

STARK

ELEKTROMOTOREN

Gegründet in der Schweiz  Founded in Switzerland

Variable Frequency Drives

We design to align

Powered by
rexroth
A Bosch Company

STARK
ELEKTROMOTOREN



BOSCH REXROTH VFD CATALOGUE
BOSCH REXROTH VFD CATALOGUE



ABC GROUP

Variable Frequency Drives and ABC Group

ABC Group is an innovation network of European partners that offers high quality industrial drive systems and components.

By joining forces, ABC Group makes the way larger enterprises work available to smaller companies. Central to this is international excellence, networks and growth. ABC Group is further characterized by:

- ✓ High quality in production, sales, service and maintenance
- ✓ Smart and cost efficient logistics organization
- ✓ Large EU stock with short delivery times thanks to the extensive European distribution network
- ✓ Very favorable price-to-quality ratio for all STARK forced ventilation types
- ✓ R&D, testing, prototyping and integration in drive systems
- ✓ Knowledge sharing and exchange of strategic information between all partners
- ✓ Customer-specific forced ventilation and drive solutions

Mission	Vision	Values
Our mission is to be competitive as a chain of drive partners.	Our vision is to create a fairer playing field in the industry. By allowing smaller players to have the same strength and capabilities as the larger companies, we want to increase the competitiveness of the smaller firms.	<ul style="list-style-type: none"> • Enterprising and transparent cooperation • Sharing = multiplying: share costs, risks, knowledge and strategic information to be more efficient and profitable • Innovating development and production

STARK ELEKTROMOTOREN

Gemeinsam sind wir STARK
Together we are strong



EU ENGINEERING

STARK = SYNERGY

STARK Forced Ventilation + STARK Electric Motor + Frequency Inverter = Compact, Reliable & Powerful



Forced ventilation is also used when the speed of the motor is controlled by a frequency inverter. Combining STARK forced ventilation with a STARK electric motor and a Bosch Rexroth variable frequency drive (VFD) results in optimal performance.

The characteristics of a STARK external cooling fan are aligned with the electric motor and VFD. While the VFD adjusts the motor flux at low speeds, forced ventilation ensures adequate cooling to lower the temperature of the motor. The outcome is optimal performance and cooling at low speeds to produce full torque while minimising motor losses and failure.

Benefits of this Drive System:

- ✓ Designed to synergize
- ✓ Available from stock
- ✓ Ultra-compact drive system
- ✓ Always compatible because of extensive testing
- ✓ EU-engineered components
- ✓ Advice and technical support in your own language
- ✓ One single point of contact

Frequency converters

With EFC3610 and EFC5610, Bosch Rexroth offers you two particularly economical and efficient frequency converter series for the realization of your application – from engineering to daily operation. Both series convince with intelligent features such as expansion options through different I/O and fieldbus modules, user panel with parameter copy function or standardized communication interfaces. They cover a power range from 0.4 kW to 160 kW. This allows you to quickly respond to the urgent requirements of innovative markets and to handle energy responsibly.

- ▶ **Shortest engineering times**
- ▶ **Simple installation with minimized wiring costs**
- ▶ **Flexible communication thanks to multi-protocol interfaces**
- ▶ **Certified safety technology Safe Torque Off**
- ▶ **Application-specific firmware functions**



- ▶ **Frequency converters EFC3610**
V/f control, easy installation and commissioning as well as an increased power range enable a wide range of applications.



- ▶ **Frequency converters EFC5610**
In addition to the V/f control, the EFC5610 offers the control types SVC and FOC. Easy installation and fast commissioning as well as a large power range enable a broad area of application.

Frequency converters

EFC3610



EFC3610 are universal and low-cost frequency converters for reliable speed control and demand-oriented energy supply. V/f control, easy installation and commissioning as well as an increased power range enable a wide range of applications.

