



# Active Next Generation

210/410/510/610 Series

Servo Drive Solutions



PRODUCTS &  
SOLUTIONS



## The highest level of precision, efficiency and energy optimization.

With over 15 years of experience in creating dedicated motion control systems, Bonfiglioli has gained an enviable reputation in the world of industrial automation.

Bonfiglioli offers its customers the highest possible level of precision, efficiency and energy optimization for their machines.

Our solutions include low backlash planetary gearboxes, induction motors, servomotors and synchronous reluctance motors, open and closed loop inverters, servo inverters and regenerative inverters. A unique combination of mechatronic solutions plus a vast range of products for industry make Bonfiglioli a one-stop-shop for applications in many different sectors.

Our two centers of excellence develop breakthrough mechatronic innovations thanks to their deep expertise and strong synergy, to provide customers with a complete motion automation offer.

Bonfiglioli's team based in Krefeld, Germany, has the cutting-edge technical know-how and capacity to design and manufacture advanced electronic devices such as frequency inverters and servo drives.

Our team based in Rovereto, Italy, benefits from a pool of talents focused on the development and production of highly sophisticated mechatronics products such as servo motors and low backlash planetary gearboxes, with the additional capability to offer to customer complete motion control solutions and application software development services.

Bonfiglioli's mission is to improve the profitability of customers worldwide by acting as a risk-free partner. Our group's international capacity enables us to work alongside our customers as day-to-day partners, ensuring that their individual needs are satisfied and their full potential is realised.

# Servo Drive Solutions



# Bonfiglioli Active Next Generation: The drive designed for High Performance applications

With the inverter series ANG Active Next Generation, Bonfiglioli expands its drive portfolio with a drive designed for providing machine builders high performance for standard and servo applications.

The range includes:

- 1 phase 230 V: 0.25...4 kW
- 3 phase 230 V: 0.25...9.2 kW
- 3 phase 400/480 V: 0.25...400...1200 kW
- 3 phase 525 V: 160...400...1200 kW
- 3 phase 690 V: 160...400...1200 kW

Size 8 offers the opportunity as single device to power installations up to 400 kW and up to 1200 kW with parallel connection of two or three Active Next Generation.

Thanks to a high-performance micro controller, enhanced functionalities are embedded such as cyclic synchronous positioning mode (CSP) with cubic interpolation, brake control and evaluation of feedback contact.

A new positioning configuration is dedicated for travelling drives in crane applications.

Our new single axis for the control of servo motors and induction motors delivers high dynamic response, high performance and application versatility.

Bonfiglioli develops Active Next Generation to meet the specific requirements of special machinery in a large range of Industries.

Moreover, ANG series support many Ethernet Fieldbuses like, PROFINET, EtherCAT, EtherNet/IP and VARAN.

With this new servo inverter series, Bonfiglioli offers the broadest connectivity with the most advanced control technology and the highest power density.

## Key Features

- Safety: STO (safe torque off, SIL 3)
- Communication protocols: CANopen, PROFINET, EtherCAT, EtherNet/IP, VARAN.
- Feedback sensors: Resolver, absolute encoder, incremental encoder
- Optional Keypad and PC-Service Interface available
- PLC functions
- Motion tasks
- Fast control loops
- Brake control

## Customer Benefits

- PLC functions with graphical software tool
- Cubic interpolation for high dynamic interpolated axis
- 525V and 690V supply voltages for heavy and steel industry.
- High precision closed loop configuration.

Bonfiglioli always contributes to save energy and offering the most efficient solution.



# Bonfiglioli drive power/control range



**S2U**

Power range:  
0.4...11 kW



**S2U IP66**

Power range:  
0.4 ... 18.5 kW



**Agile**

Power range:  
0.25 ... 11 kW



**Active**

Power range:  
0.55 ... 132 kW



**Active Cube**

Power range:  
0.25 ... 1200 kW



**ANG**

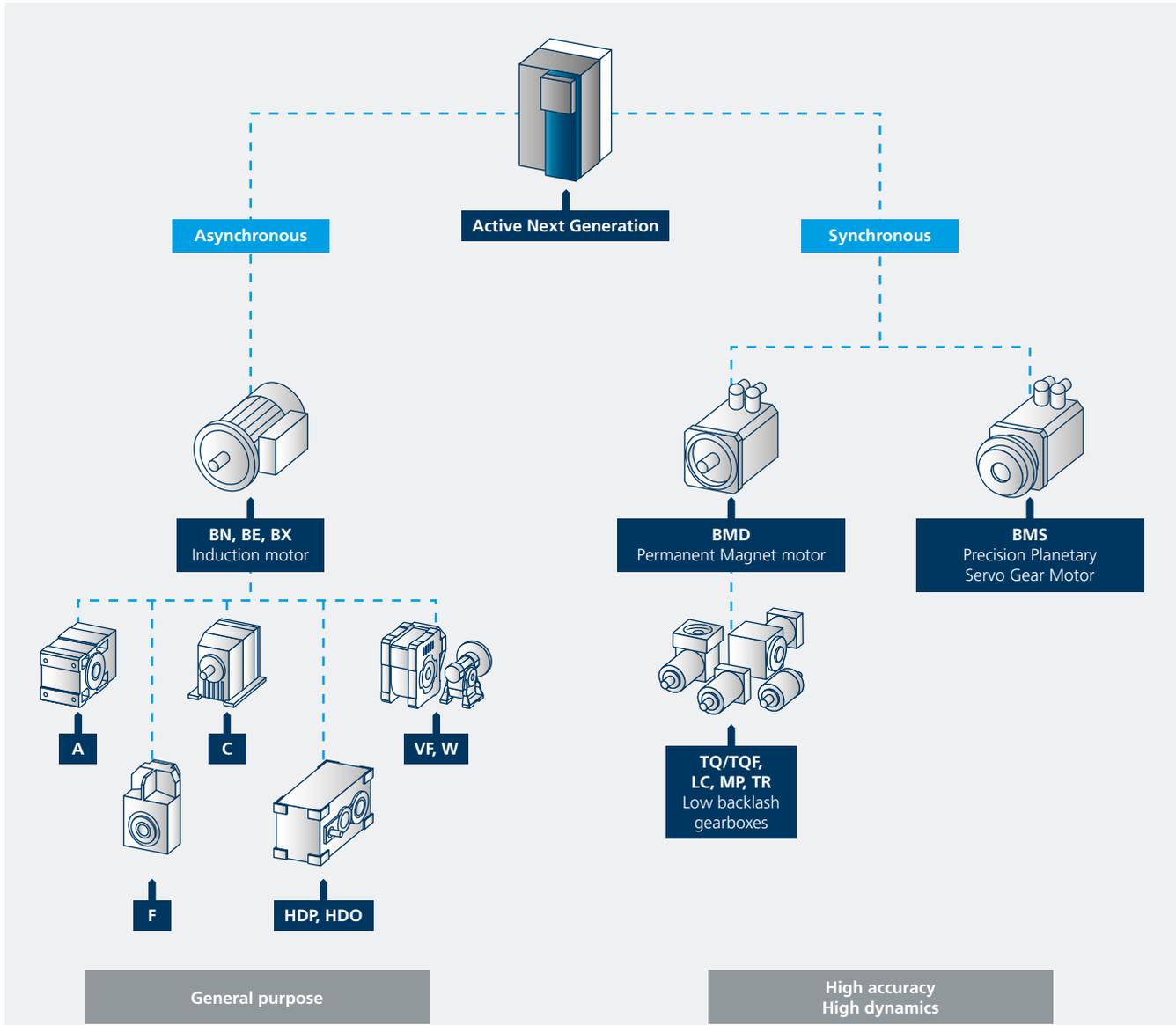
Power range:  
0.25 ... 1200 kW



**iBMD**

Torque range  
2.7...36 Nm

# Bonfiglioli system range ANG210/410/510/610



*This catalogue concerns Active Next Generation series and Active Next Generation accessories.  
For information about the other products showed in above overview, please refer to relevant catalogues.*

# The designation of ANGx10 series

**ANG 410 - 07 1 F A**

**Version**

- A** Standard
- C** Coldplate
- L** Liquid Cooling, stainless Steel, open cooling circuit
- M** Liquid Cooling, Aluminium, closed cooling circuit

**Filter**

- F** Integrated EMI-filter
- Without EMI-filter

**Mechanical Size**

- 1** Frame Size 1
- ...
- 8** Frame Size 8

**Power**

|                   |                   |                  |                  |
|-------------------|-------------------|------------------|------------------|
| <b>01</b> 0.25 kW | <b>18</b> 4.0 kW  | <b>31</b> 30 kW  | <b>49</b> 132 kW |
| <b>03</b> 0.37 kW | <b>19</b> 5.5 kW  | <b>33</b> 37 kW  | <b>51</b> 160 kW |
| <b>05</b> 0.55 kW | <b>21</b> 7.5 kW  | <b>35</b> 45 kW  | <b>53</b> 200 kW |
| <b>07</b> 0.75 kW | <b>22</b> 9.2 kW  | <b>37</b> 55 kW  | <b>55</b> 250 kW |
| <b>09</b> 1.1 kW  | <b>23</b> 11 kW   | <b>39</b> 65 kW  | <b>57</b> 315 kW |
| <b>11</b> 1.5 kW  | <b>25</b> 15 kW   | <b>43</b> 75 kW  | <b>59</b> 355 kW |
| <b>13</b> 2.2 kW  | <b>27</b> 18.5 kW | <b>45</b> 90 kW  | <b>61</b> 400 kW |
| <b>15</b> 3.0 kW  | <b>29</b> 22 kW   | <b>47</b> 110 kW |                  |

**Device**

- 210** 1/3 x 230 V<sub>AC</sub>
- 410** 3 x 400 V<sub>AC</sub> / 480 V<sub>AC</sub>
- 510** 3 x 525 V<sub>AC</sub>
- 610** 3 x 690 V<sub>AC</sub>

