

Power Drive

VCB 400



BONFIGLIOLI

Bonfiglioli: Specific Solutions for Power Transmission and Motion Control

Product diversification, process automation, and quality have enabled Bonfiglioli to play a leading role in the industry. Bonfiglioli's policy focuses on integrated solutions, competence and innovative technology as key factors, indispensable to ensure customer satisfaction, while production is aimed at achieving the highest standards.

Bonfiglioli product portfolio aims at meeting the toughest and most sophisticated requirement for Industrial Process and Automation Solution and for Mobile Equipment Solutions.





Industrial equipment applications



**BONFIGLIOLI
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Representing Helical, Bevel and Worm Gearmotors and Gear Units



**BONFIGLIOLI
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Representing AC drives

Mobile equipment applications



**BONFIGLIOLI
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Representing Planetary Gearmotors and Gear Units

VCB: performance and power



Bonfiglioli VCB series inverters are destined for speed, torque and position control applications with three phase asynchronous motors 132 kW in power.

The robust and flexible VCB series offers a power range of 132 kW to 800 kW, covering a broad spectrum of applications, and is ideal for industrial plant and production line automation.

VCB inverters are available with 150% overload capability for constant torque applications and with 120% overload capability for the sort of quadratic load applications common in the HVAC sector.

The installation and connection solutions adopted (internal signal terminals, power bus bars with input and output protection) ensure high levels of protection and safety for maintenance operations and greatly facilitate installation and connection inside electric control panels.

In plant where the inverter has to control significant regenerative loads, the intermediate circuit can be connected to the common DC bus to allow the energy generated by braking loads to be recovered, shared and used by system drives to optimise the plant's overall energy efficiency.

On request, VCB inverters can be supplied in 500 V versions. These are particularly useful when current and power cable sizes have to be kept to a minimum and help reduce the cost and complexity of connections.

Power ratings from 355 kW up to a maximum of 800 kW can be catered for by connecting two VCB units in parallel.

General characteristics

VCB inverters can be used in system architectures with a common DC bus to share energy between different drives in the same line

Common DC bus

All VCB series inverters are equipped with disconnectable signal terminal blocks

Disconnectable terminal blocks

500 V versions are available in addition to the standard 400 V versions

Mains voltage

Inverter parameter programming is greatly facilitated by the user-friendly VPlus programming software, common to Bonfiglioli's other inverter series

VPlus programming software

This practical and lightweight programming unit features a 4-key keypad with 140 segments. The KP100 can be used for manual speed control and to enter programming and functioning parameters

KP100 programming unit

In addition to the standard air cooled versions, water cooled versions are also available

Liquid cooling

On request, a brake unit is available for installation on board the inverter to dissipate load energy through resistors, limiting the voltage of the DC bus during energy regeneration by the motor

Brake unit

General characteristics

EN 60204 safety relay

Prevents unwanted starts during system maintenance and inspection

Digital communications

RS 232 and RS 485 ports
and CAN open and Profibus-DP LON standard field buses

Hardware flexibility

Analog output and feedback acquisition expansion modules are available

Inputs/Outputs

VCB series inverters permit the connection sets listed below for all models. Electrical safety is guaranteed by insulation and conformity to EN standards. All outputs are individually insulated. Terminals are easily accessible

1	+10 V reference power	1	+24 V outputs power
2	0 V analog (GND)	2	0 V digital (GND)
3	analog input 1	3	digital input 1
4	analog input 1 (with speed inversion)	4	digital input 2
5	analog input 2	5	digital input 3
6	analog inputs 2, 3 (with speed inversion)	6	digital input 4
7	analog input 3	7	digital input 5
8	analog output	8	digital input 6
		9	digital input 7
1	NO relay (voltage free)	10	digital input 8
2	common	11	external 30 V power
3	NC relay (voltage free)	12	digital output 1
		13	digital output 2
		14	external 0 V power (GND)
		15	external +8 V power

Functional characteristics

Users can create 4 different drive functioning configurations that can be switched even with the motor running

Four different parameter sets

This function restores control of a motor spinning under inertia quickly and efficiently

Synchronisation to catch a spinning motor

Increases and decreases the speed reference via digital inputs

Motor potentiometer function (UP/DOWN)

The availability of elementary processing functions, (timer and Boolean functions) provides VCB inverters with great flexibility of control and facilitates their integration in complex automation systems

Logic functions

VCB inverters permit rapid deceleration even without a braking module, thanks to a sophisticated voltage control and a motor chopper function

Controlled braking

A sequence of speed profiles can be programmed and executed cyclically by the drive

Automatic cycles

Software functions and dedicated algorithms are available for the control of processes like lifting, winding, pressure control, etc.

