

# EFC 3600 – Frequency converter for higher energy efficiency and improved process control





## Valuable energy used responsibly

Rising energy costs and increasing demands on the environmentally sound products pose major challenges to industry and in particular to mechanical engineers. End-users demand energy-efficient machines and equipment in order to significantly reduce operating costs and CO<sub>2</sub> emissions – this is particularly true in the field of drive technology. In this area, Rexroth EFC 3600 frequency converter offers economical and easy to use solutions for various applications in which valuable energy is to be used responsibly.

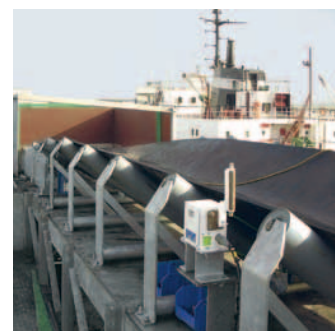
Majority of the consumed electric energy in the industry is still used by electric motors. Only a small proportion of the installed motors however operate with variable speed drives, although this would lead to substantially lower energy consumption and thus would lead to significant cost reductions. Moreover, modern, speed-regulated drives stand for improved process control, lower wear and a more slim facilities design.

Rexroth EFC 3600 frequency converters to control the speed contribute greatly to the energy savings required by your customers and also energy conservations mandated by law. They also contribute indirectly to lowering CO<sub>2</sub> emissions. Furthermore, the EFC 3600 satisfies all engineering and usability requirements. Intelligent features, low cost and effort required for installation and a high level of serviceability makes the Rexroth technology an attractive option.



#### **EFC 3600 – The energy-efficient solution for nearly all sectors:**

- ▶ Building-material machines
- ▶ Building technology
- ▶ Environmental and process engineering
- ▶ Food and beverage manufacturing
- ▶ General automation
- ▶ Logistics
- ▶ Machine tools
- ▶ Packaging machines
- ▶ Paper manufacturing and processing
- ▶ Plastics manufacturing and processing machines
- ▶ Textile machines
- ▶ Wood working and processing machines



#### **EFC 3600 – Applications:**

- ▶ **Materials handling equipment:**  
assembly lines, roller tables
- ▶ **Process engineering:**  
mixers, agitators, centrifuges
- ▶ **Pumps, compressors**
- ▶ **Ventilators, fans**

# Perfect integration in various applications

Straightforward assembly, easy installation and usability: EFC 3600 frequency converters meet your engineering needs and the desires of your customers regarding optimum usability both as a whole and right down to the smallest detail. Its universal appeal as an intelligent, cost-effective and compact solution comes from its ability to be used in the widest variety of applications, for example, in pumps, compressors, fans, materials handling equipment, packaging machines and much more.



◀ **The terminal side:  
plug-in terminal for  
peripherals**

## **EFC 3600 – Benefits at a glance**

- ▶ Significant energy savings and longer motor service life through a freely definable V/f characteristic, allowing load-dependent adjustment of the voltage-to-frequency characteristic
- ▶ Stepless adjustable pulse frequency provides maximum energy efficiency and minimized motor noise
- ▶ Savings are made on external components thanks to the integrated brake chopper and mains filter
- ▶ Additional peripheral devices are no longer required thanks to the integrated control panel for quick and easy start-up
- ▶ Easy installation thanks to pluggable I/O terminals

### Electrical properties

- ▶ 1 AC (220 V, 0.4 - 2.2 kW), 3 AC (400 V, 0.4 - 4 kW)
- ▶ High overload capacity: 150 % for 60 s, 200 % for 1 s
- ▶ High initial torque: 100 % at 1.5 Hz, 150 % at 3 Hz
- ▶ 50° C ambient temperature without derating
- ▶ Integrated brake chopper
- ▶ Integrated mains filter (EN 61800-3 C3)
- ▶ Overvoltage protection
- ▶ Motor temperature monitoring (NTC, PTC)

### Mechanical properties

- ▶ Can be installed side-by-side to save space
- ▶ Circuit boards are coated to protect them against dirt and damage
- ▶ Pluggable I/O terminals

