BONFIGLIOLI VECTRON

Operating Instructions

ACTIVE

230V single-three phase (2 sizes)
0.55 kW - 0.75 kW - 1.1 kW
1.5 kW - 2.2 kW - 3.0 kW

400V three phase (4 sizes)
0.55 kW - 0.75 kW - 1.1 kW
1.5 kW - 2.2 kW - 3.0 kW
4.0 kW - 5.5 kW - 7.5 kW
11.0 kW - 15.0 kW - 18.5 kW

BONFIGLIOLI
Power & Control Solutions

CE UL cUL C* N3878

MANUFACTORY FACILITIES

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General points on the documentation

The present documentation applies to the frequency inverters in the output range from 0.55 kW to 18.5 kW. The entire series of devices is suited for a wide range of applications in the configuration set in the factory. The modular hardware and software structure enables customer-specific adaptation of the frequency inverters. Applications demanding high functionality and dynamism are easy to implement.

For better clarity, the user documentation is structured according to the customer-specific demands made of the frequency inverter.

Brief instructions
The brief instructions describe the fundamental steps for mechanical and electrical installation of the frequency inverter. The guided commissioning supports you in the selection of necessary parameters and the software configuration of the frequency inverter.

Operating instructions
The operating instructions document the complete functionality of the frequency inverter. The parameters necessary for specific applications for adaptation to the application and the extensive additional functions are described in detail.

Application manual
The application manual supplements the documentation for purposeful installation and commissioning of the frequency inverter. Information on various subjects connected with the use of the frequency inverter are described specific to the application.

The documentation and additional information can be requested via your local representation of the firm of VECTRON Elektronik. The following pictograms and signal words are used for the purposes of the present documentation:

Danger
means a directly threatening danger. Death, serious damage to persons and considerable damage to property will occur if the precautionary measure is not taken.

Warning
marks a possible threat. Death, serious damage to persons and considerable damage to property can be the consequence if attention is not paid to the text.

Caution
refers to an indirect threat. Damage to people or property can be the result.

Attention
refers to a possible operational behavior or an undesired condition that can occur in accordance with the reference text.

Note
marks information that facilitates handling for you and supplements the corresponding part of the documentation.

Warning: In installation and commissioning, comply with the information in the documentation. You as a qualified person must read the documentation carefully before the start of the activity and obey the safety instructions. For the purposes of the instructions, "qualified person" designates a person acquainted with the erection, assembly, commissioning and operation of the frequency inverters and possessing the qualification corresponding to the activity.

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1 General safety and application information

This documentation has been produced with the greatest of care and extensively and repeatedly checked. For reasons of clarity, not all the detailed information on all types of the product and also not every imaginable case of erection, operation or maintenance have been taken into account. If you require further information or if specific problems which are not dealt with extensively enough in the documentation exist, you can request the necessary information via the local representation of the firm of VECTRON Elektronik.
We would also point out that the contents of this documentation are not part of a previous or existing agreement, assurance or legal relationship and are not intended to amend the same. All obligations of the manufacturer result from the underlying purchase contract, which also contains the complete and solely valid warranty regulation. These contractual warranty provisions are neither extended nor limited by the production of this documentation.
The manufacturer reserves the right to correct or amend the contents and the product information as well as omissions without prior notification and assumes no kind of liability for damage, injuries or expenditure to be put down to the aforementioned reasons.

1.1 General information

Depending on their protection class, VECTRON frequency inverters can have live, also moving parts as well as hot surfaces during operation.
In the event of inadmissible removal of the necessary covers, improper use, wrong installation or operation, there is the risk of serious damage to persons or property.
In order to avoid serious physical damage or considerable damage to property, only qualified trained personnel may carry out the work for transport, installation, commissioning and maintenance. The norms EN 50178, IEC 60364 (Cenelec HD 384 or DIN VDE 0100), IEC 60664-1 (Cenelec HD 625 or VDE 0110-1), BGV A2 (VBG 4) and national provisions are to be complied with. Qualified persons within the meaning of this principal safety information are people acquainted with the erection, fitting, commissioning and operating of frequency inverters or in possession of qualifications matching their activities.

