



# VECTRON

FREQUENCY INVERTER

**VCB 400**  
**from 4 to 355 kW**

FOR VARIABLE SPEED AC DRIVES

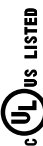


EU region



EU Directive (CE marking)

North America/Canada



UL cUL



**Bonfiglioli Group**

*Power & Control Solutions*



**VECTRON**

## SUPER MOTOR DRIVE

With the VCB range, VECTRON introduces a powerful generation of frequency inverters.

Their all-in-one features are bound to provide the right solution for your drive requirements - from simple speed variation applications up to high dynamic servo applications.

You will find the right specialist partner in VECTRON who gained a wealth of experience accumulated from several 100,000 installed frequency inverters.

Drives with VECTRON frequency inverters offer solutions of rational use of energy and materials in smallest possible physical size - it is a way to bionic drives.

- **Smooth acceleration**

with torque control

- **Excellent revolving**

at high and very low speeds

- **Pretentious positioning**

even with full load torque at zero speed

- **Highly accurate synchronous operation**

for multi-motor drives and electronic gears

- **Highdynamic current and torque limiting**

for proper operation under fast load shocks

- **Sweep function**

with periodical speed reference profiles



TAKE

VECTRON

GET BIONIC

DRIVES



**VCB 400**



**VECTRON**

## CONVENIENT IN OPERATION AND FLEXIBLE IN APPLICATION

### ● **Wide voltage range**

Frequency inverters of the VCB range operate at input voltages from 230 to 500 Vrms.

### ● **Different control methods made to measure**

Means free choice of the most suitable control method for specific applications - up to positioning and synchronous drives - using the key pad or any other control unit.

### ● **Butt mounting size**

For space and cost saving installation. All drives may be connected to a common DC bus in order to interchange energy.

### ● **PC software VPlus**

Is a commissioning and parameterising software, which is available as an accessory and can be used with the 32 bit windows operating systems on your notebook or personal computer. It allows the convenient setting of the frequency inverter to its drive task.

### ● **Plug-in terminals**

Are available for all control inputs and outputs for quick connection and disconnection.

### ● **Safety relay as per EN 60204**

To prevent unintentional starting during work on the system, e.g. during inspection and servicing.

### ● **Standardized interfaces**

Throughout the whole power range.

### ● **Digital communication**

Can be done using

- ☐ RS 485
- ☐ CANopen
- ☐ Profibus-DP
- ☐ LON



## ● Keypad KP 100

Is a light, handy unit with 4 key operation and with a 140 segment display for alphanumeric characters and symbols. The KP 100 is used for setting up the frequency inverter to the required drive tasks and for displaying the drive parameters.

## ● Mounting and installation

Separate cooling for control electronic and power electronic can be realized.

## ● Integrated DC link choke

To reduce low frequency feedback to the mains with a recommended rated motor output up to 7.5 kW. It saves space and installation costs.

## ● Integrated brake chopper

For limitation of the DC link voltage during regenerative operation.

## ● Inputs and outputs

The VCB range of frequency inverters offers the following control connections for all power classes. They all have a safe isolation and are accessible in the sense of EN. All outputs are also individually isolated.

|   |                                    |
|---|------------------------------------|
| 1 | +10V reference supply              |
| 2 | analog 0 V (GND)                   |
| 3 | analog input 1                     |
| 4 | analog input 1 (GND, reference)    |
| 5 | analog input 2                     |
| 6 | analog input 2, 3 (GND, reference) |
| 7 | analog input 3                     |
| 8 | analog output                      |
|   |                                    |
| 1 | NO contact                         |
| 2 | centre point relay                 |
| 3 | NC contact                         |

|    |                           |
|----|---------------------------|
| 1  | +24 V supply output       |
| 2  | digital 0 V (GND)         |
| 3  | digital input 1           |
| 4  | digital input 2           |
| 5  | digital input 3           |
| 6  | digital input 4           |
| 7  | digital input 5           |
| 8  | digital input 6           |
| 9  | digital input 7           |
| 10 | digital input 8           |
| 11 | external supply 30 V      |
| 12 | digital output 1          |
| 13 | digital output 2          |
| 14 | external supply 0 V (GND) |
| 15 | external supply +8 V      |

## ● Extensions and accessories

VECTRON offers a wide choice of additional facilities for controlling, communication and special control connections as well as accessories to suit your specific requirements.

# BASIC FUNCTIONS

Depending on the requirements you have to incorporate various features in your drives. The VCB range of frequency inverters offers you a selection of basic functions which can be activated time and/or event related.

## ● Application functions

give you push-button control for a variety of pre-configured function sequences for lifting drives, winding drives, pressure control etc.

## ● Adaptation for analogue inputs and outputs

for range adjustment to peripheral control elements.

## ● Customer's own functions

can be implemented on request. Consequently, elimination of peripheral components is possible.

## ● Unlimited interlinking of function blocks

the properties of the VCB range can be flexibly adapted to any given drive task thanks to their freely programmable functions.





### ● **Four different data sets**

if the operating modes change.