### Intelligent features

- ▶ Simple program structure and parameter input
- ▶ Harmonized parameters across the entire series
- ▶ Removable control panel with copy function for quick transfer of parameters
- ▶ Clearly displayed 4-digit 7-segment LED indicator
- ▶ Potentiometer to set speed setpoint
- ▶ Fan can be replaced without tools (devices up to 0.75 kW do not have a fan)
- ▶ Integrated PID controller
- ▶ Integrated sequence control system (8 steps)
- ▶ Integrated counter function
- ▶ Digital inputs and outputs
- ▶ Analogue inputs and outputs
- ▶ Modbus or PROFIBUS interface

### Perfect service

- ▶ Long-term availability of components
- ▶ Fans can be replaced without tools
- ▶ Quick and easy replacement of the device
- ▶ Quick worldwide delivery of spare parts
- ▶ Worldwide repair and on-site servicing



- ▲ Removable control panel with memory function for quick transfer of parameters

# Optimum handling "easy to use"

Rexroth technology is designed for easy installation and usability. The integrated control panel includes all what is needed for fast commissioning and simple operation of an EFC 3600. Commissioning is really easy without a PC or another programming device. The copy function of the control panel can be used for configuration of multiple inverters with the same or similar parameters.



Simple and user-friendly: All parameter values are input using the robust buttons. The 4-digit LED display shows you all the parameters in a clearly arranged manner. The documentation guides you step by step through the setting of parameters and explains the menu structure. The copying function of the removable control panel saves you time when setting parameters for several frequency converters or when replacing a device.

## The control panel: inputs, functions and indicators

- 7-segment LED indicator**
  - ▶ Output frequency
  - ▶ Parameter values
  - ▶ Error codes
- Status LED**
  - ▶ FWD: Motor rotating forwards
  - ▶ REV: Motor rotates in reverse
  - ▶ Run: Operating mode
- Function button**
  - ▶ Next higher menu level
- Run button**
  - ▶ For starting the frequency converter
- Potentiometer**
  - ▶ For specifying speed setpoint
- Arrow buttons**
  - ▶ For selecting parameter values
  - ▶ For changing parameter values
- Stop button**
  - ▶ For stopping the frequency converter
  - ▶ Fault reset
- Set button**
  - ▶ For confirming input values

# EFC 3600

## Functions and technical data

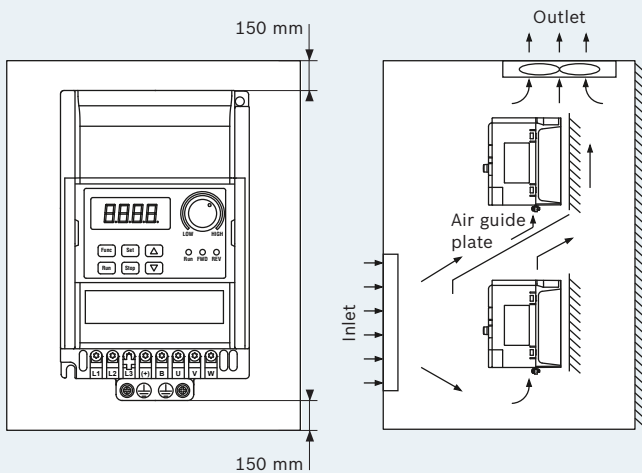
Function	
Control Mode	V/f
Speed regulation range	1 : 50
Start-up torque	100 % at 1.5 Hz; 150 % at 3 Hz
Pulse width modulation (PWM)	1 to 15 kHz, continuously adjustable in 1 kHz steps
Brake chopper	Integrated standard brake chopper
Frequency resolution	Digital: 0.01 Hz Analog: maximum frequency x 0.1 %
V/f characteristic curve	Freely definable
Ramps	Linear, S-curve
Automatic PWM frequency adaptation	Load-dependent adaptation of PWM frequency
Status message via multi-function output signal	In/above/below frequency range, operation, etc.
Bus systems	Modbus, PROFIBUS (Option)