# The order code of ANGx10 series

|            |            |          |           |          |          |          |          |          |          |          |          |          |
|------------|------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>ANG</b> | <b>410</b> | <b>-</b> | <b>07</b> | <b>1</b> | <b>F</b> | <b>A</b> | <b>S</b> | <b>B</b> | <b>X</b> | <b>S</b> | <b>X</b> | <b>0</b> |
|------------|------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|

**0** Reserved for future use

**IT Bridge\***  
**X** Without IT Bridge  
**W** With IT Bridge (Standard)

**Safety**  
**S** STO (Safe Torque Off)

**Communication ANG**  
**A** EtherCAT  
**D** EtherCAT without Absolute Encoder  
**J** PROFINET  
**R** Ethernet/IP  
**V** Varan

**Coating**  
**B** With Coating

**Brake Chopper**  
**X** Without BC (size 6, 7 and 8 only)  
**S** BC included (standard)

**Version**  
**A** Standard  
**C** Coldplate (Size 1 to 5)  
**L** Liquid Cooling, stainless Steel, open cooling circuit (Size 5 to 8)  
**M** Liquid Cooling, Aluminium, closed cooling circuit (Size 8)

**Filter**  
**F** Integrated EMI-filter  
**(blank)** Without EMI-filter

**Mechanical Size**  
**1** Frame Size 1  
 ...  
**8** Frame Size 8

**Power**

|                   |                   |                  |                  |
|-------------------|-------------------|------------------|------------------|
| <b>01</b> 0.25 kW | <b>18</b> 4.0 kW  | <b>31</b> 30 kW  | <b>49</b> 132 kW |
| <b>03</b> 0.37 kW | <b>19</b> 5.5 kW  | <b>33</b> 37 kW  | <b>51</b> 160 kW |
| <b>05</b> 0.55 kW | <b>21</b> 7.5 kW  | <b>35</b> 45 kW  | <b>53</b> 200 kW |
| <b>07</b> 0.75 kW | <b>22</b> 9.2 kW  | <b>37</b> 55 kW  | <b>55</b> 250 kW |
| <b>09</b> 1.1 kW  | <b>23</b> 11 kW   | <b>39</b> 65 kW  | <b>57</b> 315 kW |
| <b>11</b> 1.5 kW  | <b>25</b> 15 kW   | <b>43</b> 75 kW  | <b>59</b> 355 kW |
| <b>13</b> 2.2 kW  | <b>27</b> 18.5 kW | <b>45</b> 90 kW  | <b>61</b> 400 kW |
| <b>15</b> 3.0 kW  | <b>29</b> 22 kW   | <b>47</b> 110 kW |                  |

**Drive Version**  
**-** Standard  
**P** Synthetic Mains (in Progress)  
**S** Spindle Drive (in Progress)  
**W** Winding Drive (in Progress)

**Device**  
**210** 1/3 x 230 V<sub>AC</sub>  
**410** 3 x 400 V<sub>AC</sub> / 480 V<sub>AC</sub>  
**510** 3 x 525 V<sub>AC</sub>  
**610** 3 x 690 V<sub>AC</sub>

**Notes:**  
 (\*) In Sizes 1...4 the IT Bridge can be permanently removed by the user.  
 Sizes 5...8 have to be ordered according to the application requirements to receive the necessary modifications ex factory.

# Hardware

## Mounting and Cooling

- Standard Cabinet Mounting with Air Cooling (all mechanical sizes)
- ColdPlate Mounting (mechanical sizes 1...5)
- Liquid Cooling (mechanical sizes 5...8)
- DIN Rail mounting (mechanical sizes 1 & 2)
- Vibration resilient mounting kit for Air Cooling devices (mechanical sizes 1...6)

## Performance

- Very high performance for speed, position and current control
- Both "system drive" and "servo drive" focusing on applications where Ethernet-based communication and Absolute encoder is used at the same time
- Optimized combination with Bonfiglioli BMD and BCR servomotor motor series
- Integration of Ethernet based Communication and encoder evaluation ex factory

## Automation

- Small dimensions and high power density in all sizes
- "Book shape" in smaller sizes for easy integration in automation cabinets
- External 24V<sub>DC</sub> supply input for control board supply from backup systems
- Motor thermal evaluation
- Position and speed feedback input (encoder/resolver)
- Isolated CAN terminals (usable for either CANopen or Bonfiglioli Vectron System bus for fast communication among Bonfiglioli ANG drives)
- Encoder support: TTL, HTL, Resolver, SinCos, Hiperface, EnDat 2.1, EnDat 2.2, SSI

## Electrical

- Plug in control terminals for easy and fast connection
- Plug in power terminals up to 4 kW
- DC link bus for "energy sharing" in multidrive system architectures
- Integral EMI filters (EN 61800-3) up to 9.2 kW
- Integrated brake transistor on all sizes by default, sizes 6...8 available without brake transistor as option

## Options and accessories

- Multifunction keypad with monitoring and programming functions
- Drive-PC connection kit for advanced configuration with engineering software VPlus
- Comprehensive power and control cable packs for fast and easy connection to Bonfiglioli BMD and BCR servomotors

## Functional Safety

- Safe Torque Off (STO)
- Safe Stop 1 (SS1 c) with Safety Switch
- SIL3 (EN61800-5-2) and PL e (EN ISO13849-1)

## Robustness

- Coated boards to enhance the device resilience
- Vibration robustness according to DIN EN 60068-2-6: Test Fc and DIN EN 60068-2-27: Test Ea

# Software

## Flexibility

- Control of asynchronous motors and synchronous motors (all without or with encoder feedback)
- Preset values for Bonfiglioli motors to decrease commissioning times
- Full set of operation modes, freely selectable:
  - Servo synchronous control with Resolver or Absolute encoder feedback
  - Field oriented (vector) control with Absolute encoder
  - Sensorless field oriented (vector) control for all supported motor types
- Flexible assignment of digital inputs and outputs to interface with software and hardware functions
- "Motor chopper" function to increase braking power without brake resistors
- 4 independent data sets
- Flying restart

## Automation

- Easy and powerful engineering software for parameter setting, diagnostic and aided commissioning
- Integrated powerful logic functions
- Speed and position synchronization between drives through Systembus
- Master/Slave operation
- Electronic gear with optional Phasing
- PI control with advanced derivative control
- Intelligent current limits
- Motor potentiometer control via digital input, control unit and communication interface

## Servo

- Configurable position control and speed control via parameters
- Integrated motion software including homing functions and flying homing, units converter, programmable motion blocks to design and test even complex motion profiles
- Cyclic Synchronous Velocity and Cyclic Synchronous Positioning Mode including Cubic Interpolation.
- Rotary table function
- S-ramps selection with separate adjustable acceleration/deceleration and jerk limitation
- Easy integration with CiA402 objects and functionality
- Auto-Tuning for angle determination (Resolver or absolute encoder) for Synchronous motors

## Safety

- Mains voltage monitoring and buffering function to overcome short time power failures
- Adjustable Motor protection functions
- Overload protection and automatic best switching frequency adjustment

## Diagnosis

- Phase monitoring
- Mean and peak values storage
- Fault register (application and device)
- Optional Extension with Keypad and PC connection

## Advanced application functions

- Power failure regulation to ramp down in a controlled way
- Spindle control with "tool change" positioning
- "Traverse" function for winders
- "Index" function for enhanced sensorless synchronization
- Advanced brake release control (lifting applications)
- Load detection function

## Engineering software

- Extended Brake Control
- Easy programming interface
- Real time oscilloscope and variable values monitor for enhanced troubleshooting analysis
- Effective and easy management of motion block parameters
- A simple and guided procedure for set up with Bonfiglioli motors (asynchronous, synchronous)
- Logic function programming section with 64 functions

## General technical data

### Environment

#### Operating conditions

- 0°C - 40°C (40°C - 55°C with derating)
- Pollution Degree 2
- Overvoltage Category III

#### Environment class

- Operation 3K3 (EN60721-3-3)
- Relative humidity 15% ... 85%, no moisture condensation

#### Altitude of installation

- Up to 1000m (up to 4000 with derating)

#### Storage conditions

- According to EN50178

#### Protection degree (EN 60529)

- IP20 with correctly mounted covers and connection terminals

#### Environmental operation conditions according to DIN EN 60721-3-3:

- 3Z1 (negligible thermal radiation)
- 3B1 (no biological impact)
- 3C1 (chemically active substances, limits as per standard)
- 3S1 (mechanically active substances, no sand in air, limits as per standard)
- 3M4 (mechanical vibration and shocks, limits as per standard)

### Electrical

#### Rated mains voltage

- ANG 210 in the range 184-0% ... 264 V+0%
- ANG 410 in the range 320-0% ... 528 V+0%
- ANG 510 with 525 V
- ANG 610 with 690 V

#### Rated mains frequency

- 45 ... 66 Hz

#### Overload current / Peak current

- 150 % Rated current for 60 s (200 % for 0.25 and 0.37 kW)
- 200 % Rated Current for 1 s for most ratings

#### Electric protection

- Short circuit / Earth fault proof

#### Braking transistor

- Built-in by default, optionally available without in mechanical 6,7 & 8

### Standards

#### CE conformity:

- 2014/35/EU (Low voltage directive)
- 2014/30/EU (Electromagnetic Compatibility Directive)
- 2011/65/EU (RoHS Directive)
- EN61800-5-1:2007 (Adjustable speed electrical power drive systems - Safety requirements - Electrical, thermal and energy)
- EN61800-3:2004 + A1:2012 (Adjustable speed electrical power drive systems - EMC requirements and specific test methods)

