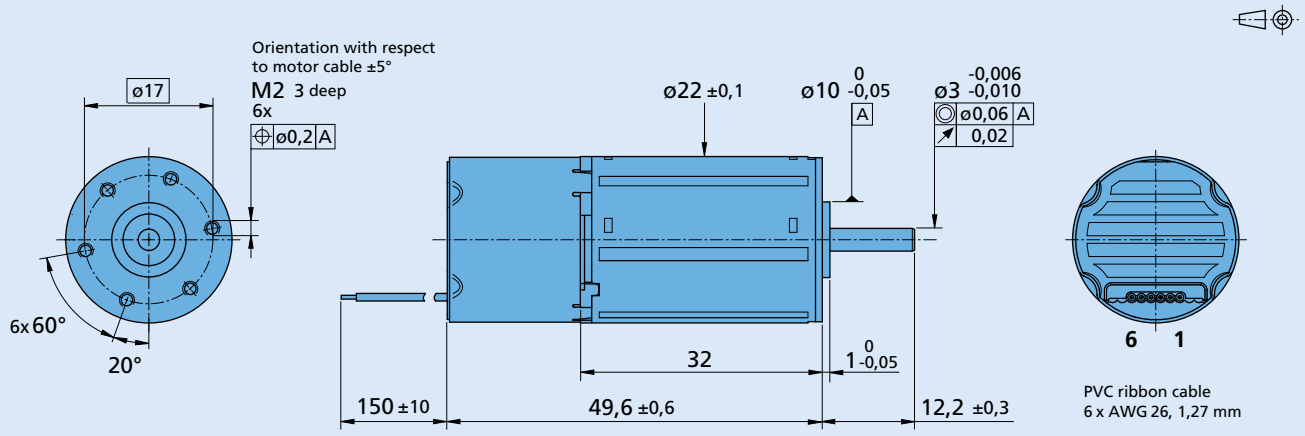
The motor is factory pre-configured to a continuous current for the thermally insulated condition. The controller must be reconfigured with the easy to use Motion Manager Software for use with other parameter settings.

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.



Recommended areas for continuous operation

Dimensional drawing



2232 S ... BX4 SC

Speed Controller			012 BX4	024 BX4	SC
Power supply electronic	U_P	5 ... 28			V DC
Power supply motor	U_{mot}	6 ... 28			V DC
PWM switching frequency	f_{PWM}	96			kHz
Efficiency	η	95			%
Max. continuous output current [1]	I_{dauer}		1,4	0,8	A
Max. peak output current [1]	I_{max}		2,8	1,6	A
Total standby current at U_N	I_{el}	0,020			A
Speed range:					
– standard » Hall sensors (digital)		400 ... 50 000 [2]			min^{-1}
– optional » Hall sensors (analog)		50 ... 50 000 [2]			min^{-1}
Scanning range		500			µs

[1] at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics
[2] speed depend on motor operating voltage

Connection information

Connection 1 "U_P":	power supply electronic	U_P
Connection 2 "U_{mot}":	power supply electronic coil	U_{mot}
Connection 3 "GND":	ground	ground
Connection 4 "U_{nsoll}":		
– analog input	input voltage	U_{in} = 0 ... 10 V | > 10 V ... U_P » set speed value not defined
	input resistance	R_{in} ≥ 5 kΩ
	set speed value	per 1 V, 1 000 min^{-1}
		U_{in} < 0,15 V » motor stops
		U_{in} > 0,3 V » motor starts
Connection 5 "DIR":		
– digital input	direction of rotation	to ground or level < 0,5 V » counterclockwise
		open or level > 3 V » clockwise
	input resistance	R_{in} ≥ 10 kΩ
Connection 6 "FG":		max. U_P; I_{max} = 15 mA; open collector with 22 kΩ pull-up resistor
– digital output	frequency output	6 lines per revolution

Features

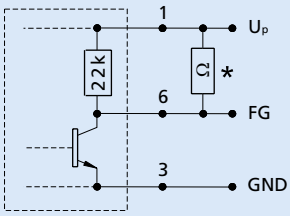
In this variant, the brushless DC servomotors have an integrated Speed Controller. The motor is commutated using Hall sensors integrated into the motor. Speed control is via a PI regulator.

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.

Using the **"FAULHABER Motion Manager"** software, the customer can modify the Speed Controller to special conditions of use. The following parameters can be changed: current limit and regulator parameters.

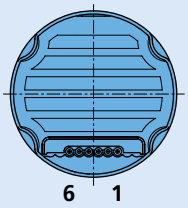
Circuit diagram / Connection information

Output circuit



* An additional external pull-up resistor can be added to improve the rise time.
Caution: I_{OUT} max. 15 mA must not be exceeded!

Cable connection



Connection

No.	Function
1	U_P
2	U_{mot}
3	GND
4	U_{nsoll}
5	DIR
6	FG

Caution:
Incorrect lead connection will damage the motor electronics!

Options

- Connector variant (Option no.: 3809)
  AWG 26 / PVC ribbon cable
  with connector Micro-Fit
- Analog Hall sensors (Option no.: 3692)

Accessories

- Programming board (Part No.: 6501.00088)

Full product description

- Example:
  2232S024BX4 SC

Brushless DC-Servomotors

with integrated Speed Controller
4 Pole Technology

20 mNm

For combination with
Gearheads:
22F, 22/7, 26A

Series 2250 ... BX4 S SC

			2250 S	024 BX4 S	SC
1	Nominal voltage	U_N		24	Volt
2	Terminal resistance, phase-phase	R		5,9	Ω
3	Output power [1]	$P_{2\ max.}$		10,3	W
4	Efficiency	$\eta_{max.}$		70,4	%
5	No-load speed	n_o		10 500	min^{-1}
6	No-load current (with shaft ø 3,0 mm)	I_o		0,105	A
7	Stall torque	M_H		84,7	mNm
8	Friction torque, static	C_o		0,75	mNm
9	Friction torque, dynamic	C_v		$1,4 \cdot 10^{-4}$	mNm/min^{-1}
10	Speed constant	k_n		451	min^{-1}/V
11	Back-EMF constant	k_E		2,218	mV/min^{-1}
12	Torque constant	k_M		21,1	mNm/A
13	Current constant	k_I		0,047	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$		125,6	min^{-1}/mNm
15	Terminal inductance, phase-phase	L		250	µH
16	Mechanical time constant	τ_m		6,97	ms
17	Rotor inertia	J		5,3	gcm^2
18	Angular acceleration	$\alpha_{max.}$		160	$\cdot 10^3 rad/s^2$
19	Thermal resistance	$R_{th\ 1} / R_{th\ 2}$	1,2 / 10,5		K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	4,2 / 332		s
21	Operating temperature range		– 40 ... +85		°C
22	Shaft bearings		ball bearings, preloaded		
23	Shaft load max.:				
	– radial at 3 000 min^{-1} (4 mm from mounting flange)		20		N
	– axial at 3 000 min^{-1}		2		N
	– axial at standstill		20		N
24	Shaft play:				
	– radial	≤	0,015		mm
	– axial	=	0		mm
25	Housing material		stainless steel		
26	Weight		97		g
27	Direction of rotation		electronically reversible		
28	Number of pole pairs		2		
Recommended values - mathematically independent of each other					
29	Speed up to	$n_{e\ max.}$		12 500	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$		15 / 20	mNm
31	Current up to [1] [2]	$I_{e\ max.}$		0,8 / 1,2	A

[1] at 5 000 min^{-1}
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

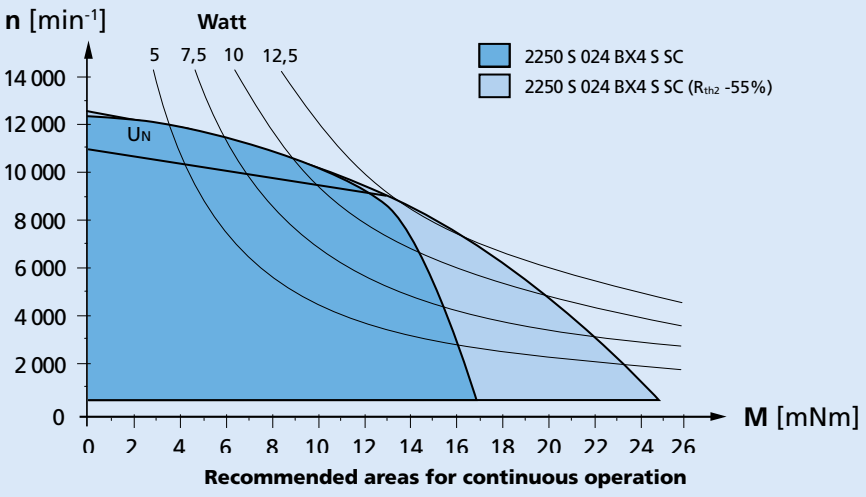
Note:

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 ($R_{th\ 2}$ 55% reduced).