- ▶ **Power range: 0.4 ... 22 kW**
- ▶ **Built-in brake chopper and net filter**
- ▶ **Control technology: V/f**
- ▶ **Operation of asynchronous motors**
- ▶ **Expansion option thanks to I/O and fieldbus modules**
- ▶ **Use in HD mode (heavy duty) and ND mode (normal duty)**
- ▶ **Integrated operator panel for quick and easy commissioning**
- ▶ **Degree of protection: IP20**

Type code

EFC3610-0K40-1P2-M D A-7P-NNNN-NNN

Motor control

EFC3610 = V/f control

Continuous power

E.g. 0K40 = 0.4 kW

Power supply

1P2 = 1 x AC 200 ... 240 V

3P4 = 3 x AC 380 ... 480 V

Fieldbus interface

M = Modbus RTU

Version

NN = Without

Display

NN = Without (dust cover)

7P = 7-segment LED display

Degree of protection

A = IP20

EMC protection category

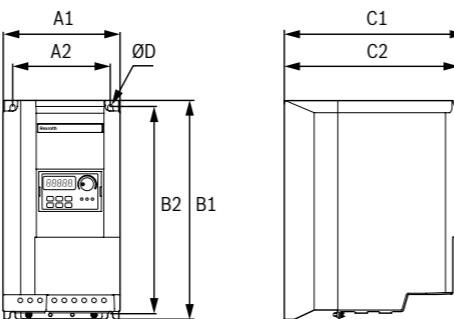
D = Class C3 – industrial environment

Functions

Type	EFC3610		
Closed-loop control	V/f		
Switching frequency (PWM)	Configurable in 1 kHz steps	kHz	1 ... 15
Start-up torque	At 1.5 Hz (V/f) max.	%	100
	At 3 Hz (V/f) max.	%	150
Frequency resolution	Analog		1/1 000 of the maximum output frequency
	Digital	Hz	0.01
Frequency setting accuracy	Analog	%	±0.1
	Digital	%	±0.01
V/f curve			
Ramps	For acceleration and braking		
DC brake	Activation frequency Braking time	Hz s	0 ... 50 0 ... 10
Automatic PWM frequency adjustment			Load-dependent adaptation of the PWM frequency
Integrated control			Integrated step-by-step switch
Controller			PID
Bus systems	Internal External		Modbus PROFIBUS CANopen Sercos EtherCAT (CANopen profile, CoE) Modbus TCP PROFINET EtherNet/IP
Number of digital inputs	24 V DC (of which 1 x pulse train 50 kHz)		5
Number of digital outputs	24 V DC, 50 mA (pulse train 32 kHz)		1
Number of relay outputs	230 V AC, 30 V DC, 3 A		1
Number of analog inputs	0 ... 10 V or 0 ... 20 mA		2
Number of analog outputs	0 ... 10 V or 0 ... 20 mA		1
Status messages via digital outputs			E.g. operation, command value reached (additional parameters, see technical documentation)
Display	Standard		LED, 5-digit Dust protection cover
	Option		Dust cover with 5 diagnostic LEDs LCD
Status LED			Rotational direction, operating state

Available options and technical specifications: see product documentation (project planning instructions in the media directory: www.boschrexroth.com/mediadirectory)

EFC3610



Power data 1				Dimensions								
Type	Heavy duty operation		Normal duty operation		A1	A2	B1	B2	C1	C2	ØD	Mass
	Rated power	Continuous rated current	Nominal power	Continuous rated current								
	P _{rated}	I _{rated}	P _{rated}	I _{rated}								
	kW	A	kW	A	mm	kg						
EFC3610-0K40-1P2	0.40	2.4	—	—	95	66	166	156	167	159	4.5	1.5
EFC3610-0K75-1P2	0.75	4.1	—	—	95	66	166	156	167	159	4.5	1.5
EFC3610-1K50-1P2	1.50	7.3	—	—	95	66	206	196	170	162	4.5	1.9
EFC3610-2K20-1P2	2.20	10.1	—	—	120	80	231	221	175	167	4.5	2.6
EFC3610-0K40-3P4	0.40	1.3	—	—	95	66	166	156	167	159	4.5	1.5
EFC3610-0K75-3P4	0.75	2.3	—	—	95	66	166	156	167	159	4.5	1.5
EFC3610-1K50-3P4	1.50	4.0	—	—	95	66	206	196	170	162	4.5	1.9
EFC3610-2K20-3P4	2.20	5.6	—	—	95	66	206	196	170	162	4.5	1.9
EFC3610-3K00-3P4	3.00	7.4	—	—	120	80	231	221	175	167	4.5	2.6
EFC3610-4K00-3P4	4.00	9.7	—	—	120	80	231	221	175	167	4.5	2.6
EFC3610-5K50-3P4	5.50	12.7	7.5	16.8	130	106	243	228	233	225	6.5	3.9
EFC3610-7K50-3P4	7.50	16.8	11.0	24.3	130	106	243	228	233	225	6.5	4.3
EFC3610-11K0-3P4	11.00	24.3	15.0	32.4	150	125	283	265	233	225	6.5	5.7
EFC3610-15K0-3P4	15.00	32.4	18.5	39.2	150	125	283	265	233	225	6.5	6.4
EFC3610-18K5-3P4	18.00	39.2	22.0	45.0	165	140	315	300	243	233	6.5	8.0
EFC3610-22K0-3P4	22.00	45.0	30.0	60.8	165	140	315	300	241	233	6.5	8.5