### ● **Torque boost**

enables your drive also for high starting torque.

### ● **Synchronisation to a rotating motor**

enables starting at any operation point.

### ● **Controlled braking**

if you need very fast shut-down without mains unit or brake unit, you can use the voltage control and the motor chopper.

### ● **Motor potentiometer function**

if you wish to set the speed through a contact input.

### ● **Technology controller**

if you like to carry out for example pressure, volume flow or speed regulation with the integrated PI controller.

### ● **Programmable starting and stopping behaviour**

so that the drive can be safely started and stopped and can also be controlled at a standstill according to the application.

### ● **S ramp profile**

if your drive has to make a smooth transition from one speed to another.

### ● **Power failure regulation**

can be activated using kinetic energies to maintain operation during short blackouts of the mains.

### ● **Parameter identification**

if you wish to start your drive with menu guidance.

### ● **Intelligent current limits**

allowing the drive to automatically and safely adjust to dynamic load changes and different ambient conditions using its power reserves.

### ● **Brake control**

if you want to activate your stop brake at an exact time and without wear.

### ● **Actual value memory**

keeps you constantly informed and allows you to monitor various actual values for the application.

### ● **Storing last 16 trips**

gives information on irregularities in operation; the last four trips show the accurate operating point of the drive.

### ● **Warning messages**

which are signalled by the frequency inverter via digital output as soon as a configurable limit has been reached.

### ● **Free choice of the reference value source**

via the frequency reference value channel or percentage reference value channel for each data set. Here several sources can be connected additively.

### ● **Motor circuit breaker**

for individual and multiple motor operation to protect the motor and its leads from overheating so that protection is possible in case of a short circuit or overloading.

### ● **Status display of the digital inputs and outputs**

so that the present state of the digital inputs and outputs can be controlled during the commissioning phase.

## TECHNICAL DATA

| VCB 400 / 4-65 kW                |                           |                |     | VCB<br>400-<br>010   | VCB<br>400-<br>014 | VCB<br>400-<br>018 | VCB<br>400-<br>025 | VCB<br>400-<br>034 | VCB<br>400-<br>045 | VCB<br>400-<br>060                  | VCB<br>400-<br>075 | VCB<br>400-<br>090 | VCB<br>400-<br>115 | VCB<br>400-<br>135 |
|----------------------------------|---------------------------|----------------|-----|--|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------------------------|--------------------|--------------------|--------------------|--------------------|
| Output<br>motor<br>side          | Rated motor output rec.   | P              | kW  | bis 4  | 5,5                | 7,5                | 11                 | 15                 | 22                 | 30                                  | 37                 | 45                 | 55                 | 65                 |
|                                  | Nominal power             | S              | kVA | 6,9  | 9,7                | 12,5               | 17,3               | 23,5               | 31,2               | 41,6                                | 52,0               | 62,4               | 79,7               | 93,5               |
|                                  | Nominal current           | I              | A   | 10   | 14                 | 18                 | 25                 | 34                 | 45                 | 60                                  | 75                 | 90                 | 115                | 135                |
|                                  | Voltage                   | U              | V   | 3 x 0 ... mains voltage input  |                    |                    |                    |                    |                    |                                     |                    |                    |                    |                    |
|                                  | Overload capacity         | -              | -   | 1,2 / 1,5 for 60 s, according to model   |                    |                    |                    |                    |                    |                                     |                    |                    |                    |                    |
|                                  | Frequency                 | f              | Hz  | 0 ... 400, according to switching frequency  |                    |                    |                    |                    |                    |                                     |                    |                    |                    |                    |
| Input<br>mains<br>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 ... 8  |                    |                    |                    |                    |                    |                                     |                    | 1 ... 4            |                    |                    |
|                                  | Protection                | -              | -   | IP20, VBG4   |                    |                    |                    |                    |                    |                                     |                    |                    |                    |                    |
|                                  | Dimensions                | WxHxD          | mm  | 124 x 406 x 262  |                    |                    |                    | 124 x 426<br>x 264 | 124 x 426<br>x 274 | 250 x 376 x 317                     |                    |                    | 300 x 602 x 298    |                    |
|                                  | Weight (approx.)          | m              | kg  | 6  |                    |                    |                    | 6,5                |                    | 17                                  | 18                 | 19                 | 31,5               | 32,5               |
| Environ-<br>ment                 | Coolant temperature       | T <sub>n</sub> | °C  | 0 ... 40 , forced ventilation  |                    |                    |                    |                    |                    |                                     |                    |                    |                    |                    |
|                                  | Rel. Humidity             | -              | %   | 15 ... 85 , no condensation  |                    |                    |                    |                    |                    |                                     |                    |                    |                    |                    |
|                                  | Power reduction           | ΔP             | %   | 2,5%/K above T <sub>n</sub> , T <sub>max</sub> =50°C; 5%/1000 m above 1000 m above sea level; h <sub>max</sub> =4000 m |                    |                    |                    |                    |                    |                                     |                    |                    |                    |                    |
| Options<br>&<br>Acces-<br>sories | Line choke (uk=4%)        | -              | -   | internal<br>DC – link choke, external  |                    |                    |                    |                    |                    | external                            |                    |                    |                    |                    |
|                                  | EMC filter                | -              | -   | external   |                    |                    |                    |                    |                    |                                     |                    |                    |                    |                    |
|                                  | Brake unit                | -              | -   | internal brake transistor, external  |                    |                    |                    | external           |                    | internal brake transistor, external |                    |                    |                    |                    |
|                                  | Dig. Control unit         | -              | -   |  |                    |                    |                    |                    |                    | yes                                 |                    |                    |                    |                    |

We reserve the right to introduce changes without notice.