Application functions

The possibility of adapting the range and gain of signals exchanged with other control systems allows VCB inverters to adapt to most common control and display devices

Analog I/O configuration

Functional characteristics

Programmable automatic start and stop

The behaviour of VCB inverters during starting and stopping can be configured by parameters. The inverter can be started and stopped safely and controlled from stationary to suit the needs of the application

S-curve acceleration and deceleration ramp profiles

Smooth acceleration and deceleration ramps can be configured to make speed changes less abrupt

Power failure control

The inverter can use the kinetic energy of the load to keep the control system active during brief periods of power failure without undesirable consequences

Intelligent current limits

The control system can adapt to dynamic variations in load to avoid undesired lock-ups

Efficient control of motor holding brake

Precise and quick activation of the motor holding brake means reduced brake wear

Memorisation of the last 16 alarms

This function provides useful information on inverter malfunctions and operating errors. A complete list of values is provided for the last four alarms if the alarms so require

Electronic protection relay (thermal relay)

VCB inverters use the motor's thermal image to protect it against overheating and short circuits

Operating value display

Inverter values can be monitored on the display as required

I/O logic state display

This is an extremely useful function during start-up, as it lets you simulate and display the functioning of the control logic

Technical data

				VCB 400 / 132-355 kW									
				Overload 1.5				Overload 1.2					
				250 OL 1.5	300 OL 1.5	370 OL 1.5	460 OL 1.5	300 OL 1.2	370 OL 1.2	460 OL 1.2	570 OL 1.2	610 OL 1.2	
Output motor side	Rated motor output rec.	P	kW	132	160	200	250	160	200	250	315	355	
	Nominal power	S	kVA	173,2	207,8	256,3	318,7	207,8	256,3	318,7	395	422,6	
	Nominal current	I	A	250	300	370	460	300	370	460	570	610	
	Voltage	U	V	3 x 0 ... mains voltage input									
	Overload capacity	-	-	1,5 for 60 s				1,2 for 60 s					
	Frequency	f	Hz	0 ... 400, according to switching frequency									
Input mains side	Voltage	U	V	3 x 400 (-20%) ... 460 (+10%)									
	Frequency	f	Hz	50 (-10%) ... 60 (+10%)									
	Power factor	cosφ	-	~1 (Power factor of the fundamental)									
General	Short circuit / earth fault	-	-	yes, unlimited									
	Efficiency (approx.)	η	%	98 , at 2 kHz switching frequency									
	Switching frequency	f	kHZ					1 ... 4					
	Protection	-	-	IP20, VBG4									
	Dimensions	LxHxP	mm	518 x 820 x 406								518 x 1095 x 406	
	Weight (approx.)	m	kg	110								120	
Environment	Coolant temperature	Tn	°C	0 ... 40 , forced ventilation									
	Rel. Humidity	-	%	15 ... 85 , no condensation									
	Power reduction	ΔP	%	2,5%/K above Tn, Tmax=50°C; 5%/1000 m above 1000 m above sea level; hmax=4000 m									
Options & accessories	Line choke (uk=4%)	-	-					external					
	EMC filter	-	-					external					
	Brake unit	-	-	internal brake transistor, external								external	

High power ratings can be achieved by connecting two VCB units in parallel.
Consult the product manual for further details.

Accessories and add-on modules

A wide selection of add-on control and communication modules are available for VCB series inverters to boost functionality in specific applications.