#### Interference immunity

- According to EN 61800-3 for use in industrial environments

#### UL approval

- UL/CSA approval, according to ul508c/CSA 22.2-No.14

## ANG210 - Technical data (from 0.25 to 3.0 kW)

| ANG210-                                    |          |                 | 01   | 03   | 05   | 07   | 09                 | 11                 | 13                  | 15                  |  |
|--|----------|-----------------|--|------|------|------|--------------------|--------------------|---------------------|---------------------|--|
|  |          |                 | Size 1 (F, A or C)   |      |      |      |                    | Size 2 (F, A or C) |                     |                     |  |
| <b>Output, motor side<sup>(1)</sup></b>    |          |                 |  |      |      |      |                    |                    |                     |                     |  |
| Recommended rated motor power              | $P_n$    | kW              | 0.25   | 0.37 | 0.55 | 0.75 | 1.1                | 1.5                | 2.2                 | 3.0                 |  |
| Rated motor current output                 | $I_n$    | A               | 1.6  | 2.5  | 3.0  | 4.0  | 5.4                | 7.0                | 9.5                 | 12.5 <sup>(1)</sup> |  |
| Rated motor voltage output                 | $U_n$    | V               | 3 x (from 0 to mains voltage)  |      |      |      |                    |                    |                     |                     |  |
| Overload current (60 s)                    | $I_{oc}$ | A               | 3.2  | 5.0  | 5.4  | 6.0  | 7.3                | 10.5               | 14.3                | 16.2                |  |
| Peak current (1 s)                         | $I_{pk}$ | A               | 3.2  | 5.0  | 6.0  | 8.0  | 8.0                | 14.0               | 19.0                | 19.0                |  |
| Switching frequency                        | $f_c$    | kHz             | From 2 to 16 kHz (Default: 4 kHz)  |      |      |      |                    |                    |                     |                     |  |
| Output frequency                           | $f_n$    | Hz              | 0 ... 599 Hz <sup>(2)</sup>  |      |      |      |                    |                    |                     |                     |  |
| <b>Input, mains side</b>                   |          |                 |  |      |      |      |                    |                    |                     |                     |  |
| Rated mains voltage                        | U        | V               | 230 (184 ... 264)  |      |      |      |                    |                    |                     |                     |  |
| Rated current 3 ph                         | I        | A               | 1.6  | 2.5  | 3.0  | 4.0  | 5.5 <sup>(4)</sup> | 7.0                | 9.5                 | 10.5 <sup>(4)</sup> |  |
| Recommended Mains fuses 3ph                | I        | A               | 6  | 6    | 6    | 6    | 10                 | 10                 | 16                  | 16                  |  |
| Rated current 1 ph/N; 2 ph                 | I        | A               | 2.9  | 4.5  | 5.4  | 7.2  | 9.5 <sup>(4)</sup> | 13.2               | 16.5 <sup>(4)</sup> | 16.5 <sup>(4)</sup> |  |
| Recommended Mains fuses 1 ph/N; 2ph        | I        | A               | 6  | 10   | 10   | 10   | 16                 | 16                 | 20                  | 20                  |  |
| <b>General</b>                             |          |                 |  |      |      |      |                    |                    |                     |                     |  |
| Connection Signal terminals <sup>(1)</sup> | A        | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   |      |      |      |                    |                    |                     |                     |  |
| Connection Power terminals <sup>(1)</sup>  | A        | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   |      |      |      |                    |                    |                     |                     |  |
| Short circuit / ground fault protection    | -        | -               | Yes  |      |      |      |                    |                    |                     |                     |  |
| Mounting position                          | -        | -               | Vertical   |      |      |      |                    |                    |                     |                     |  |
| Dimensions Standard Device                 | HxWxD    | mm              | 190 x 60 x 175   |      |      |      |                    | 250 x 60 x 175     |                     |                     |  |
| Dimensions ColdPlate Device                | HxWxD    | mm              | 190 x 82 x 140   |      |      |      |                    | 250 x 85 x 140     |                     |                     |  |
| Weight (approx.)                           | m        | kg              | 1.2  |      |      |      |                    | 1.6                |                     |                     |  |
| Brake chopper                              | -        | -               | Internal brake chopper   |      |      |      |                    |                    |                     |                     |  |
| UL/CSA approval                            | -        | -               | ul508c/CSA 22.2-No.14  |      |      |      |                    |                    |                     |                     |  |
| <b>Environment</b>                         |          |                 |  |      |      |      |                    |                    |                     |                     |  |
| Cooling temperature                        | $T_n$    | °C              | From 0 to 40   |      |      |      |                    |                    |                     |                     |  |
| Relative air humidity                      | -        | %               | From 15 to 85, non-condensing  |      |      |      |                    |                    |                     |                     |  |
| <b>Options &amp; accessories</b>           |          |                 |  |      |      |      |                    |                    |                     |                     |  |
| Screen sheet for cable screens             | -        | -               | SCR1-2   |      |      |      |                    |                    |                     |                     |  |
| Pass through mounting kit                  | -        | -               | MPVS1  |      |      |      |                    | MPVS2              |                     |                     |  |
| Increased Vibration mounting kit           | -        | -               | MNVIB1   |      |      |      |                    | MNVIB2             |                     |                     |  |
| DIN rail mounting kit                      | -        | -               | MDIN1  |      |      |      |                    | MDIN2              |                     |                     |  |
| Input line choke                           | -        | -               | External (depending on mains supply)   |      |      |      |                    |                    |                     |                     |  |
| EMI filter                                 | -        | -               | Internal Filter: Class A2 / External Filter or external choke: Class A1 / B <sup>(3)</sup> |      |      |      |                    |                    |                     |                     |  |

### Notes:

(1) Please check the Operating Instructions for additional data

(2) Higher frequencies available on request

(3) For more details, please check the Input filter table in this catalogue

(4) Continuous operation with rated current requires a line choke

## ANG210 - Technical data (from 4.0 to 9.2 kW)

| ANG210-                                    |          |                 | 18   | 19                | 21                  | 22                  |
|--|----------|-----------------|--|-------------------|---------------------|---------------------|
|  |          |                 | Size 3 (- or F, A or C)  |                   | Size 4 (-, A or C)  |                     |
| <b>Output, motor side <sup>(1)</sup></b>   |          |                 |  |                   |                     |                     |
| Recommended rated motor power              | $P_n$    | kW              | 4.0  | 5.5               | 7.5                 | 9.2                 |
| Rated motor current output                 | $I_n$    | A               | 18.0   | 22.0              | 32.0                | 35.0                |
| Rated motor voltage output                 | $U_n$    | V               | 3 x (from 0 to mains voltage)  |                   |                     |                     |
| Overload current (60 s)                    | $I_{oc}$ | A               | 26.3   | 30.3              | 44.5                | 51.5                |
| Peak current (1 s)                         | $I_{pk}$ | A               | 33.0   | 33.0              | 64.0                | 64.0                |
| Switching frequency                        | $f_c$    | kHz             | From 2 to 16 kHz (Default: 4 kHz)  |                   |                     |                     |
| Output frequency                           | $f_n$    | Hz              | 0 ... 599 Hz <sup>(2)</sup>  |                   |                     |                     |
| <b>Input, mains side</b>                   |          |                 |  |                   |                     |                     |
| Rated mains voltage                        | U        | V               | 230 (184 ... 264)  |                   |                     |                     |
| Rated current 3 ph                         | I        | A               | 18   | 20 <sup>(3)</sup> | 28.2 <sup>(3)</sup> | 35.6 <sup>(3)</sup> |
| Recommended Mains fuses                    | I        | A               | 25   |                   | 35                  | 50                  |
| <b>General</b>                             |          |                 |  |                   |                     |                     |
| Connection Signal terminals <sup>(1)</sup> | A        | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   |                   |                     |                     |
| Connection Power terminals <sup>(1)</sup>  | A        | mm <sup>2</sup> | 0.2 ... 6  |                   | 0.2 ... 16          |                     |
| Short circuit / ground fault protection    | -        | -               | Yes  |                   |                     |                     |
| Mounting position                          | -        | -               | Vertical   |                   |                     |                     |
| Dimensions Standard Device                 | HxWxD    | mm              | 250 x 100 x 200  |                   | 250 x 125 x 200     |                     |
| Dimensions ColdPlate Device                | HxWxD    | mm              | 250 x 125 x 144  |                   | 250 x 150 x 144     |                     |
| Weight (approx.)                           | m        | kg              | 3.0  |                   | 3.7                 |                     |
| Brake chopper                              | -        | -               | Internal brake chopper   |                   |                     |                     |
| UL/CSA approval                            | -        | -               | -  |                   |                     |                     |
| <b>Environment</b>                         |          |                 |  |                   |                     |                     |
| Cooling temperature                        | $T_n$    | °C              | From 0 to 40   |                   |                     |                     |
| Relative air humidity                      | -        | %               | From 15 to 85, non-condensing  |                   |                     |                     |
| <b>Options &amp; accessories</b>           |          |                 |  |                   |                     |                     |
| Screen sheet for cable screens             | -        | -               | SCR3   |                   | SCR4                |                     |
| Pass through mounting kit                  | -        | -               | MPVS3  |                   | MPVS4               |                     |
| Increased Vibration mounting kit           | -        | -               | MNVIB3   |                   | MNVIB4              |                     |
| Input line choke                           | -        | -               | External (depending on mains supply)   |                   |                     |                     |
| EMI filter                                 | -        | -               | For selection of EMI related components, please check the Input filter table in this catalogue |                   |                     |                     |