Power data 2		EFC3610-0K40-1P2	EFC3610-0K40-3P4	EFC3610-5K50-3P4
Type	... EFC3610-2K20-1P2	... EFC3610-4K00-3P4	... EFC3610-22K0-3P4	
Connection data				
Power supply voltage (U _{mains})	1 x AC 3 x AC	V AC V AC	200 ... 240 —	— —
Tolerance of the power supply voltage		%	±10 —	-15 ... +10 380 ... 480
Mains frequency (f _{mains})		Hz	50 ... 60	50 ... 60 50 ... 60
Tolerance of the mains frequency		%	±5	±5 ±5
Output voltage	3 x AC	V AC	0 ... U _{mains}	0 ... U _{mains} 0 ... U _{mains}
Output frequency		Hz	0 ... 400	0 ... 400 0 ... 400
Overload capacity of the continuous rated current (I _{rated})	1 s (heavy duty operation) 1 min (heavy duty operation) 1 min (normal duty operation)	%	200 150 —	200 150 120
Brake chopper/resistor				
Brake chopper	Internal		Yes	Yes Yes
Braking resistor	External		Yes	Yes Yes
Motor cable length (EN 61800-3 C3)	Internal/external	m	15/30	15/30 30/50
Ambient conditions				
Permitted ambient temperature (T)	Without derating	°C	-10 ... +45	-10 ... +45 -10 ... +45
Reduction in output power	For operating height from 1 000 m above sea level		1 % per 100 m	1 % per 100 m 1 % per 100 m
Relative humidity	No condensation	%	< 90	< 90 < 90
Degree of protection			IP20	IP20 IP20

Frequency converters

EFC5610



The EFC5610 enables a wide range of applications thanks to V/f control, SVC and FOC control, easy installation and commissioning and a wide power range. Demand-oriented energy supply – universal, reliable and cost-effective at any time with this frequency converter.

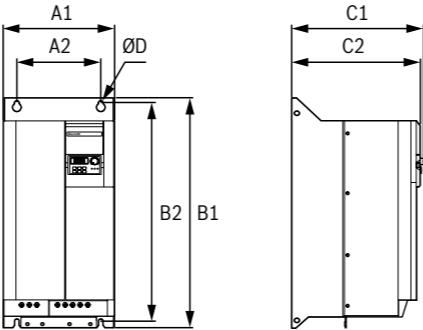
- ▶ **Power range: 0.4 ... 160 kW**
- ▶ **Built-in brake chopper (up to 22 kW) and net filter**
- ▶ **Control technology: V/f, SVC, FOC**
- ▶ **Safety technology: Safe Torque Off (STO)**
- ▶ **Expansion option thanks to I/O and fieldbus modules**
- ▶ **Operation of asynchronous and synchronous motors**
- ▶ **Use in HD mode (heavy duty) and ND mode (normal duty)**
- ▶ **Integrated operator panel for quick and easy commissioning**
- ▶ **Degree of protection: IP20**

Type code	
EFC5610-0K40-1P2-M D A-7P-NNNN-L1NN	
Motor control	
EFC5610	= V/f, SVC and FOC control
Continuous power	
E.g. 0K40 = 0.4 kW	
Power supply	
1P2	= 1 x AC 200 ... 240 V
3P4	= 3 x AC 380 ... 480 V
Fieldbus interface	
M	= Modbus RTU
Display	
NN	= Without (dust cover)
7P	= 7-segment LED display
Degree of protection	
A	= IP20
B	= IP20 Cold Plate
EMC protection category	
D	= Class C3 – industrial environment