Expansions

KP100	Control unit (keypad)
ADA-VCB-2	KP100 serial conversion interface/RS232 control panel
VCM-PTC	Monitoring of motor temperature via PTC sensor
ENC-1	Speed feedback and motor temperature control via PTC sensor
EAL-1	Expansion for additional analog outputs, frequency regulation and motor temperature control via PTC sensor
VCI-232	RS232 connection
VCI-485	RS485 connection
VCI-CAN	CANopen connection
VCI-PROF	Profibus-DP connection
VCI-LON	LON connection

Reference standards

All models in the VCB series are designed and made in conformity to the requirements of the 'low voltage' directive 73/23/EEC (CE conformity). Conformity to the EMC directive 89/336/EEC is subject to the correct installation procedures being followed. The manufacturer's declaration of conformity and the installation instructions are included in the documentation accompanying the product.

VCB designation

Field 1	Field 2	Field 3	Field 4	Field 5	Field 6	Field 7	Specialist applications
Inverter series	Size	Overload OL	Braking unit	KP keypad	Communication modules	Expansion modules	
VCB 400	250	OL1.5 OL1.2	_no BU BU	KP100 _no KP	VCI 232 _no comunic. VCI485 VCICAN VCIPROF VCILON	_no exp EAL1 ENC1 VCMPTC	
	300						
	370						
	460						
	570						
	610						

Standard values are shown in bold

Designation rules

- The BU option is only available with overload OL1.5
- Sizes 570 and 610 are only available with overload OL1.2
- Communication modules (Field 6) are alternatives
- Expansion modules (Field 7) are alternatives

Field 1: VCB400 = inverter VCB 3ph 400VAC

Field 2: 250 = 132 kW
300 = 160 kW
370 = 200 kW
460 = 250 kW
570 = 315 kW
610 = 355 kW

Field 3: OL1.2 = overload 120%
OL1.5 = overload 150%

Field 4: _ (blank) = no braking unit
BU = internal braking unit

Field 5: _ (blank) = no keypad
KP100 = keypad

Field 6: _ (blank) = no communication module

VCI232 = RS232 serial interface
VCI485 = RS485 serial interface
VCICAN = CAN BUS interface
VCIPROF = PROFIBUS interface
VCILON = LON interface

Field 7: _ (blank) = no expansion module

EAL1 = analog expansion module
ENC1 = encoder module
VCMPTC = temperature control module with PTC thermistor

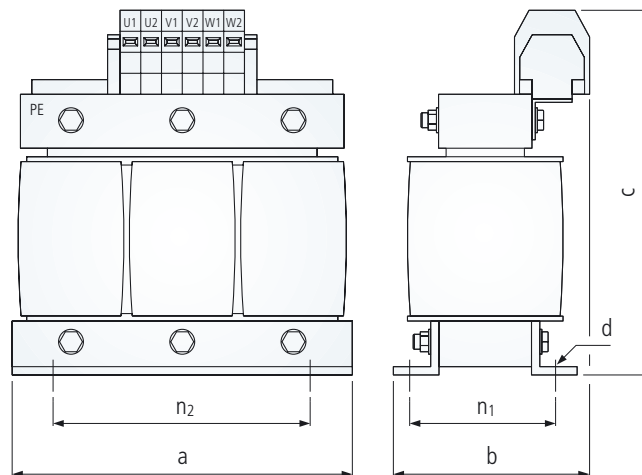
Example of designation: VCB400 370 OL1.5 BU KP100 VCI232