The motor is factory pre-configured to a continuous current for the thermally insulated condition. The controller must be reconfigured with the easy to use Motion Manager Software for use with other parameter settings.

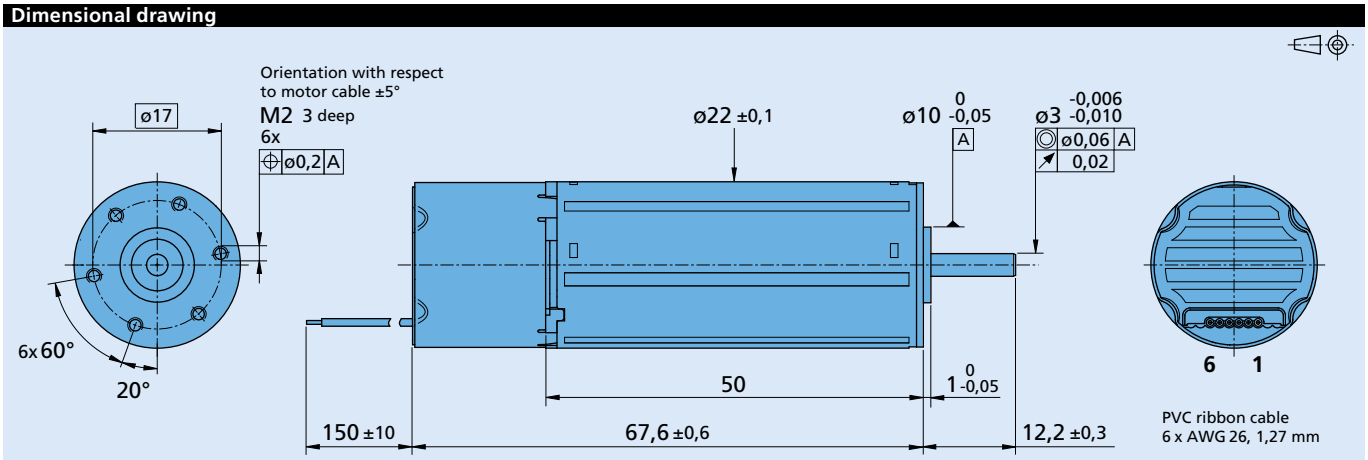
The nominal voltage (U_N) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



For notes on technical data and lifetime performance refer to "Technical Information".

Edition 2016

Dimensional drawing



2250 S ... BX4 S SC

Speed Controller		024 BX4 S	SC
Power supply electronic	U_P	5 ... 28	V DC
Power supply motor	U_{mot}	6 ... 28	V DC
PWM switching frequency	f_{PWM}	96	kHz
Efficiency	η	95	%
Max. continuous output current [1]	I_{dauer}	0,8	A
Max. peak output current [1]	I_{max}	1,6	A
Total standby current at U_N	I_{el}	0,020	A
Speed range:			
– standard » Hall sensors (digital)		400 ... 50 000 [2]	min^{-1}
Scanning range		500	µs

[1] at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics
[2] speed depend on motor operating voltage

Connection information

Connection 1 "U_P":	power supply electronic	U_P
Connection 2 "U_{mot}":	power supply electronic coil	U_{mot}
Connection 3 "GND":	ground	ground
Connection 4 "U_{nsoll}":		
– analog input	input voltage	U_{in} = 0 ... 10 V | > 10 V ... U_P » set speed value not defined
	input resistance	R_{in} ≥ 5 kΩ
	set speed value	per 1 V, 2 000 min^{-1}
		U_{in} < 0,15 V » motor stops
		U_{in} > 0,3 V » motor starts
Connection 5 "DIR":		
– digital input	direction of rotation	to ground or level < 0,5 V » counterclockwise
		open or level > 3 V » clockwise
	input resistance	R_{in} ≥ 10 kΩ
Connection 6 "FG":		max. U_P; Imax = 15 mA; open collector with 22 kΩ pull-up resistor
– digital output	frequency output	6 lines per revolution

Features

In this variant, the brushless DC servomotors have an integrated Speed Controller. The motor is commutated using Hall sensors integrated into the motor. 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.

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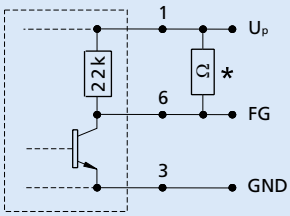
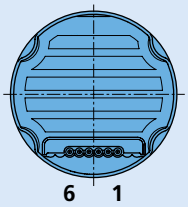
Circuit diagram / Connection information

Output circuit



* An additional external pull-up resistor can be added to improve the rise time.
Caution: I_{OUT} max. 15 mA must not be exceeded!

Cable connection



Connection

No.	Function
1	U_P
2	U_{mot}
3	GND
4	U_{nsoll}
5	DIR
6	FG

Caution:
Incorrect lead connection will damage the motor electronics!

Options

- Connector variant (Option no.: 3809)
  AWG 26 / PVC ribbon cable
  with connector Micro-Fit

Accessories

- Programming board (Part No.: 6501.00088)

Full product description

- Example:
  2250S024BX4S SC

Brushless DC-Servomotors

with integrated Speed Controller
4 Pole Technology

25 mNm

For combination with
Gearheads:
22F, 22/7, 26A

Series 2250 ... BX4 SC

			2250 S		024 BX4	SC
1	Nominal voltage	U_N			24	Volt
2	Terminal resistance, phase-phase	R			5,9	Ω
3	Output power [1]	$P_{2\ max.}$			17,3	W
4	Efficiency	$\eta_{max.}$			75,0	%
5	No-load speed	n_o			6 000	min^{-1}
6	No-load current (with shaft ø 3,0 mm)	I_o			0,072	A
7	Stall torque	M_H			149,0	mNm
8	Friction torque, static	C_o			1,2	mNm
9	Friction torque, dynamic	C_v			$2{,}4 \cdot 10^{-4}$	mNm/min^{-1}
10	Speed constant	k_n			259	min^{-1}/V
11	Back-EMF constant	k_E			3,860	mV/min^{-1}
12	Torque constant	k_M			36,9	mNm/A
13	Current constant	k_I			0,027	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$			41,4	min^{-1}/mNm
15	Terminal inductance, phase-phase	L			240	µH
16	Mechanical time constant	τ_m			4,30	ms
17	Rotor inertia	J			10	gcm^2
18	Angular acceleration	$\alpha_{max.}$			149	$\cdot 10^3 rad/s^2$
19	Thermal resistance	$R_{th\,1} / R_{th\,2}$	1,2 / 10,5			K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	4,2 / 424			s
21	Operating temperature range		– 40 ... +85			°C
22	Shaft bearings		ball bearings, preloaded			
23	Shaft load max.:					
	– radial at 3 000 min^{-1} (4 mm from mounting flange)		20			N
	– axial at 3 000 min^{-1}		2			N
	– axial at standstill		20			N
24	Shaft play:					
	– radial	≤	0,015			mm
	– axial	=	0			mm
25	Housing material		stainless steel			
26	Weight		117			g
27	Direction of rotation		electronically reversible			
28	Number of pole pairs		2			
Recommended values - mathematically independent of each other						
29	Speed up to	$n_{e\ max.}$			7 200	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$			23 / 25	mNm
31	Current up to [1] [2]	$I_{e\ max.}$			0,8 / 1,2	A