Technical data										
Typ		0k40- 1P2-MDA-7P	0k75- 1P2-MDA-7P	1k50- 1P2-MDA-7P	2k20- 1P2-MDA-7P	0k40- 3P4-MDA-7P	0k75- 3P4-MDA-7P	1k50- 3P4-MDA-7P	2k20- 3P4-MDA-7P	4k00- 3P4-MDA-7P
<b>Performance data</b>										
Power supply voltage	V	1 AC 200 to 240 V (-10%/+10 %)				3 AC 380 to 480 V (-15%/+10 %)				
Supply frequency	Hz	50 to 60 (±5 %)								
Rated motor output	kW	0.4	0.75	1.5	2.2	0.4	0.75	1.5	2.2	4
Continuous rated current	A	2.3	3.9	7.0	9.7	1.2	2.1	3.7	5.1	8.8
Output voltage	V	0 V to power supply voltage								
Output frequency	Hz	0 to 400								
Overload capacity		200 % for 1 s, each 20 s or 150 % for 60 s, each 10 min								
<b>Brake</b>										
Brake chopper		Internal								
Brake resistor		External								
<b>Motor cable length</b>										
Int. mains filter C3	m	15								
Int. mains filter C4	m	30								
<b>Mechanical data</b>										
Size		A	B	C	D	B	B	C	D	D
Width A	mm	90	95	95	120	95	95	95	120	120
Height B	mm	135	145	185	210	145	145	185	210	210
Depth C	mm	105	120	125	130	120	120	125	130	130
Mass	kg	0.96	1.24	1.61	2.35	1.18	1.26	1.52	2.25	2.36
<b>Ambient conditions</b>										
Ambient temperature		-10 to +50 °C without derating								
Max. installation height		1,000 m (max. 4,000 m over sea level with 20 % derating)								
Relative humidity		< 90 %								
Degrees of protection		IP20								

# EFC 3600

## Installation space and dimensional drawings

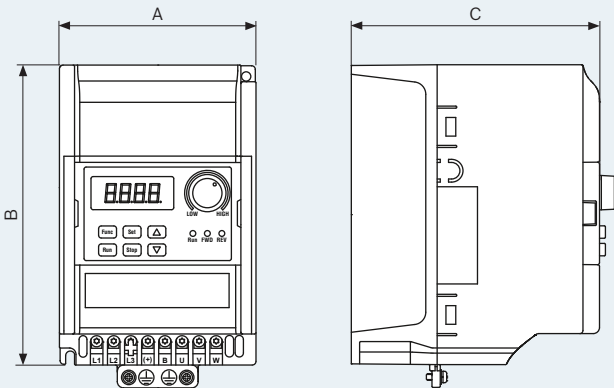
### Installation situation



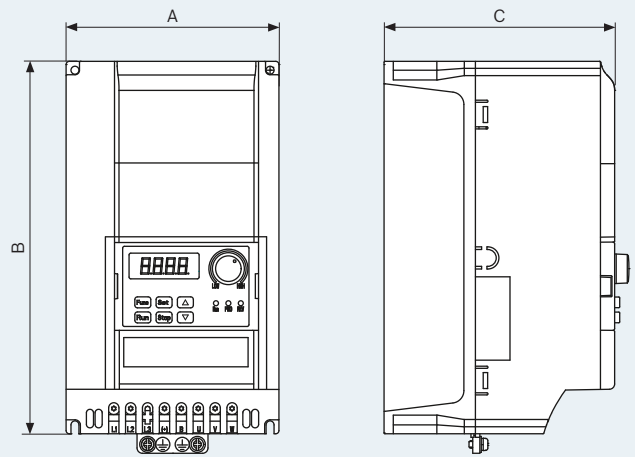
### The perfect installation

EFC 3600 frequency converters do not have ventilation openings, which makes it possible to install several devices next to each other with no gap between them. This saves control cabinet space and simplifies cooling.