3x400V line inductor for VCB 400 inverters

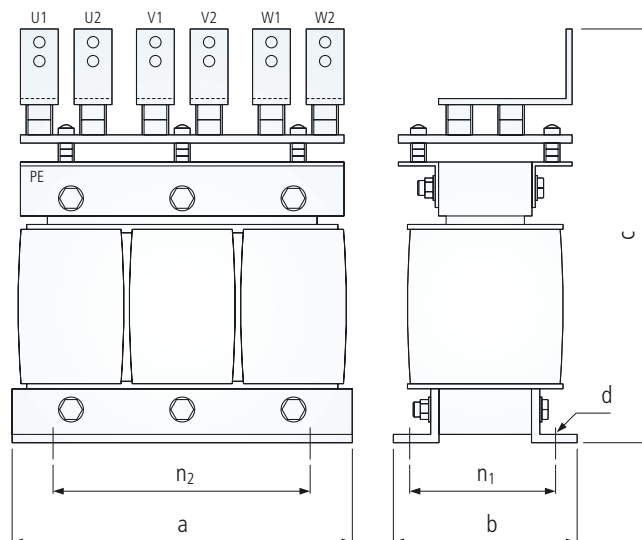
Size	Description of inductor	Rated current (A)	Inductance (mH)	Dissipated power (W)	Dimensions (mm)			Installation (mm)			Weight (kg)
					a	b	c	n2	n1	d	
250	LCVT250	250	0.12	210	240	210	350	190	126	11	28
300	LCVT300	300	0.098	290	320	210	410	240	121	11	38
370	LCVT370	370	0.077	350	320	230	410	240	134	11	46
460	LCVT460	460	0.064	410	360	270	460	240	146	11	55
570	LCVT600	610	0.049	480	360	290	510	310	126	11	65
610		verify the application with Bonfiglioli's technical service									

Always fit the inductor on the input

LCVT250 ... LCVT370



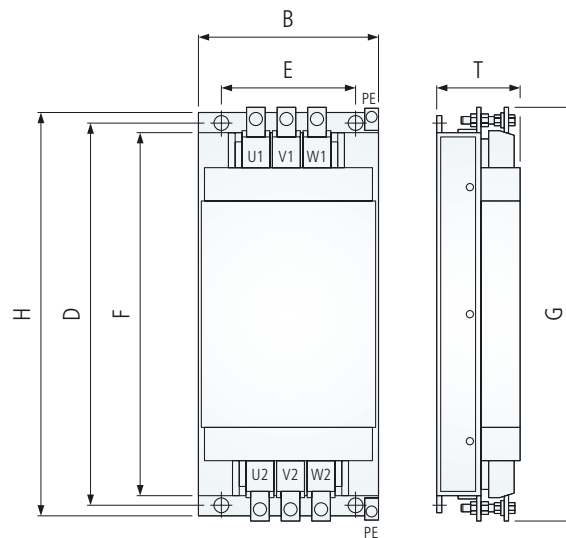
LCVT460 ... LCVT600



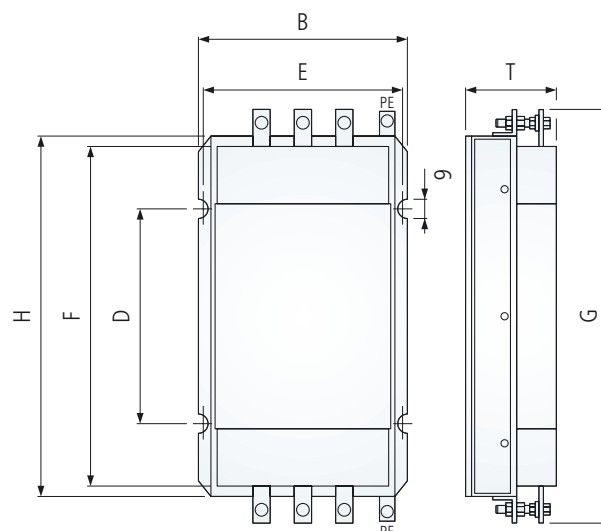
EMC filters for VCB 400 inverters

Size	Description of filter	Rated current (A)	Inductance (mH)	Dissipated power (W)	Dimensions (mm)			Installation (mm)	
					H	B	T	D	E
250	FTV250	250	375	180	490	230	158	470	170
300	FTV300	300	400	200	490	230	158	470	170
370	FTV400	400	600	230	580	230	158	560	170
460	FTV500	500	750	270	630	345	158	530	325
570	FTV600	600	900	290	660	375	187	450	355
610	FTV700	verify the application with Bonfiglioli's technical service							