[1] at 5 000 min^{-1}
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

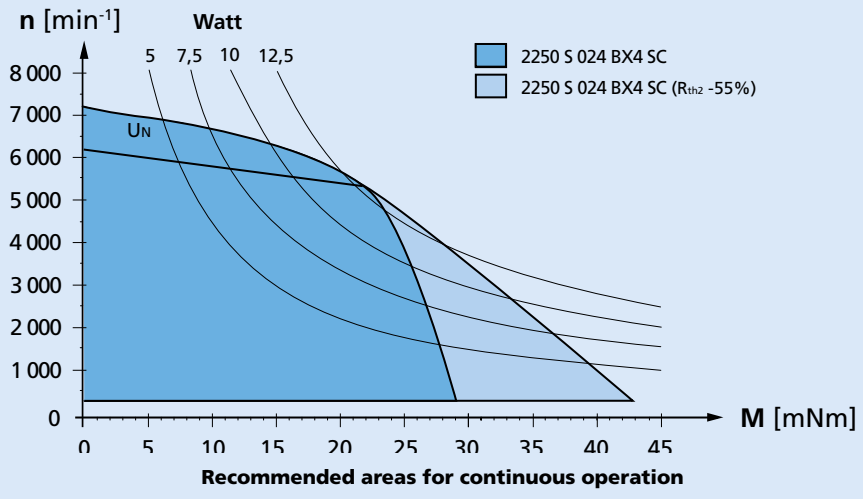
Note:

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 ($R_{th\,2}$ 55% reduced).

The motor is factory pre-configured to a continuous current for the thermally insulated condition. The controller must be reconfigured with the easy to use Motion Manager Software for use with other parameter settings.

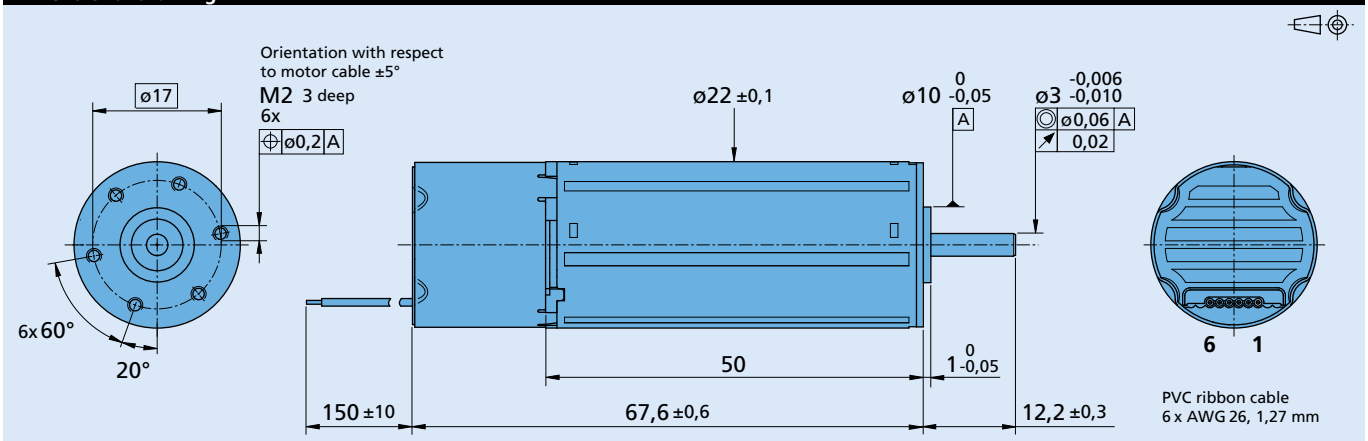
The nominal voltage (U_N) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



For notes on technical data and lifetime performance refer to "Technical Information".

Edition 2016

Dimensional drawing



2250 S ... BX4 SC

Speed Controller		024 BX4	SC
Power supply electronic	U_P	5 ... 28	V DC
Power supply motor	U_{mot}	6 ... 28	V DC
PWM switching frequency	f_{PWM}	96	kHz
Efficiency	η	95	%
Max. continuous output current [1]	I_{dauer}	0,8	A
Max. peak output current [1]	I_{max}	1,6	A
Total standby current at U_N	I_{el}	0,020	A
Speed range:			
– standard » Hall sensors (digital)		400 ... 50 000 [2]	min^{-1}
– optional » Hall sensors (analog)		50 ... 50 000 [2]	min^{-1}
Scanning range		500	µs

[1] at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics
[2] speed depend on motor operating voltage

Connection information

Connection 1 "U_P":	power supply electronic	U_P
Connection 2 "U_{mot}":	power supply electronic coil	U_{mot}
Connection 3 "GND":	ground	ground
Connection 4 "U_{nsoll}":		
– analog input	input voltage	U_{in} = 0 ... 10 V | > 10 V ... U_P » set speed value not defined
	input resistance	R_{in} ≥ 5 kΩ
	set speed value	per 1 V, 1 000 min^{-1}
		U_{in} < 0,15 V » motor stops
		U_{in} > 0,3 V » motor starts
Connection 5 "DIR":		
– digital input	direction of rotation	to ground or level < 0,5 V » counterclockwise
		open or level > 3 V » clockwise
	input resistance	R_{in} ≥ 10 kΩ
Connection 6 "FG":		max. U_P; Imax = 15 mA; open collector with 22 kΩ pull-up resistor
– digital output	frequency output	6 lines per revolution

Features

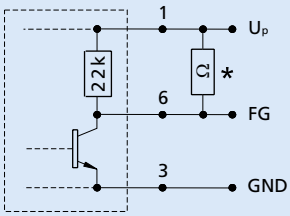
In this variant, the brushless DC servomotors have an integrated Speed Controller. The motor is commutated using Hall sensors integrated into the motor. Speed control is via a PI regulator.

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.

Using the **"FAULHABER Motion Manager"** software, the customer can modify the Speed Controller to special conditions of use. The following parameters can be changed: current limit and regulator parameters.

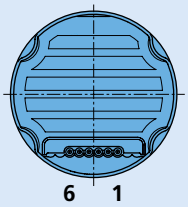
Circuit diagram / Connection information

Output circuit



* An additional external pull-up resistor can be added to improve the rise time.
Caution: I_{OUT} max. 15 mA must not be exceeded!

Cable connection



Connection

No.	Function
1	U_P
2	U_{mot}
3	GND
4	U_{nsoll}
5	DIR
6	FG

Caution:
Incorrect lead connection will damage the motor electronics!