1.2 Proper use

The frequency inverters are electrical drive components intended for installation in industrial plant or machines. Commissioning and start of intended operation are not allowed until it has been established that the machine corresponds to the provisions of the EC machine directive 98/37/EEC and EN 60204. According to the CE sign, the frequency inverters additionally fulfill the requirements of the low-voltage directive 73/23/EEC and the norms EN 50178 / DIN VDE 0160 and EN 61800-2. Responsibility for compliance with the EMC directive 89/336/EEC is with the user. Frequency inverters are available in a limited way and as components exclusively intended for professional use within the meaning of the norm EN 61000-3-2.
With the issue of the UL test sign according to UL508c, the requirements of the CSA Standard C22.2-No. 14-95 have also been fulfilled.
The technical data and the information on connection and ambient conditions can be seen from the rating plate and the documentation and are to be complied with at all costs.

1.3 Transport and storage

Transport and storage are to be done in an adequate way in the original packaging. Storage shall be in dry rooms protected against dust and moisture with slight temperature fluctuations. Please observe the climatic conditions according to EN 50178 and the marking on the packaging.
The duration of storage without connection to the admissible reference voltage may not exceed one year.

1.4 Handling and positioning

The frequency inverters are to be used according to the documentation, the directives and the norms. Ensure careful handling and avoid mechanical overloading. In transport and handling, do not bend the construction elements or alter the insulation distances. Do not touch any electronic construction elements and contacts. The devices contain construction elements with a risk of electrostatic which can easily be damaged by improper handling. Damaged or destroyed components may not be put into operation as they can be a risk to your health and compliance with the applied norms is not guaranteed.

1.5 Electrical connection

In work on the frequency inverters, please observe the applicable norms BGV A2 (VBG 4), VDE 0100 and other national directives. The information in the documentation on electrical installation and the relevant directives are to be observed. Responsibility for compliance with and examination of the limit values of the EMC product norm EN 61800-3 for variable-speed electrical drive mechanisms is with the manufacturer of the industrial plant or machine.
The documentation contains information on installation correct for EMC. The wires connected to the frequency inverters may not be subjected to an insulation test with a high-test voltage without prior wiring measures.

1.6 Operation information

Before commissioning and the start of the intended operation, all the covers are to be attached and the terminals checked. Check additional monitoring and protective devices pursuant to EN 60204 and the safety directives applicable in each case (e.g. Working Machines Act, Accident Prevention Directives etc.). Before working on the frequency inverter, the latter must be switched off, and you are not allowed to touch live connections immediately as the capacitors can be charged up. Please observe the information and markings on the frequency inverter.

1.7 Maintenance and upkeep

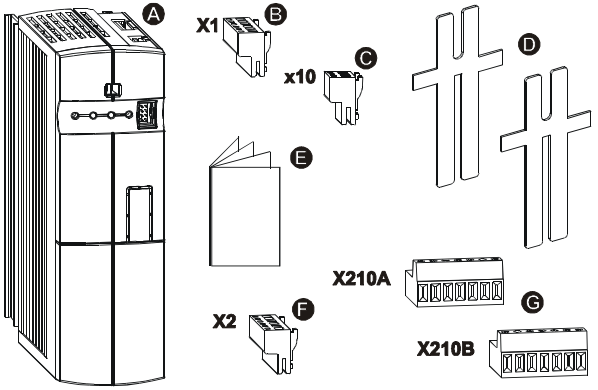
Unauthorized opening and improper interventions can lead to physical injury or damage to property. Repairs on the frequency inverters may only be done by the manufacturer or persons authorized by the latter.

2 Scope of delivery

The frequency inverters are easy to integrate into the automation concept thanks to the modular hardware components. The scope of delivery described can be supplemented by optional components and adapted to the customer-specific requirements. The plug-in type connection terminals enable safe functioning and economical assembly.