### Notes:

(1) Please check the Operating Instructions for additional data

(2) Higher frequencies available on request

(3) Continuous operation with rated current requires a line choke

## ANG410 - Technical data (from 0.25 to 3.0 kW)

| ANG410-                                    |                 |                 | 01   | 03   | 05   | 07   | 09                 | 11                 | 12                 | 13   | 15                 |  |
|--|-----------------|-----------------|--|------|------|------|--------------------|--------------------|--------------------|------|--------------------|--|
|  |                 |                 | Size 1 (F, A or C)   |      |      |      |                    |                    | Size 2 (F, A or C) |      |                    |  |
| <b>Output, motor side<sup>(1)</sup></b>    |                 |                 |  |      |      |      |                    |                    |                    |      |                    |  |
| Recommended rated motor power              | P <sub>n</sub>  | kW              | 0.25   | 0.37 | 0.55 | 0.75 | 1.1                | 1.5                | 1.85               | 2.2  | 3.0                |  |
| Rated motor current output                 | I <sub>n</sub>  | A               | 1.0  | 1.6  | 1.8  | 2.4  | 3.2                | 3.8                | 4.2                | 5.8  | 7.8                |  |
| Rated motor voltage output                 | U <sub>n</sub>  | V               | 3 x (from 0 to mains voltage)  |      |      |      |                    |                    |                    |      |                    |  |
| Overload current (60 s)                    | I <sub>oc</sub> | A               | 2.0  | 3.2  | 2.7  | 3.6  | 4.8                | 5.7                | 6.3                | 8.7  | 11.7               |  |
| Peak current (1 s)                         | I <sub>pk</sub> | A               | 2.0  | 3.2  | 3.6  | 4.8  | 6.4                | 7.6                | 8.4                | 11.6 | 15.6               |  |
| Switching frequency                        | f <sub>c</sub>  | kHz             | From 2 to 16 kHz (Default: 4 kHz)  |      |      |      |                    |                    |                    |      |                    |  |
| Output frequency                           | f <sub>n</sub>  | Hz              | 0 ... 599 Hz <sup>(1)</sup>  |      |      |      |                    |                    |                    |      |                    |  |
| <b>Input, mains side</b>                   |                 |                 |  |      |      |      |                    |                    |                    |      |                    |  |
| Rated mains voltage                        | U               | V               | 400 (320 ... 528)  |      |      |      |                    |                    |                    |      |                    |  |
| Rated current 3 ph                         | I               | A               | 1.0  | 1.6  | 1.8  | 2.4  | 2.8 <sup>(3)</sup> | 3.3 <sup>(3)</sup> | 4.2                | 5.8  | 6.8 <sup>(3)</sup> |  |
| Recommended Mains fuses                    | I               | A               | 6  |      |      |      |                    |                    | 6                  | 10   |                    |  |
| <b>General</b>                             |                 |                 |  |      |      |      |                    |                    |                    |      |                    |  |
| Connection Signal terminals <sup>(1)</sup> | A               | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   |      |      |      |                    |                    |                    |      |                    |  |
| Connection Power terminals <sup>(1)</sup>  | A               | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   |      |      |      |                    |                    |                    |      |                    |  |
| Short circuit / ground fault protection    | -               | -               | Yes  |      |      |      |                    |                    |                    |      |                    |  |
| Mounting position                          | -               | -               | Vertical   |      |      |      |                    |                    |                    |      |                    |  |
| Dimensions Standard Device                 | HxWxD           | mm              | 190 x 60 x 175   |      |      |      |                    |                    | 250 x 60 x 175     |      |                    |  |
| Dimensions ColdPlate Device                | HxWxD           | mm              | 190 x 82 x 140   |      |      |      |                    |                    | 250 x 85 x 140     |      |                    |  |
| Weight (approx.)                           | m               | kg              | 1.2  |      |      |      |                    |                    | 1.6                |      |                    |  |
| Brake chopper                              | -               | -               | Internal brake chopper   |      |      |      |                    |                    |                    |      |                    |  |
| UL/CSA approval                            | -               | -               | ul508c/CSA 22.2-No.14  |      |      |      |                    |                    |                    |      |                    |  |
| <b>Environment</b>                         |                 |                 |  |      |      |      |                    |                    |                    |      |                    |  |
| Cooling temperature                        | T <sub>n</sub>  | °C              | From 0 to 40   |      |      |      |                    |                    |                    |      |                    |  |
| Relative air humidity                      | -               | %               | From 15 to 85, non-condensing  |      |      |      |                    |                    |                    |      |                    |  |
| <b>Options &amp; accessories</b>           |                 |                 |  |      |      |      |                    |                    |                    |      |                    |  |
| Screen sheet for cable screens             | -               | -               | SCR1-2   |      |      |      |                    |                    |                    |      |                    |  |
| Pass through mounting kit                  | -               | -               | MPVS1  |      |      |      |                    |                    | MPVS2              |      |                    |  |
| Increased Vibration mounting kit           | -               | -               | MNVIB1   |      |      |      |                    |                    | MNVIB2             |      |                    |  |
| DIN rail mounting kit                      | -               | -               | MDIN1  |      |      |      |                    |                    | MDIN2              |      |                    |  |
| Input line choke                           | -               | -               | External (depending on mains supply)   |      |      |      |                    |                    |                    |      |                    |  |
| EMI filter                                 | -               | -               | Internal Filter: Class A2 / External Filter or external choke: Class A1 / B <sup>(4)</sup> |      |      |      |                    |                    |                    |      |                    |  |

### Notes:

(1) Please check the Operating Instructions for additional data

(2) Higher frequencies available on request

(3) Continuous operation with rated current requires a line choke

(4) For more details, please check the Input filter table in this catalogue

## ANG410 - Technical data (from 4.0 to 15 kW)

| ANG410-                                    |          |                 | 18   | 19                      | 21                  | 22                  | 23                 | 25                  |
|--|----------|-----------------|--|-------------------------|---------------------|---------------------|--------------------|---------------------|
|  |          |                 | Size 2 (F, A or C)   | Size 3 (- or F, A or C) |                     |                     | Size 4 (-, A or C) |                     |
| <b>Output, motor side <sup>(1)</sup></b>   |          |                 |  |                         |                     |                     |                    |                     |
| Recommended rated motor power              | $P_n$    | kW              | 4.0  | 5.5                     | 7.5                 | 9.2                 | 11.0               | 15.0                |
| Rated motor current output                 | $I_n$    | A               | 9.0  | 14.0                    | 18.0                | 22.0                | 25.0               | 32.0                |
| Rated motor voltage output                 | $U_n$    | V               | 3 x (from 0 to mains voltage)  |                         |                     |                     |                    |                     |
| Overload current (60 s)                    | $I_{oc}$ | A               | 13.5   | 21.0                    | 26.3                | 30.3                | 37.5               | 44.5                |
| Peak current (1 s)                         | $I_{pk}$ | A               | 18.0   | 28.0                    | 33.0                | 33.0                | 50.0               | 64.0                |
| Switching frequency                        | $f_c$    | kHz             | From 2 to 16 kHz (Default: 4 kHz)  |                         |                     |                     |                    |                     |
| Output frequency                           | $f_n$    | Hz              | 0 ... 599 Hz <sup>(2)</sup>  |                         |                     |                     |                    |                     |
| <b>Input, mains side</b>                   |          |                 |  |                         |                     |                     |                    |                     |
| Rated mains voltage                        | U        | V               | 400 (320 ... 528)  |                         |                     |                     |                    |                     |
| Rated current 3 ph                         | I        | A               | 7.8 <sup>(3)</sup>   | 14.2                    | 15.8 <sup>(3)</sup> | 20.0 <sup>(3)</sup> | 26.0               | 28.2 <sup>(3)</sup> |
| Recommended Mains fuses                    | I        | A               | 10.0   | 16.0                    | 25.0                |                     | 35.0               |                     |
| <b>General</b>                             |          |                 |  |                         |                     |                     |                    |                     |
| Connection Signal terminals <sup>(1)</sup> | A        | mm <sup>2</sup> | 0. 2... 1.5 (detachable terminals)   |                         |                     |                     |                    |                     |
| Connection Power terminals <sup>(1)</sup>  | A        | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   | 0.2 ... 6               |                     |                     | 0.2 ... 16         |                     |
| Short circuit / ground fault protection    | -        | -               | Yes  |                         |                     |                     |                    |                     |
| Mounting position                          | -        | -               | Vertical   |                         |                     |                     |                    |                     |
| Dimensions Standard Device                 | HxWxD    | mm              | 250 x 60 x 175   | 250 x 100 x 200         |                     |                     | 250 x 125 x 200    |                     |
| Dimensions ColdPlate Device                | HxWxD    | mm              | 250 x 85 x 144   | 250 x 125 x 144         |                     |                     | 250 x 150 x 144    |                     |
| Weight (approx.)                           | m        | kg              | 1.6  | 3.0                     |                     |                     | 3.7                |                     |
| Brake chopper                              | -        | -               | Internal brake chopper   |                         |                     |                     |                    |                     |
| UL/CSA approval                            | -        | -               | ul508c/CSA 22.2-No.14  |                         |                     |                     |                    |                     |
| <b>Environment</b>                         |          |                 |  |                         |                     |                     |                    |                     |
| Cooling temperature                        | $T_n$    | °C              | From 0 to 40   |                         |                     |                     |                    |                     |
| Relative air humidity                      | -        | %               | From 15 to 85, non-condensing  |                         |                     |                     |                    |                     |
| <b>Options &amp; accessories</b>           |          |                 |  |                         |                     |                     |                    |                     |
| Screen sheet for cable screens             | -        | -               | SCR1-2   | SCR3                    |                     |                     | SCR4               |                     |
| Pass through mounting kit                  | -        | -               | MPVS2  | MPVS3                   |                     |                     | MPVS4              |                     |
| Increased Vibration mounting kit           | -        | -               | MNVIB2   | MNVIB3                  |                     |                     | MNVIB4             |                     |
| DIN rail mounting kit                      | -        | -               | MDIN2  | -                       |                     |                     | -                  |                     |
| Input line choke                           | -        | -               | External (depending on mains supply)   |                         |                     |                     |                    |                     |
| EMI filter                                 | -        | -               | For selection of EMI related components, please check the Input filter table in this catalogue |                         |                     |                     |                    |                     |