Options

- Connector variant (Option no.: 3809)
  AWG 26 / PVC ribbon cable
  with connector Micro-Fit
- Analog Hall sensors (Option no.: 3692)

Accessories

- Programming board (Part No.: 6501.00088)

Full product description

- Example:
  2250S024BX4 SC

Brushless DC-Servomotors

with integrated Speed Controller
4 Pole Technology

54 mNm

For combination with
Gearheads:
32A, 32ALN, 32/3, 32/3 S, 38/1, 38/1S, 38/2, 38/2 S

Series 3242 ... BX4 SC

		3242 G		012 BX4	024 BX4	SC
1	Nominal voltage	U_N		12	24	Volt
2	Terminal resistance, phase-phase	R		0,89	3,6	Ω
3	Output power [1]	$P_{2\ max.}$		21,2	21,1	W
4	Efficiency	$\eta_{max.}$		77,4	77,3	%
5	No-load speed	n_o		5 500	5 500	min^{-1}
6	No-load current	I_o		0,206	0,103	A
7	Stall torque	M_H		83	83	mNm
8	Friction torque, static	C_o		1,3	1,3	mNm
9	Friction torque, dynamic	C_v		$5,2 \cdot 10^{-4}$	$5,2 \cdot 10^{-4}$	mNm/min^{-1}
10	Speed constant	k_n		455	227	min^{-1}/V
11	Back-EMF constant	k_E		2,199	4,409	mV/min^{-1}
12	Torque constant	k_M		21,0	42,1	mNm/A
13	Current constant	k_I		0,0476	0,0238	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$		19,3	19,4	min^{-1}/mNm
15	Terminal inductance, phase-phase	L		60	240	µH
16	Mechanical time constant	τ_m		6,1	6,1	ms
17	Rotor inertia	J		30	30	gcm^2
18	Angular acceleration	$\alpha_{max.}$		28	28	$\cdot 10^3 rad/s^2$
19	Thermal resistance	R_{th1} / R_{th2}	1,6 / 12,4			K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	9 / 810			s
21	Operating temperature range		– 40 ... + 100			°C
22	Shaft bearings		ball bearings, preloaded			
23	Shaft load max.:					
	– radial at 3 000 min^{-1} (4,5 mm from mounting flange)		50			N
	– axial at 3 000 min^{-1}		5			N
	– axial at standstill		50			N
24	Shaft play:					
	– radial	≤	0,015			mm
	– axial	=	0			mm
25	Housing material		stainless steel			
26	Weight		192			g
27	Direction of rotation		electronically reversible			
28	Number of pole pairs		2			
Recommended values - mathematically independent of each other						
29	Speed up to	$n_{e\ max.}$		14 000	6 000	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$		32 / 36	32 / 54	mNm
31	Current up to [1] [2]	$I_{e\ max.}$		1,90 / 2,00	0,95 / 1,55	A

[1] at 5 000 min^{-1}
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

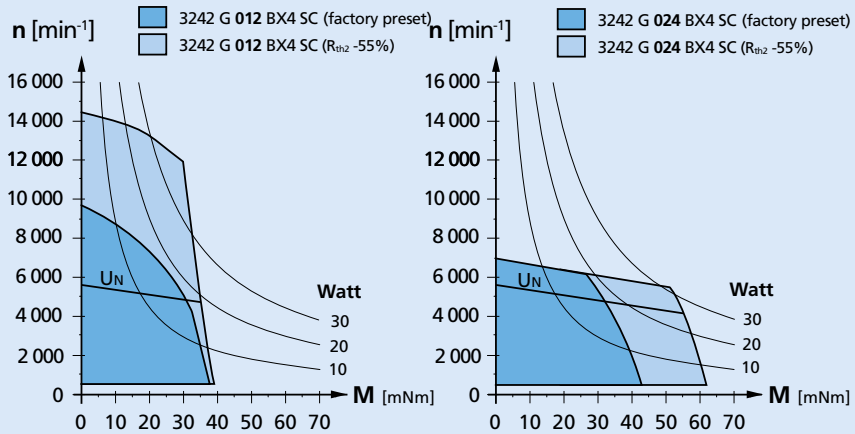
Note:

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 ($R_{th\,2}$ 55% reduced).

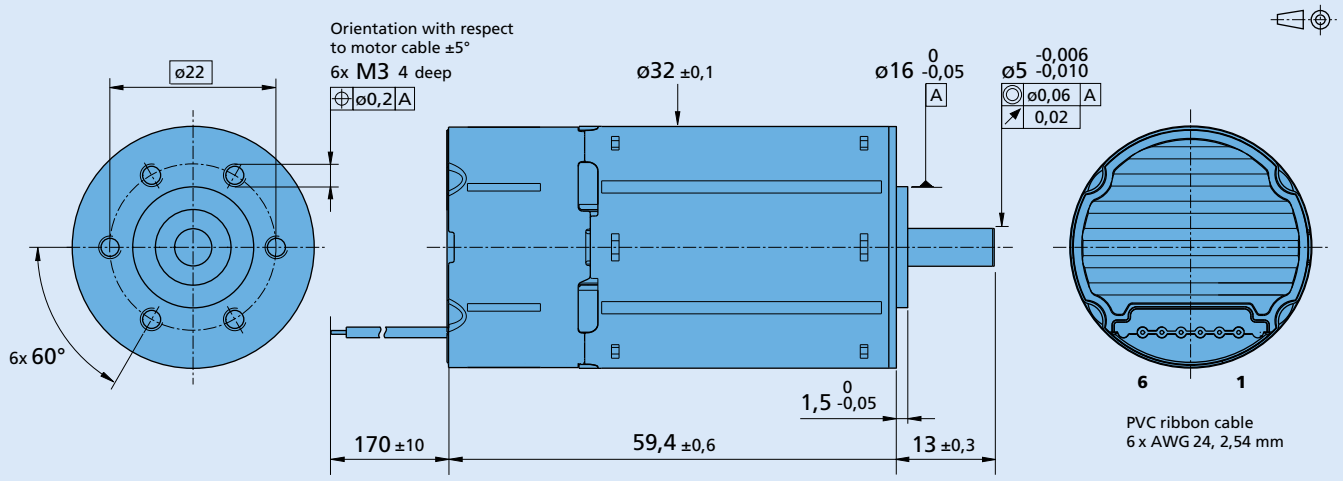
The motor is factory pre-configured to a continuous current for the thermally insulated condition. The controller must be reconfigured with the easy to use Motion Manager Software for use at higher continuous current.

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.



Recommended areas for continuous operation

Dimensional drawing



3242 G ... BX4 SC

Speed Controller		012 BX4	024 BX4	SC
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	η	95		%
Max. continuous output current [1]	I_{dauer}	2		A
Max. peak output current	I_{max}	4		A
Total standby current at U_N	I_{el}	17	10	mA
Speed range:				
– standard » Hall sensors (digital)		400 ... 50 000 [2]		min^{-1}
– optional » Hall sensors (analog)		50 ... 50 000 [2]		min^{-1}
Scanning range		500		µs

[1] at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics
[2] speed is dependent on the motor operating voltage

Connection information

Connection 1 "U_P":	power supply electronic	U_P	
Connection 2 "U_{mot}":	power supply electronic coil	U_{mot}	
Connection 3 "GND":	ground	ground	
Connection 4 "U_{nsoll}":			
– analog input	input voltage	U_{in} = 0 ... 10 V | > 10 V ... U_P » set speed value not defined	
	input resistance	R_{in} ≥ 8,9 kΩ	
	set speed value	per 1 V, 1 000	min^{-1}
		U_{in} < 0,15 V » motor stops	
		U_{in} > 0,3 V » motor starts	
Connection 5 "DIR":			
– digital input	direction of rotation	to ground or level < 0,5 V » counterclockwise	
		open or level > 3 V » clockwise	
	input resistance	R_{in} ≥ 10 kΩ	
Connection 6 "FG":		max. U_P; I_{max} = 15 mA; open collector with 22 kΩ pull-up resistor	
– digital output	frequency output	6 lines per revolution	

Features

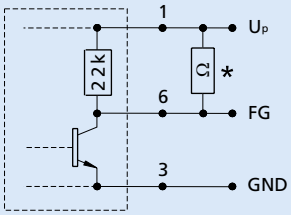
In this variant, the brushless DC servomotors have an integrated Speed Controller. The motor is commutated using Hall sensors integrated into the motor. Speed control is via a PI regulator.

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.