2.1 Frequency inverter (0.55 to 3.0 kW)

Power range 0.55 kW to 3.0 kW

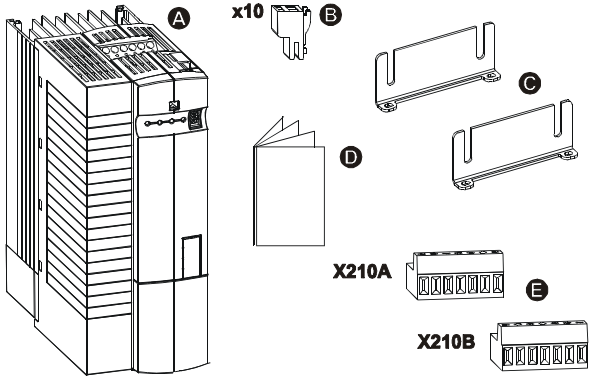


Scope of delivery	
A	Frequency inverter
B	Connection terminal strip X1 (Phoenix ZEC 1.5/..ST7.5) Plug-in terminals for mains connection and DC linking
C	Connection terminal strip X10 (Phoenix ZEC 1.5/3ST5.0) Plug-in terminals for the relay output
D	Standard fittings, for three vertical assembly variants
E	Brief instructions
F	Connection terminal strip X2 (Phoenix ZEC 1.5/..ST7.5) Plug-in terminal for brake resistor and motor connection
G	Control terminals X210A / X210B (Wieland DST85 / RM3.5) Plug-in terminal for connection of the control signals

Note: Please check incoming goods for quality, quantity and nature without delay. Apparent defects such as external damage to the packaging or the device are to be reported to the sender within seven days for insurance reasons.

2.2 Frequency inverter (4.0 to 18.5 kW)

Power range 4.0 kW to 18.5 kW



Scope of delivery

A	Frequency inverter
B	Connection terminal strip X10 (Phoenix ZEC 1.5/3ST5.0) Plug-in terminals for the relay output
C	Standard fittings with fitting screws (M4x20, M4x60), for vertical assembly
D	Brief instructions
E	Control terminals X210A / X210B (Wieland DST85 / RM3.5) Plug-in terminal for connection of the control signals

Note: Please check incoming goods for quality, quantity and nature without delay. Apparent defects such as external damage to the packaging or the device are to be reported to the sender within seven days for insurance reasons.

3 Technical data

3.1 230 V Frequency inverter (0.55 to 3.0 kW)

The following information applies to the reference point of the frequency inverter. The nominal point of the frequency inverter is defined at the admissible mains voltage of 230 V and a switching frequency of 2 kHz.

Output, motor side								
ACT200			**003**	**004**	**005**	**007**	**009**	**012**
Recommended motor shaft output	P	kW	0.4/0.55	0.55/0.75	0.75/1.1	1.1/1.5	1.5/2.2	2.2/3.0 [4]
Output current	I	A	2.4/3.0	3.0/4.0	4.0/5.5	5.5/7.0	7.0/9.5	9.5/12.5 [4]
Output voltage	U	V	3 x 0 to mains voltage					
Overload capacity	-	-	1.2 for 60s; 1.5 for 1s					
Protection	-	-	Short circuit / earth fault proof					
Rotary field frequency	f	Hz	0 to 400 depending on switching frequency					
Switching frequency	f	kHz	2 to 16					
Output, brake resistor								
Min. brake resistance	R	Ω	230	160	115	75	55	37
Protection	-	-	Short circuit proof					
Input, mains side								
Mains current [3] 3ph/PE 1ph/N/PE ; 2ph/PE	I	A	3 5.4	4 7.2	5.5 9.5 [2]	7 13.2	9.5 16.5 [2]	10.5 [1] 16.5 [2] [4]
Mains voltage	U	V	184 to 264					
Mains frequency	f	Hz	45 to 66					
Fuse 3ph/PE 1ph/N/PE ; 2ph/PE	I	A	6 10		10 16		16 20	16 20 [4]
Mechanics								
Dimensions:	HxWxD	mm	190 x 60 x 175			250 x 60 x 175		
Weight (approx.)	m	kg	1.3			1.7		
Protection class	-	-	IP20 (EN60529)					
Terminals	A	mm^2	0.2 to 1.5					
Form of assembly	-	-	vertical					
Ambient conditions								
Energy dissipation	P	W	43	53	73	84	115	170
Coolant temperature	T_n	°C	0 to 40 (3K3 DIN IEC 721-3-3)					
Storage temperature	T_L	°C	-25 to 55					
Transport temperature	T_T	°C	-25 to 70					
Relative air humidity	-	%	15 to 85; not condensing					

An increase of the switching frequency with a reduction of the output current is admissible to match the customer-specific requirements. The norms and directives in question are to be observed for this operating point.