**Notes:**

(1) Please check the Operating Instructions for additional data

(2) Higher frequencies available on request

(3) Continuous operation with rated current requires a line choke

## ANG410 - Technical data (from 18.5 to 65 kW)

| ANG410-                                    |                 |                 | 27   | 29   | 31                  | 33   | 35    | 37                   | 39                   |
|--|-----------------|-----------------|--|------|---------------------|--|-------|----------------------|----------------------|
|  |                 |                 | Size 5 (A or C or L)   |      |                     | Size 6 (- or N, A or L)                              |       |                      |                      |
| <b>Output, motor side<sup>(1)</sup></b>    |                 |                 |  |      |                     |  |       |                      |                      |
| Recommended rated motor power              | P <sub>n</sub>  | kW              | 18.5   | 22.0 | 30.0                | 37.0   | 45.0  | 55.0                 | 65.0                 |
| Rated motor current output                 | I <sub>n</sub>  | A               | 40.0   | 45.0 | 60.0                | 75.0   | 90.0  | 110.0                | 125.0                |
| Rated motor voltage output                 | U <sub>n</sub>  | V               | 3 x (from 0 to mains voltage)  |      |                     |  |       |                      |                      |
| Overload current (60 s)                    | I <sub>oc</sub> | A               | 60.0   | 67.5 | 90.0                | 112.5  | 135.0 | 165.0                | 187.5                |
| Peak current (1 s)                         | I <sub>pk</sub> | A               | 80.0   | 90.0 | 120.0               | 150.0  | 180.0 | 220.0                | 250.0                |
| Switching frequency                        | f <sub>c</sub>  | kHz             | From 2 to 8 kHz (Default: 4 kHz)   |      |                     |  |       |                      |                      |
| Output frequency                           | f <sub>n</sub>  | Hz              | 0 ... 599 Hz <sup>(2)</sup>  |      |                     |  |       |                      |                      |
| <b>Input, mains side</b>                   |                 |                 |  |      |                     |  |       |                      |                      |
| Rated mains voltage                        | U               | V               | 400 (320 ... 528)  |      |                     |  |       |                      |                      |
| Rated current 3 ph                         | I               | A               | 42.0   | 50.0 | 58.0 <sup>(3)</sup> | 87.0   | 104.0 | 105.0 <sup>(3)</sup> | 120.0 <sup>(3)</sup> |
| Recommended Mains fuses                    | I               | A               | 50.0   |      | 63.0                | 100.0  | 125.0 | 125.0                |                      |
| <b>General</b>                             |                 |                 |  |      |                     |  |       |                      |                      |
| Connection Signal terminals <sup>(1)</sup> | A               | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   |      |                     |  |       |                      |                      |
| Connection Power terminals <sup>(1)</sup>  | A               | mm <sup>2</sup> | ... 25   |      |                     | ... 70   |       |                      |                      |
| Short circuit / ground fault protection    | -               | -               | Yes  |      |                     |  |       |                      |                      |
| Mounting position                          | -               | -               | Vertical   |      |                     |  |       |                      |                      |
| Dimensions Standard Device                 | HxWxD           | mm              | 250 x 200 x 260  |      |                     | 400 x 275 x 260                                      |       |                      |                      |
| Dimensions ColdPlate Device                | HxWxD           | mm              | 250 x 225 x 171  |      |                     | -  |       |                      |                      |
| Dimensions Liquid Cooling Device           | HxWxD           | mm              | 480 x 300 x 220  |      |                     | 480 x 300 x 208                                      |       |                      |                      |
| Weight Standard Device (approx.)           | m               | kg              | 8.0  |      |                     | 20.0   |       |                      |                      |
| Weight ColdPlate Device (approx.)          | m               | kg              | 6.0  |      |                     | -  |       |                      |                      |
| Weight Liquid Cooling Device (approx.)     | m               | kg              | 22.0   |      |                     | 25.0   |       |                      |                      |
| Brake chopper                              | -               | -               | Internal brake chopper   |      |                     | Internal brake chopper, optionally available without |       |                      |                      |
| UL/CSA approval: Device series "A" & "C"   | -               | -               | ul508c/CSA 22.2-No.14  |      |                     |  |       |                      |                      |
| UL/CSA approval: Device series "L"         | -               | -               | -  |      |                     |  |       |                      |                      |
| <b>Environment</b>                         |                 |                 |  |      |                     |  |       |                      |                      |
| Cooling temperature <sup>(4)</sup>         | T <sub>n</sub>  | °C              | From 0 to 40   |      |                     |  |       |                      |                      |
| Relative air humidity                      | -               | %               | From 15 to 85, non-condensing  |      |                     |  |       |                      |                      |
| <b>Options &amp; accessories</b>           |                 |                 |  |      |                     |  |       |                      |                      |
| Screen sheet for cable screens             | -               | -               | SCR5   |      |                     | -  |       |                      |                      |
| Pass through mounting kit                  | -               | -               | MPVS5  |      |                     | MPVS6  |       |                      |                      |
| Increased Vibration mounting kit           | -               | -               | MNVIB5   |      |                     | MNVIB6   |       |                      |                      |
| Input line choke                           | -               | -               | External (depending on mains supply)   |      |                     |  |       |                      |                      |
| EMI filter                                 | -               | -               | For selection of EMI related components, please check the Input filter table in this catalogue |      |                     |  |       |                      |                      |

### Notes:

(1) Please check the Operating Instructions for additional data

(2) Higher frequencies available on request

(3) Continuous operation with rated current requires a line choke

(4) When using Liquid Cooling devices, please check the Additional Operating Instructions for Liquid Cooling

## ANG410 - Technical data (from 75 to 132 kW)

| ANG410-                                    |          |                 | 43   | 45                 | 47                 | 49                 |
|--|----------|-----------------|--|--------------------|--------------------|--------------------|
| Size 7 (- or N, A or L)                    |          |                 |  |                    |                    |                    |
| <b>Output, motor side <sup>(1)</sup></b>   |          |                 |  |                    |                    |                    |
| Recommended rated motor power              | $P_n$    | kW              | 75   | 90                 | 110                | 132                |
| Rated motor current output                 | $I_n$    | A               | 150  | 180                | 210                | 250                |
| Rated motor voltage output                 | $U_n$    | V               | 3 x (from 0 to mains voltage)  |                    |                    |                    |
| Overload current (60 s)                    | $I_{oc}$ | A               | 225  | 270                | 315                | 332                |
| Peak current (1 s)                         | $I_{pk}$ | A               | 270  | 325                | 375                | 375                |
| Switching frequency                        | $f_c$    | kHz             | From 2 to 8 kHz (Default: 4 kHz)   |                    |                    |                    |
| Output frequency                           | $f_n$    | Hz              | 0 ... 599 Hz <sup>(2)</sup>  |                    |                    |                    |
| <b>Input, mains side</b>                   |          |                 |  |                    |                    |                    |
| Rated mains voltage                        | U        | V               | 400 (320 ... 528)  |                    |                    |                    |
| Rated current 3 ph                         | I        | A               | 143 <sup>(4)</sup>   | 172 <sup>(4)</sup> | 208 <sup>(4)</sup> | 249 <sup>(4)</sup> |
| Recommended Mains fuses                    | I        | A               | 160  | 200                | 250                | 315                |
| <b>General</b>                             |          |                 |  |                    |                    |                    |
| Connection Signal terminals <sup>(1)</sup> | A        | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   |                    |                    |                    |
| Connection Power terminals <sup>(1)</sup>  | A        | mm <sup>2</sup> | ... 2x95   |                    |                    |                    |
| Short circuit / ground fault protection    | -        | -               | Yes  |                    |                    |                    |
| Mounting position                          | -        | -               | Vertical   |                    |                    |                    |
| Dimensions <sup>(3)</sup>                  | HxWxD    | mm              | 510 x 412 x 351  |                    |                    |                    |
| Weight (approx.)                           | m        | kg              | 48   |                    | 48                 |                    |
| Brake chopper                              | -        | -               | Internal brake chopper, optionally available without   |                    |                    |                    |
| UL/CSA approval: Device series "A"         | -        | -               | ul508c/CSA 22.2-No.14  |                    |                    |                    |
| UL/CSA approval: Device series "L"         | -        | -               | -  |                    |                    |                    |
| <b>Environment</b>                         |          |                 |  |                    |                    |                    |
| Cooling temperature <sup>(5)</sup>         | $T_n$    | °C              | From 0 to 40   |                    |                    |                    |
| Relative air humidity                      | -        | %               | From 15 to 85, non-condensing  |                    |                    |                    |
| <b>Options &amp; accessories</b>           |          |                 |  |                    |                    |                    |
| Pass through mounting kit                  |          |                 | MPVS7  |                    |                    |                    |
| Input line choke                           | -        | -               | External (depending on mains supply)   |                    |                    |                    |
| EMI filter                                 | -        | -               | For selection of EMI related components, please check the Input filter table in this catalogue |                    |                    |                    |

### Notes:

(1) Please check the Operating Instructions for additional data

(2) Higher frequencies available on request

(3) Dimensions are the same for Standard and Liquid

(4) Operation requires a line choke

(5) When using Liquid Cooling devices, please check the Additional Operating Instructions for Liquid Cooling