Using the **"FAULHABER Motion Manager"** software, the customer can modify the Speed Controller to special conditions of use. The following parameters can be changed: current limit and regulator parameters.

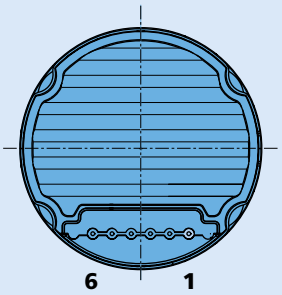
Circuit diagram / Connection information

Output circuit



* An additional external pull-up resistor can be added to improve the rise time.
Caution: I_{OUT} max. 15 mA must not be exceeded!

Cable connection



Connection

No.	Function
1	U_P
2	U_{mot}
3	GND
4	U_{nsoll}
5	DIR
6	FG

Caution:
Incorrect lead connection will damage the motor electronics!

Options

- Connector variant (Option no.: 3809)
  AWG 24 / PVC ribbon cable
  with connector Micro-Fit
- Analog Hall sensors (Option no.: 3692)

Accessories

- Programming board (Part No.: 6501.00088)

Full product description

- Examples:
  3242G012BX4 SC
  3242G024BX4 SC

Brushless DC-Servomotors

with integrated Speed Controller
4 Pole Technology

50 mNm

For combination with
Gearheads:
32A, 32ALN, 32/3, 32/3 S, 38/1, 38/1S, 38/2, 38/2 S

Series 3242 ... BX4 SCDC

		3242 G		012 BX4	024 BX4	SCDC
1	Nominal voltage	U_N		12	24	Volt
2	Terminal resistance, phase-phase	R		0,89	3,6	Ω
3	Output power [1]	$P_{2\ max.}$		21,2	21,1	W
4	Efficiency	$\eta_{max.}$		77,4	77,3	%
5	No-load speed	n_o		5 300	5 400	min^{-1}
6	No-load current	I_o		0,199	0,101	A
7	Stall torque	M_H		83	83	mNm
8	Friction torque, static	C_o		1,3	1,3	mNm
9	Friction torque, dynamic	C_v		$5{,}2 \cdot 10^{-4}$	$5{,}2 \cdot 10^{-4}$	mNm/min^{-1}
10	Speed constant	k_n		455	227	min^{-1}/V
11	Back-EMF constant	k_E		2,199	4,409	mV/min^{-1}
12	Torque constant	k_M		21,0	42,1	mNm/A
13	Current constant	k_I		0,0476	0,0238	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$		19,3	19,4	min^{-1}/mNm
15	Terminal inductance, phase-phase	L		60	240	µH
16	Mechanical time constant	τ_m		6,1	6,1	ms
17	Rotor inertia	J		30	30	gcm^2
18	Angular acceleration	$\alpha_{max.}$		28	28	$\cdot 10^3 rad/s^2$
19	Thermal resistance	R_{th1} / R_{th2}	1,6 / 12,4			K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	9 / 810			s
21	Operating temperature range		– 40 ... +85			°C
22	Shaft bearings		ball bearings, preloaded			
23	Shaft load max.:					
	– radial at 3 000 min^{-1} (4,5 mm from mounting flange)		50			N
	– axial at 3 000 min^{-1}		5			N
	– axial at standstill		50			N
24	Shaft play:					
	– radial	≤	0,015			mm
	– axial	=	0			mm
25	Housing material		stainless steel			
26	Weight		189			g
27	Direction of rotation		electronically reversible			
28	Number of pole pairs		2			
Recommended values - mathematically independent of each other						
29	Speed up to	$n_{e\ max.}$		12 000	6 000	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$		27 / 29	28 / 50	mNm
31	Current up to [1] [2]	$I_{e\ max.}$		1,60 / 1,60	0,82 / 1,40	A

[1] at 5000 min^{-1}
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

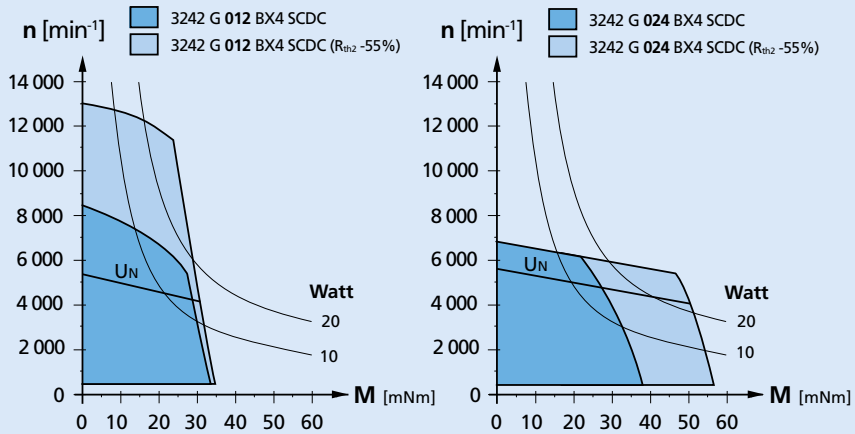
Note:

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 ($R_{th\,2}$ 55% reduced).

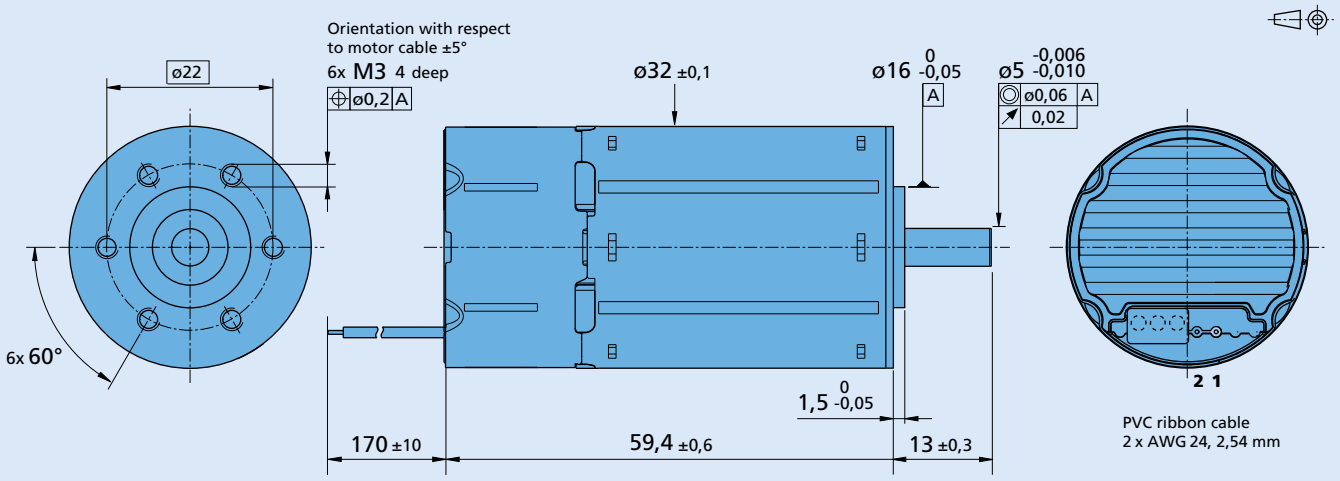
The motor is factory pre-configured to perform at the recommended continuous current. Non-standard configurations are only possible upon request from the manufacturer.

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.