### Size A, B, C



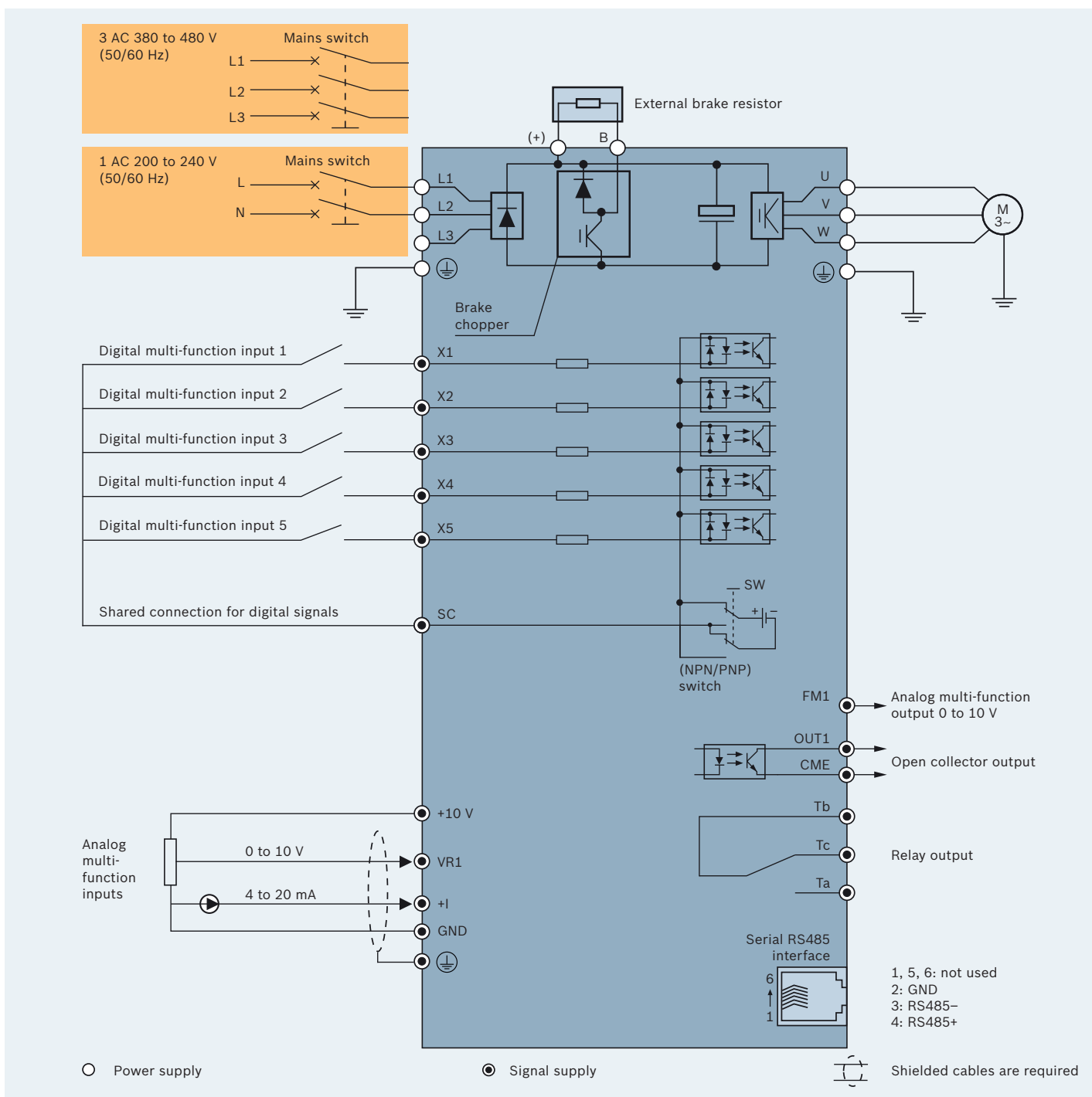
### Size D





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## Block diagram



**Bosch Rexroth AG**

P.O. Box 13 57  
97803 Lohr, Germany  
Bgm.-Dr.-Nebel-Str. 2  
97816 Lohr, Germany  
Phone + 49 9352-18-0  
Fax + 49 9352-18-8400  
[www.boschrexroth.com](http://www.boschrexroth.com)

**Find your local contact person here:**

[www.boschrexroth.com/contact](http://www.boschrexroth.com/contact)

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