## ANGx10 - Technical data (from 160 to 400 kW)

| ANG410-/510-/610-                                      |   |                 | 51   | 53                        | 55                 | 57                 | 59                 | 61                 |                    |
|--|---|-----------------|--|---------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Size 8 (- or N, A or L or M)                           |   |                 |  |                           |                    |                    |                    |                    |                    |
| <b>Output, motor side<sup>(1)</sup></b>                |   |                 |  |                           |                    |                    |                    |                    |                    |
| Recommended rated motor power                          | $P_n$                                       | kW              | 160  | 200                       | 250                | 315                | 355                | 400                |                    |
| ANG410   | Rated motor current output                  | $I_n$           | A  | 305                       | 380                | 475                | 595                | 645                | 735                |
|  | Long-term overload current (60s)            | $I_{oc}$        | A  | 460                       | 570                | 715                | 895                | 970                | 1100               |
|  | Short-term overload current (1s)            | $I_{pk}$        | A  | 550                       | 685                | 855                | 1070               | 1160               | 1330               |
| ANG510   | Rated motor current output                  | $I_n$           | A  | 230                       | 290                | 360                | 450                | 490                | 560                |
|  | Long-term overload current (60s)            | $I_{oc}$        | A  | 345                       | 435                | 540                | 675                | 735                | 840                |
|  | Short-term overload current (1s)            | $I_{pk}$        | A  | 420                       | 520                | 650                | 810                | 880                | 1000               |
| ANG610   | Rated motor current output                  | $I_n$           | A  | 180                       | 230                | 280                | 350                | 400                | 450                |
|  | Long-term overload current (60s)            | $I_{oc}$        | A  | 270                       | 350                | 420                | 530                | 600                | 675                |
|  | Short-term overload current (1s)            | $I_{pk}$        | A  | 330                       | 420                | 510                | 630                | 720                | 810                |
| Rated motor voltage output                             | $U_n$                                       | V               | Maximum input voltage, three-phase   |                           |                    |                    |                    |                    |                    |
| Switching frequency                                    | $f_c$                                       | kHz             | From 2 to 8 kHz (Default: 4 kHz)   |                           |                    |                    |                    |                    |                    |
| Output frequency                                       | $f_n$                                       | Hz              | 0 ... 500 Hz   |                           |                    |                    |                    |                    |                    |
| <b>Input, mains side</b>                               |   |                 |  |                           |                    |                    |                    |                    |                    |
| ANG410   | Rated mains voltage                         | U               | V  | 400 (320 ... 528)         |                    |                    |                    |                    |                    |
|  | Rated current 3 ph <sup>(2)</sup>           | I               | A  | 280 <sup>(4)</sup>        | 350 <sup>(4)</sup> | 440 <sup>(4)</sup> | 550 <sup>(4)</sup> | 620 <sup>(4)</sup> | 690 <sup>(4)</sup> |
|  | Recommended Mains fuses 3 ph <sup>(3)</sup> | I               | A  | 400                       | 500                | 630                | 700                | 800                | 900                |
| ANG510   | Rated mains voltage                         | U               | V  | 525                       |                    |                    |                    |                    |                    |
|  | Rated current 3 ph <sup>(2)</sup>           | I               | A  | 215 <sup>(4)</sup>        | 270 <sup>(4)</sup> | 335 <sup>(4)</sup> | 420 <sup>(4)</sup> | 470 <sup>(4)</sup> | 525 <sup>(4)</sup> |
|  | Recommended Mains fuses 3 ph <sup>(3)</sup> | I               | A  | 315                       | 350                | 450                | 550                | 630                | 700                |
| ANG610   | Rated mains voltage                         | U               | V  | 690 (reduced for UL: 600) |                    |                    |                    |                    |                    |
|  | Rated current 3 ph <sup>(2)</sup>           | I               | A  | 160 <sup>(4)</sup>        | 200 <sup>(4)</sup> | 250 <sup>(4)</sup> | 320 <sup>(4)</sup> | 360 <sup>(4)</sup> | 410 <sup>(4)</sup> |
|  | Recommended Mains fuses 3 ph <sup>(3)</sup> | I               | A  | 252                       | 315                | 350                | 450                | 500                | 550                |
| <b>General</b>   |   |                 |  |                           |                    |                    |                    |                    |                    |
| Connection Signal terminals <sup>(1)</sup>             | A   | mm <sup>2</sup> | 0.2 ... 1.5 (detachable terminals)   |                           |                    |                    |                    |                    |                    |
| Connection Power terminals <sup>(1)</sup>              | A   | mm <sup>2</sup> | ... 2x240  |                           |                    |                    |                    |                    |                    |
| Short circuit / ground fault protection <sup>(3)</sup> | -   | -               | Yes  |                           |                    |                    |                    |                    |                    |
| Mounting position                                      | -   | -               | Vertical   |                           |                    |                    |                    |                    |                    |
| Dimensions   | HxWxD                                       | mm              | 1063 x 439 x 375   |                           |                    |                    |                    |                    |                    |
| Weight (approx.)                                       | m   | kg              | 120  | 120                       | 120                | 140                | 140                | 140                |                    |
| Brake chopper  | -   | -               | Internal brake chopper, optionally available without   |                           |                    |                    |                    |                    |                    |
| UL/CSA approval  | -   | -               | Available on request   |                           |                    |                    |                    |                    |                    |
| <b>Environment</b>                                     |   |                 |  |                           |                    |                    |                    |                    |                    |
| Cooling temperature <sup>(5)</sup>                     | $T_n$                                       | °C              | -25 ... 45   |                           |                    |                    |                    |                    |                    |
| Relative air humidity                                  | -   | %               | From 15 to 85, non-condensing  |                           |                    |                    |                    |                    |                    |
| <b>Options &amp; accessories</b>                       |   |                 |  |                           |                    |                    |                    |                    |                    |
| Input line choke                                       | -   | -               | External (depending on mains supply)   |                           |                    |                    |                    |                    |                    |
| EMI filter   | -   | -               | For selection of EMI related components, please check the Input filter table in this catalogue |                           |                    |                    |                    |                    |                    |

### Notes:

(1) Please check the Operating Instructions for additional data

(2) Related value with recommended motor power, rated mains voltage and mains inductance  $U_k=4\%$

(3) Semiconductor fuses recommended (in example Bussmann Type 170M)

(4) Operation requires a line choke

(5) When using Liquid Cooling devices, please check the Additional Operating Instructions for Liquid Cooling

# Automation modules

## Variants

With ordering the ANG device the Communication version has to be selected.



| VARIANT                                     |                    |                    |           |             |           |
|---|--------------------|--------------------|-----------|-------------|-----------|
| Device Designation part                     | A                  | D                  | J         | R           | V         |
| Module name                                 | EM-AUT-01          | EM-AUT-04          | EM-AUT-11 | EM-AUT-21   | EM-AUT-31 |
| <b>Protocol</b>                             |                    |                    |           |             |           |
| Ethernet                                    | EtherCAT           | EtherCAT           | PROFINET  | Ethernet/IP | Varan     |
| CAN <sup>(1)</sup>                          | Yes <sup>(2)</sup> | Yes <sup>(2)</sup> | Yes       | Yes         | Yes       |
| <b>Encoder Interface X412</b>               |                    |                    |           |             |           |
| Hiperface                                   | Yes                | No                 | Yes       | Yes         | Yes       |
| EnDat 2.1                                   | Yes                | No                 | Yes       | Yes         | Yes       |
| EnDat 2.2                                   | Yes                | No                 | Yes       | Yes         | Yes       |
| SSI   | Yes                | No                 | Yes       | Yes         | Yes       |
| SinCos                                      | Yes                | No                 | Yes       | Yes         | Yes       |
| TTL   | Yes                | No                 | Yes       | Yes         | Yes       |
| <b>Encoder Interface X410</b>               |                    |                    |           |             |           |
| Resolver                                    | Yes                | Yes                | Yes       | Yes         | Yes       |
| TTL   | Yes                | Yes                | Yes       | Yes         | Yes       |
| <b>Analogue Multifunctions IO Functions</b> |                    |                    |           |             |           |
| 0...+10 V Input                             | Yes                | No                 | Yes       | Yes         | Yes       |
| -10...+10 V Input                           | Yes                | No                 | Yes       | Yes         | Yes       |
| 0...20 mA Input                             | Yes                | No                 | Yes       | Yes         | Yes       |
| PTC Input (KTY, PT1000, PT100)              | Yes                | No                 | Yes       | Yes         | Yes       |
| 0...10 V Output                             | Yes                | Yes                | Yes       | Yes         | Yes       |

(1) CAN Interface can be used for CANopen or Systembus  
 (2) CANopen and EtherCAT cannot be used at the same time.



EtherCAT



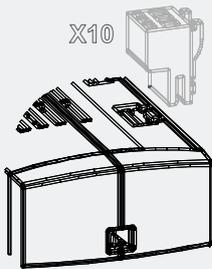
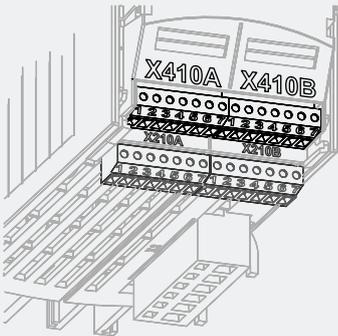
PROFINET



VARAN

# Automation modules

## Control terminals



### CONTROL TERMINAL X210A

|         |   |
|---------|---|
| X210A.1 | Voltage output DC +20 V or input for external power supply DC 24 V ±10% |
| X210A.2 | GND 20 V/ GND 24 V (ext.)   |
| X210A.3 | Digital Input STOA (first shut-down path)                               |
| X210A.4 | Digital input <sup>(1)</sup> Start Clockwise (default setting)          |
| X210A.5 | Digital input <sup>(1)</sup> Start Anticlockwise (default setting)      |
| X210A.6 | Digital input <sup>(1)</sup> Data Set Changeover 1 (default setting)    |
| X210A.7 | Digital input <sup>(1)</sup> Data Set Changeover 2 (default setting)    |

### CONTROL TERMINAL X210B

|         |  |
|---------|--|
| X210B.1 | Digital input <sup>(1)</sup>   |
| X210B.2 | Digital input STOB (second shut-down path)   |
| X210B.3 | MF3: Digital input / digital output <sup>(1)</sup>   |
| X210B.4 | MF2: Multifunction input/output <sup>(1)</sup> (voltage signal, proportional actual frequency, default setting), digital input |
| X210B.5 | Supply voltage DC +10 V for reference value potentiometer, (I <sub>max</sub> = 4 mA)   |
| X210B.6 | MF1: Multifunction input <sup>(1)</sup> 0V ... +10V, ±10V, PT1000/KTY, 0 ... 20 mA   |
| X210B.7 | Ground 10 V  |

### RELAY OUTPUT X10

|       |                              |
|-------|------------------------------|
| S3OUT | Parameterizable relay output |
|-------|------------------------------|

(1) Control terminals are freely configurable.