Recommended areas for continuous operation

Dimensional drawing



3242 G ... BX4 SCDC

Speed Controller		012 BX4	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	η	95		%
Max. continuous output current [1]	I_{dauer}	1,6		A
Max. peak output current	I_{max}	4		A
Total standby current at U_N	I_{el}	17	10	mA
Speed range, electronics		400 ... 50 000 [2]		min^{-1}
Scanning rate		500		µs

[1] at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics
[2] 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:

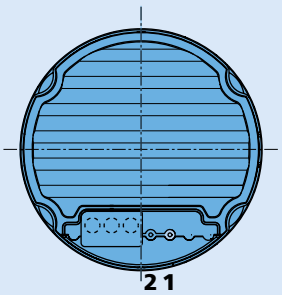
  3242G012BX4 SCDC
  3242G024BX4 SCDC

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 –

Brushless DC-Servomotors

with integrated Speed Controller
4 Pole Technology

73 mNm

For combination with
Gearheads:
32A, 32ALN, 32/3, 32/3 S, 38/1, 38/1S, 38/2, 38/2 S

Series 3268 ... BX4 SC

			3268 G		024 BX4	SC
1	Nominal voltage	U_N			24	Volt
2	Terminal resistance, phase-phase	R			1,45	Ω
3	Output power [1]	$P_{2\ max.}$			32,7	W
4	Efficiency	$\eta_{max.}$			79,5	%
5	No-load speed	n_o			5 500	min^{-1}
6	No-load current	I_o			0,215	A
7	Stall torque	M_H			137	mNm
8	Friction torque, static	C_o			1,7	mNm
9	Friction torque, dynamic	C_v			$1,3 \cdot 10^{-3}$	mNm/min^{-1}
10	Speed constant	k_n			220	min^{-1}/V
11	Back-EMF constant	k_E			4,555	mV/min^{-1}
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	min^{-1}/mNm
15	Terminal inductance, phase-phase	L			110	µH
16	Mechanical time constant	τ_m			4,6	ms
17	Rotor inertia	J			60	gcm^2
18	Angular acceleration	$\alpha_{max.}$			23	$\cdot 10^3 rad/s^2$
19	Thermal resistance	R_{th1} / R_{th2}	1,9 / 9,6			K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	17 / 1 060			s
21	Operating temperature range		– 40 ... + 100			°C
22	Shaft bearings		ball bearings, preloaded			
23	Shaft load max.:					
	– radial at 3 000 min^{-1} (4,5 mm from mounting flange)		50			N
	– axial at 3 000 min^{-1}		5			N
	– axial at standstill		50			N
24	Shaft play:					
	– radial	≤	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			
Recommended values - mathematically independent of each other						
29	Speed up to	$n_{e\ max.}$			7 000	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$			47 / 73	mNm
31	Current up to [1] [2]	$I_{e\ max.}$			1,41 / 2,00	A

[1] at U_{soll} = 10V
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

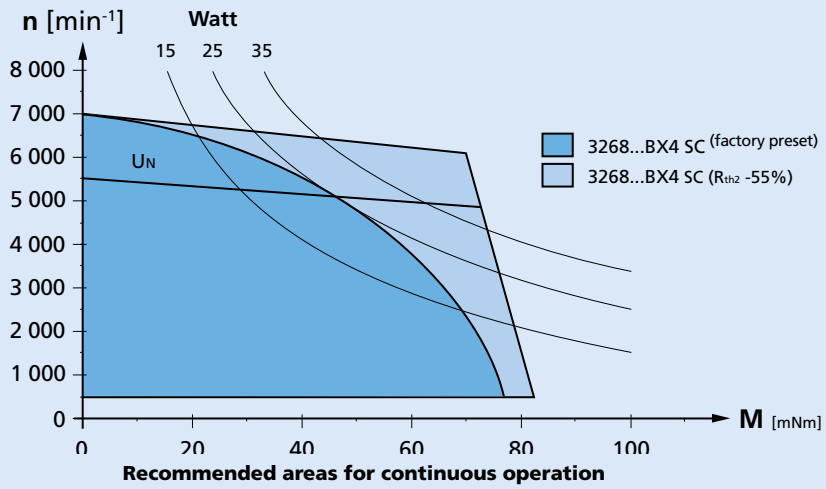
Note:

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 ($R_{th\ 2}$ 55% reduced).

The motor is factory pre-configured to a continuous current for the thermally insulated condition. The controller must be reconfigured with the easy to use Motion Manager Software for use at higher continuous current.

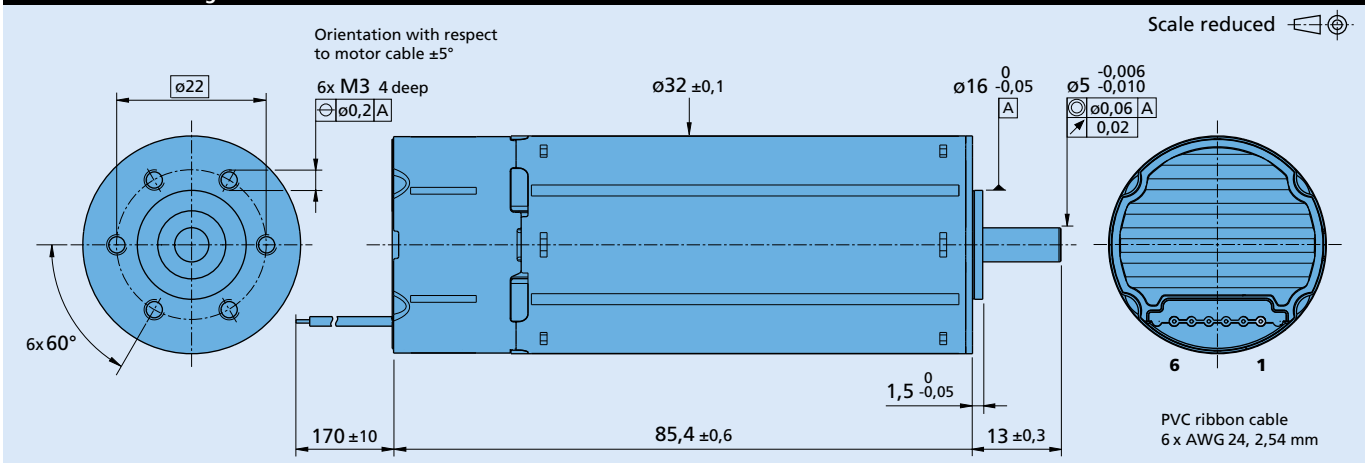
The nominal voltage (U_N) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



Recommended areas for continuous operation

For notes on technical data and lifetime performance refer to "Technical Information".
Edition 2016

Dimensional drawing



3268 G ... BX4 SC

Speed Controller		024 BX4	SC
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	η	95	%
Max. continuous output current [1]	I_{dauer}	2	A
Max. peak output current	I_{max}	4	A
Total standby current at U_N	I_{el}	10	mA
Speed range:			
– standard » Hall sensors (digital)		400 ... 50 000 [2]	min^{-1}
– optional » Hall sensors (analog)		50 ... 50 00 [2]	min^{-1}
Scanning range		500	µs

[1] at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics
[2] speed is dependent on the motor operating voltage

Connection information

Connection 1 "U_P":	power supply electronic	U_P	
Connection 2 "U_{mot}":	power supply electronic coil	U_{mot}	
Connection 3 "GND":	ground	ground	
Connection 4 "U_{nsoll}":			
– analog input	input voltage	U_{in} = 0 ... 10 V | > 10 V ... U_P » set speed value not defined	
	input resistance	R_{in} ≥ 8,9 kΩ	
	set speed value	per 1 V , 1 000	min^{-1}
		U_{in} < 0,15 V » motor stops	
		U_{in} > 0,3 V » motor starts	
Connection 5 "DIR":			
– digital input	direction of rotation	to ground or level < 0,5 V » counterclockwise	
		open or level > 3 V » clockwise	
	input resistance	R_{in} ≥ 10 kΩ	
Connection 6 "FG":		max. U_P; I_{max} = 15 mA; open collector with 22 kΩ pull-up resistor	
– digital output	frequency output	6 lines per revolution	

Features

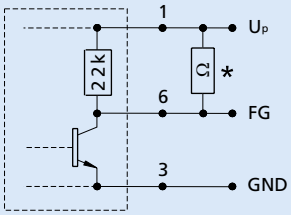
In this variant, the brushless DC servomotors have an integrated Speed Controller. The motor is commutated using Hall sensors integrated into the motor. Speed control is via a PI regulator.