## Expansions

|           |  |
|-----------|--|
| KP100     | Control unit   |
| VPlus     | PC software for 32 bit windows operating systems                         |
| ADA-VCB-2 | RS232 / KP100 interface converter set                                    |
| VCM-PTC   | Motor PTC monitoring   |
| ENC-1     | Speed feedback and motor PTC monitoring                                  |
| EAL-1     | Expansion for analog outputs, leading frequency and motor PTC monitoring |
| SSR       | Safety relays (only in combination with VCM-PTC, ENC-1 or EAL-1)         |
| VCI-232   | RS232 - connection   |
| VCI-485   | RS485 - connection   |
| VCI-CAN   | CANopen - connection   |
| VCI-PROF  | Profibus-DP - connection   |
| VCI-LON   | LON - connection   |

# TECHNICAL DATA

| VCB 400 / 75-355 KW      |                           |                |     | VCB 400-150  | VCB 400-180 | VCB 400-210 | VCB 400-250 | VCB 400-300                   | VCB 400-370 | VCB 400-460 | VCB 400-570  | VCB 400-610 |  |
|--------------------------|---------------------------|----------------|-----|--|-------------|-------------|-------------|-------------------------------|-------------|-------------|--------------|-------------|--|
| Output motor side        | Rated motor output rec.   | P              | kW  | 75   | 90          | 110         | 132         | 160                           | 200         | 250         | 315          | 355         |  |
|                          | Nominal power             | S              | kVA | 103,9  | 124,7       | 145,5       | 173,2       | 207,8                         | 256,3       | 318,7       | 395          | 422,6       |  |
|                          | Nominal current           | I              | A   | 150  | 180         | 210         | 250         | 300                           | 370         | 460         | 570          | 610         |  |
|                          | Voltage                   | U              | V   | 3 x 0 ... mains voltage input  |             |             |             |                               |             |             |              |             |  |
|                          | Overload capacity         | -              | -   | 1,2 / 1,5 for 60 s, according to model   |             |             |             |                               |             |             |              |             |  |
|                          | 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   |             |             |             |                               |             |             |              |             |  |
|                          | Efficiencia (approx.)     | η              | %   | 98 , at 2 kHz switching frequency  |             |             |             |                               |             |             |              |             |  |
|                          | Switching frequency       | f              | kHz | 1 ... 8  |             | 1 ... 4     |             |                               |             |             |              |             |  |
|                          | Protection                | -              | -   |  |             |             |             | IP 20, VBG4                   |             |             |              |             |  |
|                          | Dimensions                | WxHxD          | mm  | 412x510x362  |             |             |             | 518x820x406                   |             |             | 518x1095x406 |             |  |
|                          | Weight (approx.)          | m              | kg  | 50   |             |             |             | 110                           |             |             | 120          |             |  |
| Environ-<br>ment         | Coolant temperature       | T <sub>n</sub> | °C  |  |             |             |             | 0 ... 40 , forced ventilation |             |             |              |             |  |
|                          | Rel. Humidity             | -              | %   |  |             |             |             | 15 ... 85 , no condensation   |             |             |              |             |  |
|                          | Power reduction           | ΔP             | %   | 2,5%/K above T <sub>n</sub> , T <sub>max</sub> =50°C; 5%/1000 m above 1000 m above sea level; h <sub>max</sub> =4000 m |             |             |             |                               |             |             |              |             |  |
| Options &<br>Accessories | Line choke (uk=4%)        | -              | -   |  |             |             |             | external                      |             |             |              |             |  |
|                          | EMC filter                | -              | -   |  |             |             |             | external                      |             |             |              |             |  |
|                          | Brake unit                | -              | -   | internal brake transistor, external  |             |             |             |                               |             |             |              | external    |  |
|                          | Dig. Control unit         | -              | -   |  |             |             |             | yes                           |             |             |              |             |  |

We reserve the right to introduce changes without notice.

## ● EU guidelines

All units from the VCB range are designed and built in accordance with the requirements of the 73/23/EEC guidelines (CE conformity). The EMC 89/336/EEC requirements are also fulfilled subject to correct installation.

The required manufacturer's and conformity declarations are included in the documentation supplied with the equipment.

The frequency inverters VCB 400-010 up to VCB 400-135 are released as per UL in compliance with UL 508c and are in compliance with the CSA standards C22.2 - No. 14-95.

The release of the frequency inverters VCB 400-150 to VCB 400-610 complying with UL and CSA Rules are under development.