FTV250 ... FTV400



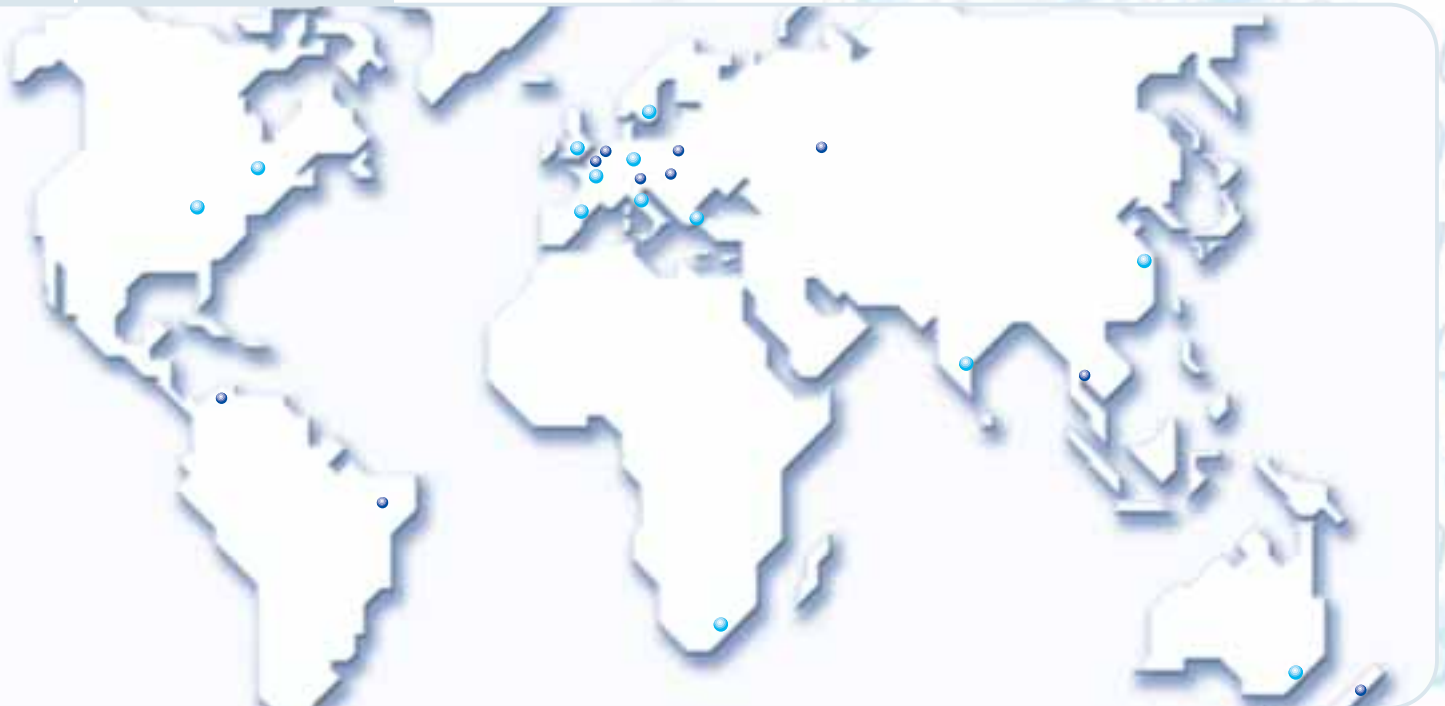
FTV500 ... FTV600





Bonfiglioli is a Partner Worldwide for Power Transmission and Motion Control

The ever-growing export share has led Bonfiglioli into the most far away Countries. With expansion plans entailing a further growth of the sales network Bonfiglioli aims at improving both the competitiveness of its products and the effectiveness of the Customer service. In every market place Bonfiglioli is committed to improve the Customer satisfaction by offering state-of-the-art technology and shorter deliveries. Nowadays branch companies and BEST Partners bearing the Bonfiglioli name are operating in seventeen Countries outside Italy, with sales and service in the other countries managed by appointed dealers. The domestic network is made up of 30 sales office and representatives and 100 dealers operating with their own warehouse and supporting Customers locally. Throughout the World Bonfiglioli's reputed know-how and Service guarantee effective and timely assistance.



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