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.

Using the **"FAULHABER Motion Manager"** software, the customer can modify the Speed Controller to special conditions of use. The following parameters can be changed: current limit and regulator parameters.

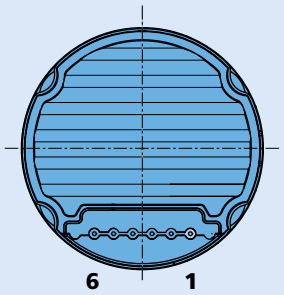
Circuit diagram / Connection information

Output circuit



* An additional external pull-up resistor can be added to improve the rise time.
Caution: I_{OUT} max. 15 mA must not be exceeded!

Cable connection



Connection

No.	Function
1	U_P
2	U_{mot}
3	GND
4	U_{nsoll}
5	DIR
6	FG

Caution:
Incorrect lead connection will damage the motor electronics!

Options

- Connector variant (Option no.: 3809)
  AWG 24 / PVC ribbon cable
  with connector Micro-Fit
- Analog Hall sensors (Option no.: 3692)

Accessories

- Programming board (Part No.: 6501.00088)

Full product description

- Example:
  3268G024BX4 SC

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	Ω
3	Output power [1]	$P_{2\ max.}$		32,7	W
4	Efficiency	$\eta_{max.}$		79,5	%
5	No-load speed	n_o		5 300	min^{-1}
6	No-load current	I_o		0,210	A
7	Stall torque	M_H		137	mNm
8	Friction torque, static	C_o		1,7	mNm
9	Friction torque, dynamic	C_v		$1,3 \cdot 10^{-3}$	mNm/min^{-1}
10	Speed constant	k_n		220	min^{-1}/V
11	Back-EMF constant	k_E		4,555	mV/min^{-1}
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	min^{-1}/mNm
15	Terminal inductance, phase-phase	L		110	µH
16	Mechanical time constant	τ_m		4,6	ms
17	Rotor inertia	J		60	gcm^2
18	Angular acceleration	$\alpha_{max.}$		23	$\cdot 10^3 rad/s^2$
19	Thermal resistance	R_{th1} / R_{th2}	1,9 / 9,6		K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	17 / 1 060		s
21	Operating temperature range		– 40 ... +85		°C
22	Shaft bearings		ball bearings, preloaded		
23	Shaft load max.:				
	– radial at 3 000 min^{-1} (4,5 mm from mounting flange)		50		N
	– axial at 3 000 min^{-1}		5		N
	– axial at standstill		50		N
24	Shaft play:				
	– radial	≤	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		
Recommended values - mathematically independent of each other					
29	Speed up to	$n_{e\ max.}$		6 500	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$		37 / 58	mNm
31	Current up to [1] [2]	$I_{e\ max.}$		1,11 / 1,60	A

[1] at 5000 min^{-1}
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

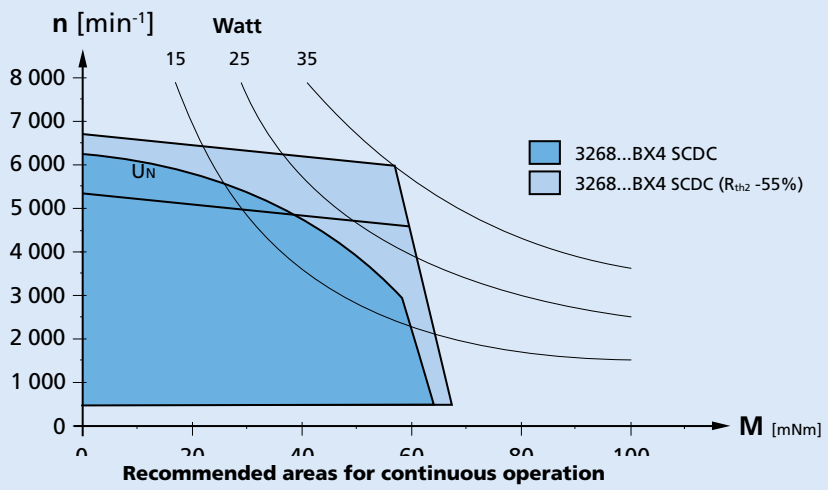
Note:

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 ($R_{th\ 2}$ 55% reduced).

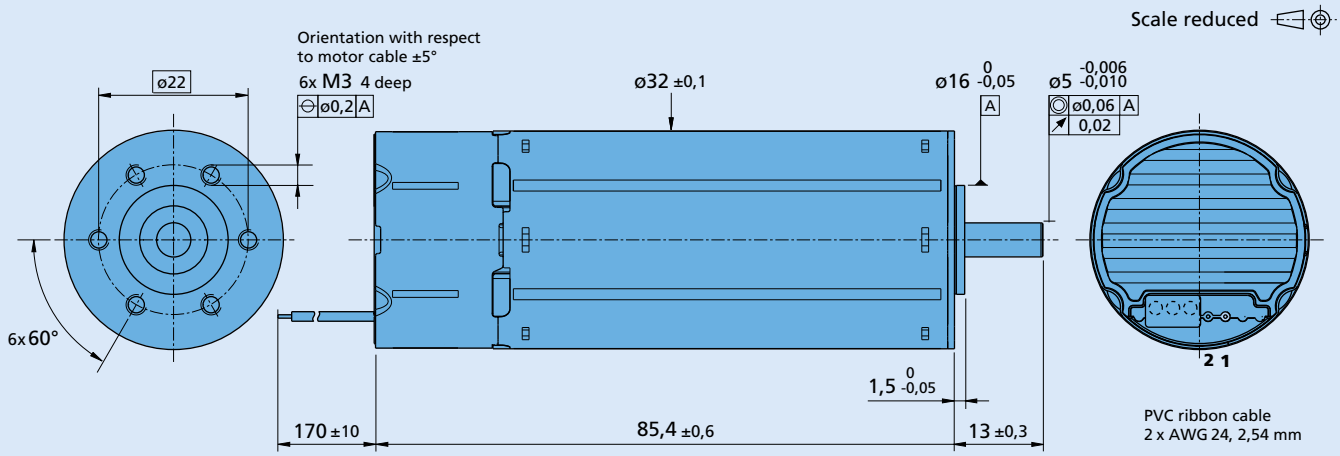
The motor is factory pre-configured to perform at the recommended continuous current. Non-standard configurations are only possible upon request from the manufacturer.

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.



For notes on technical data and lifetime performance refer to "Technical Information".

Dimensional drawing



3268 G ... BX4 SCDC

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	η	95	%
Max. continuous output current [1]	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 [2]	min^{-1}
Scanning rate		500	µs

[1] at 22°C ambient temperature and max. 60°C motor temperature at the nominal voltage of motor and electronics
[2] 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