### CONTROL TERMINAL X410A

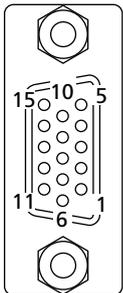
|         |                   |
|---------|-------------------|
| X410A.1 | REF+              |
| X410A.2 | REF-              |
| X410A.3 | SIN- / Encoder B+ |
| X410A.4 | SIN+ / Encoder B- |
| X410A.5 | COS- / Encoder A+ |
| X410A.6 | COS+ / Encoder A- |
| X410A.7 | Earth (GND)       |

### CONTROL TERMINAL X410B

|         |  |
|---------|--|
| X410B.1 | V <sub>ENC</sub> : Sensor supply 5 V <sub>DC</sub> |
| X410B.2 | Encoder Z-   |
| X410B.3 | Encoder Z+   |
| X410B.4 | Analogue in/out MF4                                |
| X410B.5 | CAN low (CANopen or System Bus)                    |
| X410B.6 | CAN high (CANopen or System Bus)                   |
| X410B.7 | Earth (GND <sub>CAN</sub> )                        |

### Sensor and PTC input X412 (HD-Sub-D socket)

| CONTACT | FUNCTION              |                     |                       |                       |                        |  |
|---------|-----------------------|---------------------|-----------------------|-----------------------|------------------------|--|
|         | Sin/Cos / TTL         | HIPERFACE           | ENDAT 2.1             | ENDAT 2.2             | SSI                    |  |
|         | PE                    | PE                  | PE                    | PE                    | PE                     |  |
| Housing |                       |                     |                       |                       |                        |  |
| 1       | D-                    |                     | Clock-                | Clock-                | Clock-                 |  |
| 2       | D+                    |                     | Clock+                | Clock+                | Clock+                 |  |
| 3       | Cos- / B-             | Cos-                | B- / Cos-             |                       | (optionally B- / Cos-) |  |
| 4       | Cos+ / B+             | Cos+                | B+ / Cos+             |                       | (optionally B+ / Cos+) |  |
| 5       | TM <sub>PTC</sub> -   | TM <sub>PTC</sub> - | TM <sub>PTC</sub> -   | TM <sub>PTC</sub> -   | TM <sub>PTC</sub> -    |  |
| 6       | V <sub>Enc</sub>      | V <sub>Enc</sub>    | V <sub>Enc</sub>      | V <sub>Enc</sub>      | V <sub>Enc</sub>       |  |
| 7       |                       |                     |                       |                       |                        |  |
| 8       | - / R- <sup>(1)</sup> | Data -              | Data -                | Data -                | Data -                 |  |
| 9       | Sin- / A-             | Sin-                | Sin-                  |                       | (optionally A- / Sin-) |  |
| 10      | TM <sub>PTC</sub> +   | TM <sub>PTC</sub> + | TM <sub>PTC</sub> +   | TM <sub>PTC</sub> +   | TM <sub>PTC</sub> +    |  |
| 11      | V <sub>EncSense</sub> |                     | V <sub>EncSense</sub> | V <sub>EncSense</sub> | V <sub>EncSense</sub>  |  |
| 12      |                       |                     |                       |                       |                        |  |
| 13      | - / R+ <sup>(1)</sup> | Data +              | Data +                | Data +                | Data +                 |  |
| 14      | Sin+ / A+             | Sin+                | Sin+                  |                       | (optionally A+ / Sin+) |  |
| 15      | GND                   | GND                 | GND                   | GND                   | GND                    |  |

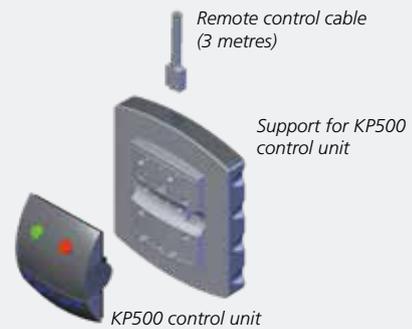


## Control unit / KP500

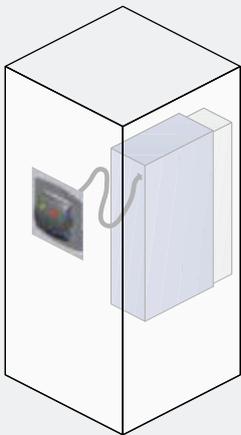
Active Next Generation is designed to give the highest flexibility in drive hardware to suit every control requirement. Machine designers can select an optional Keypad for diagnosis or parameterization independent from a Personal Computer. An optional remote unit gives the possibility to mount the keypad on a cabinet door or convert a keypad into a handheld.



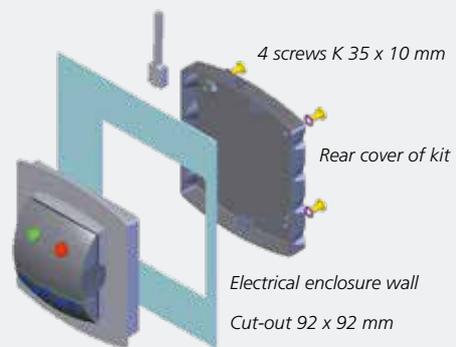
Control unit remote installation kit / KPCMK  
The KPCMK kit is used to remotely control the inverter from the KP500 unit.



Handheld remote control unit



Remote installation on exterior of enclosure



Fixing to enclosure

## Interface / KP-232



Serial interface KP232 can be used as an alternative to control unit KP500. This connection enables parameterisation, monitoring, setting management, inverter control and even commissioning from a PC or laptop computer. The serial point-to-point connection between inverter and PC complies with specifications for transmission between data terminals (DTE) and data communication equipment (DCE), requiring, in this mode, a serial pin-to-pin cable with SUBD-9 male connector on the inverter side.

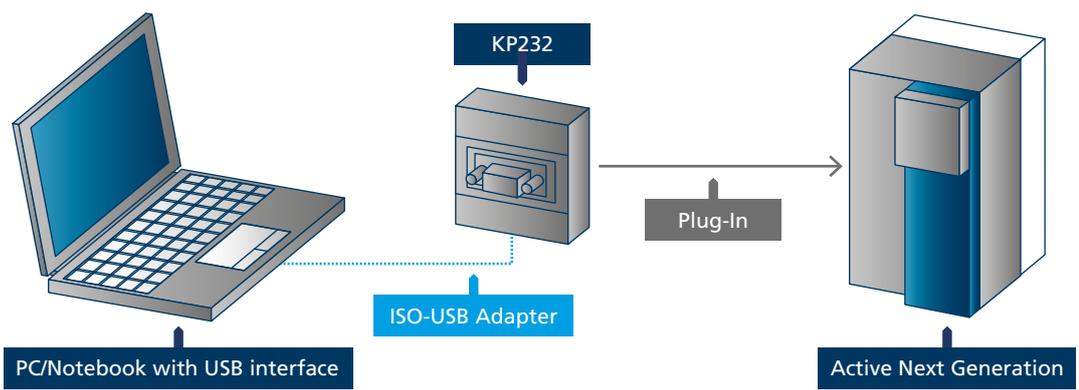
The KP232 interface is compatible with lines up to 15 metres. The serial transmission protocol ensures high data security and does not require handshake signals between computer and inverter.

| TECHNICAL DATA    |                |
|-------------------|----------------|
| Baud rate (kBaud) | Up to 115.2 kb |

**ISO-USB Interface**

The ISO-USB Interface links the KP232 or CM-232 to a USB port of your PC. This interface uses an isolated USB/RS232 converter to improve the robustness against possible EMC disturbances. This Interface can be used with PCs using Windows 10, Windows 8/8.1, Windows Vista and Windows XP with FTDI drivers provided with the VPlus installation package. The Interface uses USB serial numbers and therefore the PC is able to assign uniquely the COM port.

The USB side is compatible with USB1.1 and USB2.0.



## Safe Torque Off (STO)

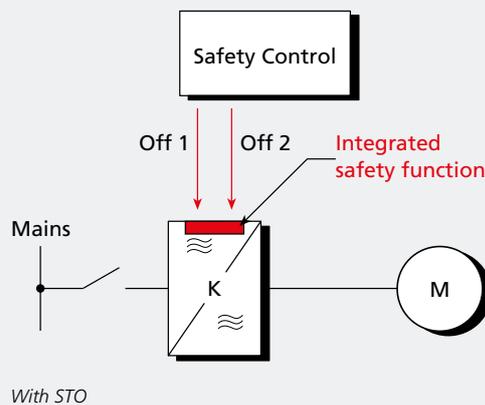
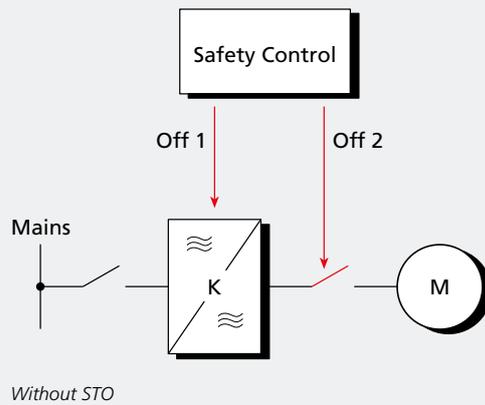
The Functional Safety Function "Safe Torque Off" (STO) with the safety integrity level SIL 3 (EN 61508 and DIN IEC 61800-5-2) and Performance level PL e (EN 13849-1) is implemented into standard Active Next Generation inverter range.