Output current					
Frequency inverter nominal output	Switching frequency				
	2 kHz	4 kHz	8 kHz	12 kHz	16 kHz
0.55 kW	3.0 A	2.8 A	2.4 A	2.0 A	1.6 A
0.75 kW	4.0 A	3.7 A	3.0 A	2.5 A	2.0 A
1.1 kW	5.5 A [2]	5.0 A [2]	4.0 A	3.4 A	2.7 A
1.5 kW	7.0 A	6.5 A	5.5 A	4.6 A	3.7 A
2.2 kW	9.5 A [2]	8.7 A [2]	7.0 A	5.9 A	4.8 A
3.0 kW	12.5 A [1] [2]	11.5 A [1] [2]	9.5 A [2]	8.0 A [2]	6.5 A

[1] Three-phased connection demands mains commutating choke
[2] One and two-phased connection demands mains commutating choke
[3] Mains current with relative mains impedance of 1 % (see Chapter 5)
[4] One and two-phased connection demands an output limit (de-rating)

3.2 400 V Frequency inverter (0.55 to 3.0 kW)

The following information applies to the reference point of the frequency inverter. The nominal point of the frequency inverter is defined at the admissible mains voltage of 400 V and a switching frequency of 2 kHz.

Output, motor side								
ACT400			**001**	**002**	**003**	**004**	**005**	**007**
Recommended motor shaft output	P	kW	0.4/0.55	0.55/0.75	0.75/1.1	1.1/1.5	1.5/2.2	2.2/3.0
Output current	I	A	1.3/1.8	1.8/2.4	2.4/3.2	3.2/4.2	4.2/5.8	5.8/7.8
Output voltage	U	V	3 x 0 to mains voltage					
Overload capacity	-	-	1.2 for 60s; 1.5 for 1s					
Protection	-	-	Short circuit / earth fault proof					
Rotary field frequency	f	Hz	0 to 400 depending on switching frequency					
Switching frequency	f	kHz	2 to 16					
Output, brake resistor								
Min. brake resistance	R	Ω	930	634	462	300	220	148
Protection	-	-	Short circuit proof					
Input, mains side								
Mains current [2] 3ph/PE	I	A	1.8	2.4	2.8 [1]	4.2	5.8	6.8 [1]
Mains voltage	U	V	320 to 528					
Mains frequency	f	Hz	45 to 66					
Fuses 3ph/PE	I	A	6				10	
Mechanics								
Dimensions:	HxWxD	mm	190 x 60 x 175			250 x 60 x 175		
Weight (approx.)	m	kg	1.3			1.7		
Protection class	-	-	IP20 (EN60529)					
Terminals	A	mm^2	0.2 to 1.5					
Form of assembly	-	-	vertical					
Ambient conditions								
Energy dissipation	P	W	40	46	58	68	87	115
Coolant temperature	T_n	°C	0 to 40 (3K3 DIN IEC 721-3-3)					
Storage temperature	T_L	°C	-25 to 55					
Transport temperature	T_T	°C	-25 to 70					
Relative air humidity	-	%	15 to 85, not condensing					

An increase of the switching frequency with a reduction of the output current is admissible to match the customer-specific requirements. The norms and directives in question are to be observed for this operating point.

Output current					
Frequency inverter nominal output	Switching frequency				
	2 kHz	4 kHz	8 kHz	12 kHz	16 kHz
0.55 kW	1.8 A	1.6 A	1.3 A	1.1 A	0.9 A
0.75 kW	2.4 A	2.2 A	1.8 A	1.5 A	1.2 A
1.1 kW	3.2 A [1]	2.9 A [1]	2.4 A	2.0 A	1.6 A
1.5 kW	4.2 A	3.9 A	3.2 A	2.7 A	2.2 A
2.2 kW	5.8 A	5.3 A	4.2 A	3.5 A	2.9 A
3.0 kW	7.8 A [1]	7.1 A [1]	5.8 A	4.9 A	3.9 A

[1] Three-phased connection demands mains commutating choke
[2] Mains current with relative mains impedance of 1 % (see Chapter 5)