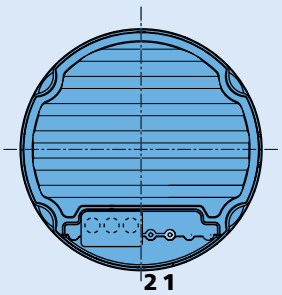
- Examples:
  3268G024BX4 SCDC

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 –

Brushless Flat DC-Micromotors 3,7 mNm

with integrated Speed Controller

Series 2610 ... B SC

		2610 T		006 B	012 B	SC
1	Nominal voltage	U_N		6	12	Volt
2	Terminal resistance, phase-phase	R		7,0	28,2	Ω
3	Output power [1]	$P_{2\ max.}$		1,92	1,91	W
4	Efficiency	$\eta_{max.}$		78	78	%
5	No-load speed	n_o		6 200	6 200	min^{-1}
6	No-load current	I_o		0,012	0,006	A
7	Stall torque	M_H		7,73	7,68	mNm
8	Friction torque, static	C_o		0,025	0,025	mNm
9	Friction torque, dynamic	C_v		$1,35 \cdot 10^{-5}$	$1,35 \cdot 10^{-5}$	mNm/min^{-1}
10	Speed constant	k_n		1 055	528	min^{-1}/V
11	Back-EMF constant	k_E		0,948	1,895	mV/min^{-1}
12	Torque constant	k_M		9,05	18,1	mNm/A
13	Current constant	k_I		0,111	0,055	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$		816	822	min^{-1}/mNm
15	Terminal inductance, phase-phase	L		480	1 940	µH
16	Mechanical time constant	τ_m		69	70	ms
17	Rotor inertia	J		8,1	8,1	gcm^2
18	Angular acceleration	$\alpha_{max.}$		9,5	9,5	$\cdot 10^3 rad/s^2$
19	Thermal resistance	R_{th1} / R_{th2}	33 / 27			K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	20 / 230			s
21	Operating temperature range		-25 ... +80			°C
22	Shaft bearings		ball bearing, preloaded			
23	Shaft load max.:					
	– radial at 3 000/7 000 min^{-1} (3 mm from mounting flange)		4,0 / 3,5			N
	– axial at 3 000/7 000 min^{-1} (push-on only)		3,5 / 3,4			N
	– axial at standstill (push-on only)		17,5			N
24	Shaft play:					
	– radial	≤	0,015			mm
	– axial	=	0			mm
25	Housing material		plastic			
26	Weight		20,1			g
27	Direction of rotation		electronically reversible			
28	Number of pole pairs		2			
Recommended values - mathematically independent of each other						
29	Speed up to	$n_{e\ max.}$		7 000	7 000	min^{-1}
30	Torque up to [1] [2]	$M_{e\ max.}$		3,14 / 3,72	3,13 / 3,70	mNm
31	Current up to [1] [2]	$I_{e\ max.}$		0,40 / 0,47	0,20 / 0,24	A

[1] at 5 000 min^{-1}

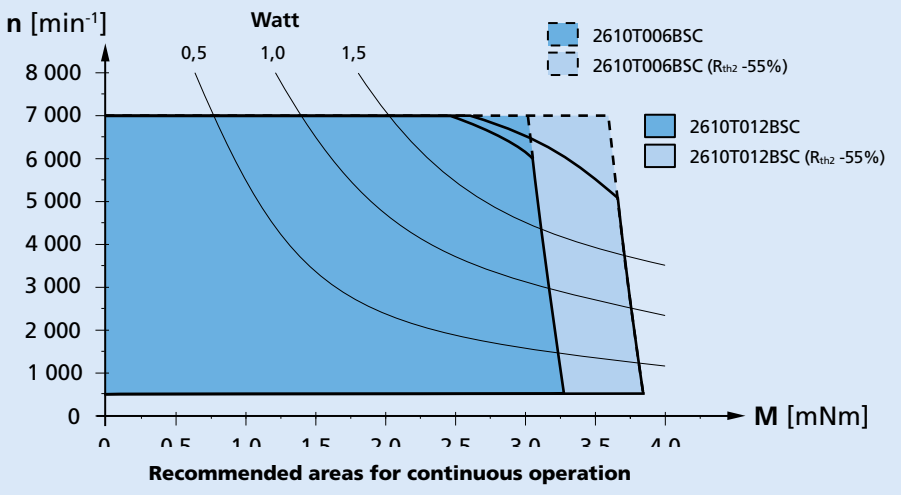
[2] thermal resistance R_{th2} not reduced / thermal resistance R_{th2} by 55% reduced

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 ($R_{th\,2}$ 55% reduced).

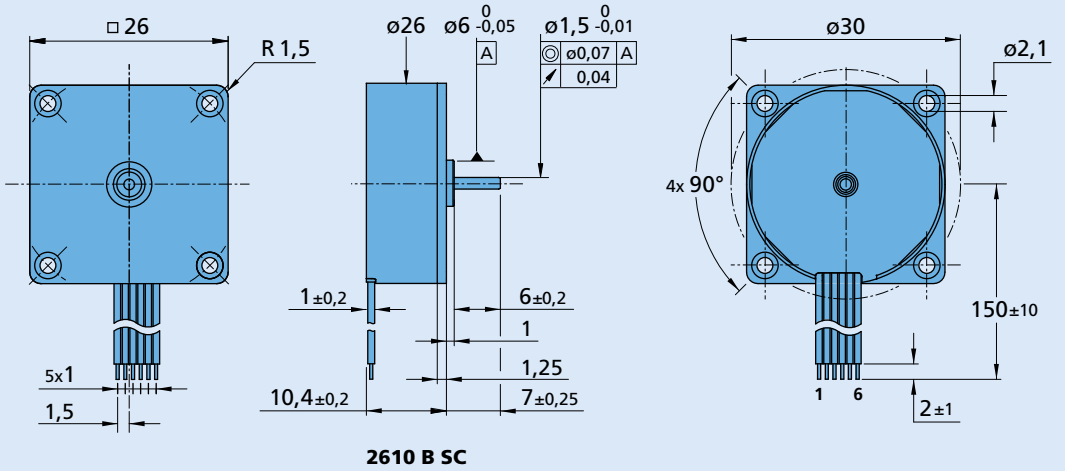
The area of the curve is defined by the maximum allowable supply voltage of the integrated speed controller as well as the control performance characteristics.



For notes on technical data and lifetime performance refer to "Technical Information".

Edition 2016

2610 T ... B SC



2610 B SC

Cable
Jacket Material: PVC
8 conductors, AWG 28
grid 1,0 mm
wires tinned

Note:
Hallsensors digital

Connection

No.	Function
1	U_P
2	U_{mot}
3	GND
4	U_{nsoll}
5	DIR
6	FG

Speed Controller			
PWM switching frequency	f_{PWM}	96	kHz
Efficiency	η	95	%
Max. continuous output current [1]	I_{dauer}	0,8	A
Max. peak output current	I_{max}	1,6	A
Total standby current	I_{el}	0,020	A
Speed range:			
– standard » Hall sensors (digital)		500 ... 60 000 [2]	min^{-1}
Scanning range		500	µs

[1] at 22°C ambient temperature and max. 60°C motor temperature respectively
[2] speed depend on motor operating voltage

Connection information		
Connection 1 "U_P":	power supply electronic	U_P = 4 ... 18 V
Connection 2 "U_{mot}":	power supply electronic coil	U_{mot} = 1,7 ... 18 V
Connection 3 "GND":	ground	ground
Connection 4 "U_{nsoll}":		
– analog input	input voltage	U_{in} = 0 ... 10 V (max. Up)
	input resistance	R_{in} ≥ 8 kΩ
	set speed value	per 1 V » 1 000 min^{-1}
		U_{in} < 0,15 V » motor stops
		U_{in} > 0,3 V » motor starts
Connection 5 "DIR":		
– digital input	direction of rotation	to ground or level < 0,5 V » counterclockwise
		open or level > 3 V » clockwise (max. Up)
	input resistance	R_{in} ≥ 10 kΩ
Connection 6 "FG":		with max. U_P » I_{max} = 15 mA; open collector with 22 kΩ pull-up resistor
– digital output	frequency output	6 lines per revolution

Features

In this variant, the brushless DC-Micromotors have an integrated Speed Controller. The motor is commutated using Hall sensors integrated into the motor. 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.

Using the **"FAULHABER Motion Manager"** software, the customer can modify the Speed Controller to special conditions of use.

The following parameters can be changed: current limit and regulator parameters.

Full product description

- Examples:
  2610T006B SC
  2610T012B SC

Option

- connector variants
  (Option no. 4257)
  AWG 28 / PVC ribbon cable with connector Picoblade