Available options and technical specifications: see product documentation (project planning instructions in the media directory: www.boschrexroth.com/mediadirectory)

Functions	
Type	EFC5610
Closed-loop control	V/f
	SVC (sensorless vector control)
	FOC (field-oriented control)
Switching frequency (PWM)	Configurable in 1 kHz steps
	kHz
Start-up torque	At 1.5 Hz (V/f) max.
	%
	At 3 Hz (V/f) max.
	%
	At 0.5 Hz (SVC) max.
	%
	At 0 Hz (FOC) max.
	%
Frequency resolution	Analog
	Digital
Frequency setting accuracy	Analog
	Digital
V/f curve	Freely definable
	Linear
	Square
Ramps	For acceleration and braking
DC brake	Activation frequency
	Hz
	Braking time
	s
Automatic PWM frequency adjustment	
Integrated control	
Controller	PID
Bus systems	Modbus
	PROFIBUS
	CANopen
	Sercos
	EtherCAT (CANopen profile, CoE)
	Modbus TCP
	PROFINET
	EtherNet/IP
Number of digital inputs	24 V DC (of which 1x pulse train 50 kHz)
Number of digital outputs	24 V DC, 50 mA (pulse train 32 kHz)
Number of relay outputs	230 V AC, 30 V DC, 3 A
Number of analog inputs	0 ... 10 V or 0 ... 20 mA
Number of analog outputs	0 ... 10 V or 0 ... 20 mA
Status messages via digital outputs	E.g. operation, command value reached (additional parameters, see technical documentation)
Display	Standard
	LED, 5-digit
	Dust protection cover
Option	Dust cover with 5 diagnostic LEDs
	LCD
Status LED	Rotational direction, operating state
Safety technology	Option
	Safe Torque Off (STO, SIL 3 PL e)

EFC5610



Power data 1					Dimensions							
Type	Heavy duty operation		Normal duty operation		A1	A2	B1	B2	C1	C2	ØD	Mass
	Rated power	Continuous rated current	Nominal power	Continuous rated current								
	P _{rated}	I _{rated}	P _{rated}	I _{rated}								
	kW	A	kW	A	mm	mm	mm	mm	mm	mm	mm	kg
EFC5610-0K40-1P2	0.40	2.4	—	—	95	66	166	156	167	159	4.5	1.5
EFC5610-0K75-1P2	0.75	4.1	—	—	95	66	166	156	167	159	4.5	1.5
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EFC5610-4K00-3P2	4.00	17.5	—	—	130	106	243	228	233	225	6.5	4.3
EFC5610-5K50-3P2	5.50	23.4	—	—	150	125	283	265	233	225	6.5	5.7
EFC5610-7K50-3P2	7.50	31.1	—	—	150	125	283	265	233	225	6.5	6.4
EFC5610-11K0-3P2	11.00	44.9	—	—	165	140	315	300	241	233	6.5	8.5
EFC5610-0K40-3P4	0.40	1.3	—	—	95	66	166	156	167	159	4.5	1.5
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EFC5610-22K0-3P4	22.00	45.0	30.0	60.8	165	140	315	300	241	233	6.5	8.5
EFC5610-30K0-3P4	30.00	60.8	37.0	73.7	250	200	510	492	272	264	7.0	27.5
EFC5610-37K0-3P4	37.00	73.7	45.0	89.1	250	200	510	492	272	264	7.0	29.5
EFC5610-45K0-3P4	45.00	89.0	55.0	108.0	265	200	585	555	325	317	11.0	39.0
EFC5610-55K0-3P4	55.00	108.0	75.0	147.0	265	200	585	555	325	317	11.0	42.0
EFC5610-75K0-3P4	75.00	147.0	90.0	176.0	325	200	760	727	342	334	11.0	54.0
EFC5610-90K0-3P4	90.00	176.0	110.0	212.0	325	200	760	727	342	334	11.0	61.0
EFC5610-110K-3P4	110.00	212.0	132.0	253.0	385	250	923	893	350	342	11.0	71.7
EFC5610-132K-3P4	132.00	253.0	160.0	303.0	385	250	923	893	350	342	11.0	76.6
EFC5610-160K-3P4	160.00	303.0	200.0	380.0	480	400	1 030	995	360	352	13.0	108.0

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