When triggering the STO function the frequency inverter switches off the rotating field to the motor.

Deactivation of the inverter supply is carried out via two switch off paths in no-signal current mode, thus performing redundant switch off control.

Continuous monitoring tests are done by the inverter to detect possible control failures.

"Safe Torque Off" function greatly improves safety level of your automation system without the need of additional components.



## Mounting of Standard devices

A wide range of mechanical accessories is available for Active Next Generation Series frequency inverters, to make installation as easy as possible in all sorts of applications.

In standard mountings the unit can be installed directly on the mounting plate or through-the-wall with optional mounting equipment. A vibration-proof mounting variant and a standard DIN bar mounting variant are also available. The range of mounting variants also includes an optional support with shielded brackets, so that the right solution for all possible needs can always be found.

Installations are almost identical for all sizes, so the examples shown below can be taken as representative solutions and ideal for all installers seeking a mechanically simple, compact installation solution.

### Types of mounting kits

The drive is supplied complete for fixing to an electrical cabinet mounting panel. 3 optional installation kits are additionally available.

#### **MSTD (Standard Mounting Kit)**

The Standard Mounting Kit is always included for devices for mounting version "A"

#### **MPSV**

Thru-type assembly for higher protection classes or enhanced cooling characteristics

#### **MNVIB**

Anti-vibration mounting for installations on machines that generate significant vibrational stress

#### **MDIN**

DIN rail assembly for fast and modular installation / coupling

---

#### **SCR1-2, SCR3, SCR4, SCR5**

For the mechanical sizes 1 to 5 screen plates are available for the mounting of electrical cable screens.



SCR1-2



SCR3



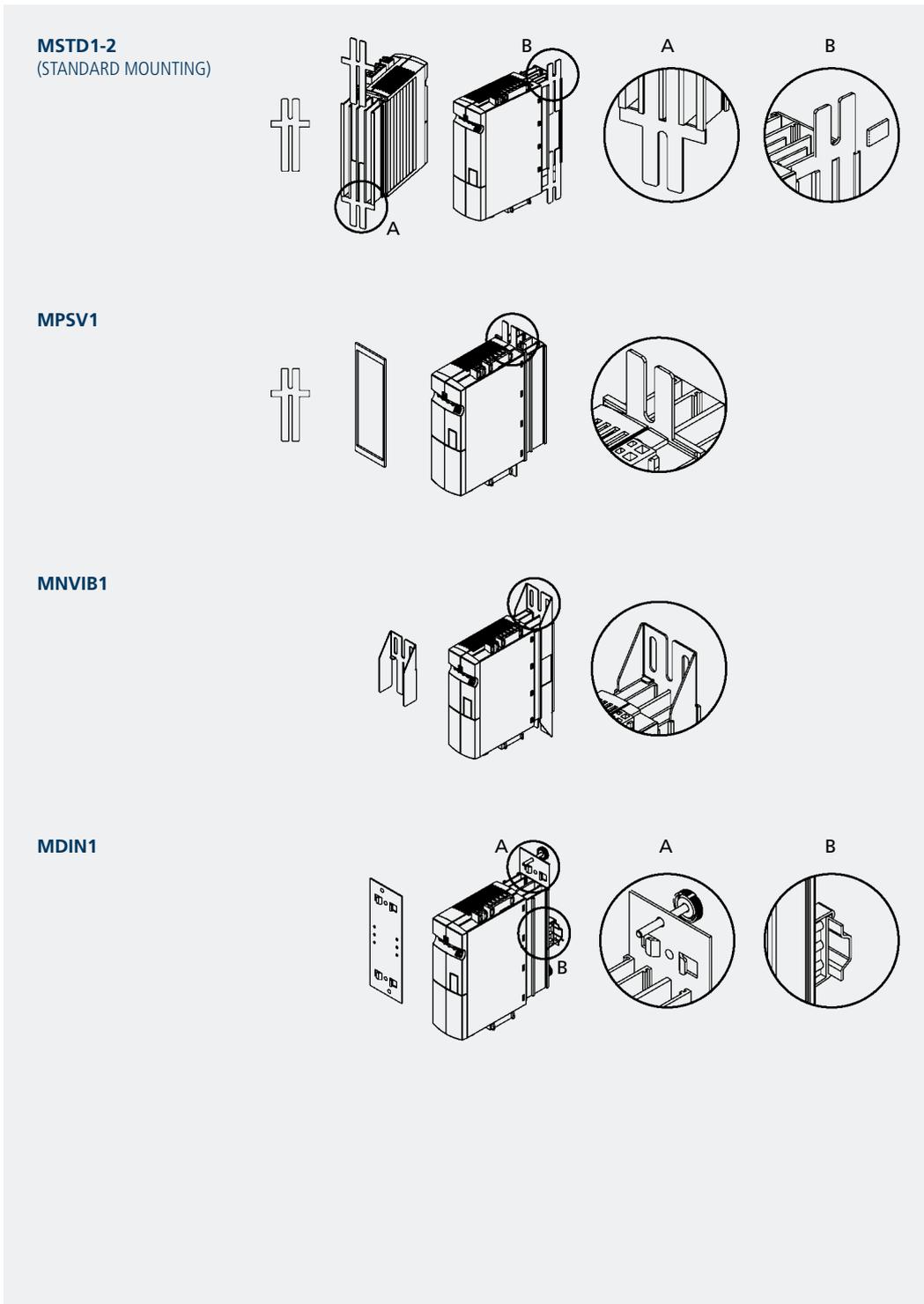
SCR4



SCR5

# Size 1

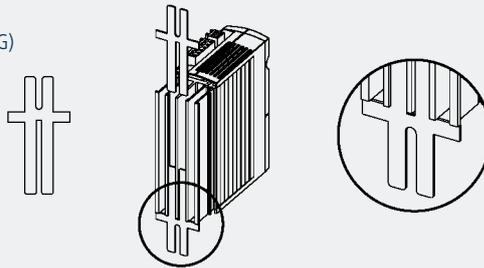
| INVERTER BONFIGLIOLI         | MOUNTING | DESCRIPTION            |
|------------------------------|----------|------------------------|
| 210-xx 1 ...<br>410-xx 1 ... | Standard | Standard mounting      |
|                              | MPSV1    | Thru-type mounting     |
|                              | MNVIB1   | Antivibration mounting |
|                              | MDIN1    | DIN rail mounting      |



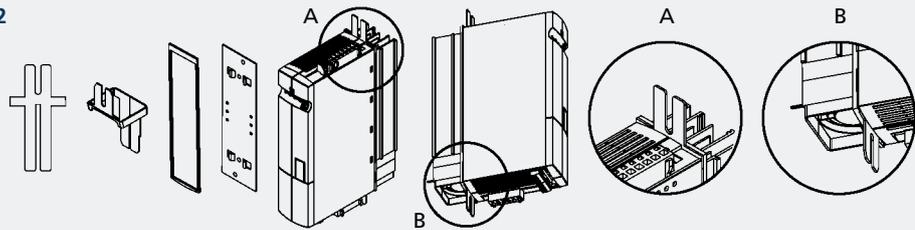
## Size 2

| INVERTER BONFIGLIOLI         | MOUNTING | DESCRIPTION            |
|------------------------------|----------|------------------------|
| 210-xx 2 ...<br>410-xx 2 ... | Standard | Standard mounting      |
|                              | MPSV2    | Thru-type mounting     |
|                              | MNVIB2   | Antivibration mounting |
|                              | MDIN2    | DIN rail mounting      |

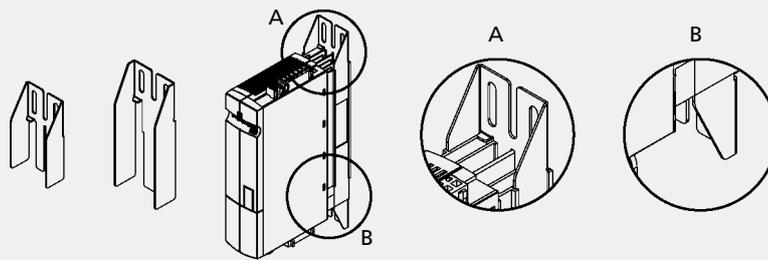
**MSTD1-2**  
(STANDARD MOUNTING)



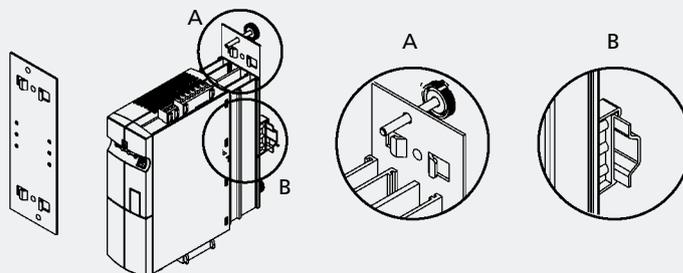
**MPSV2**



**MNVIB2**



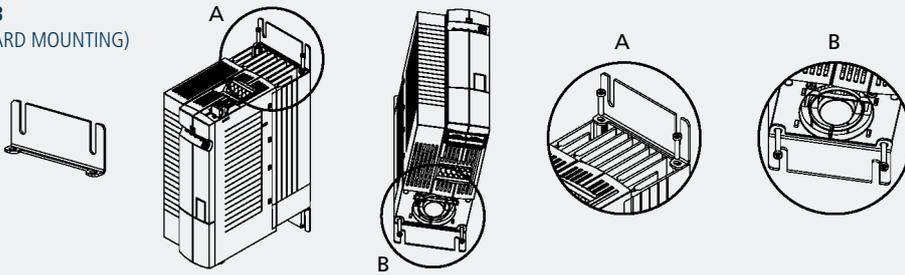
**MDIN2**



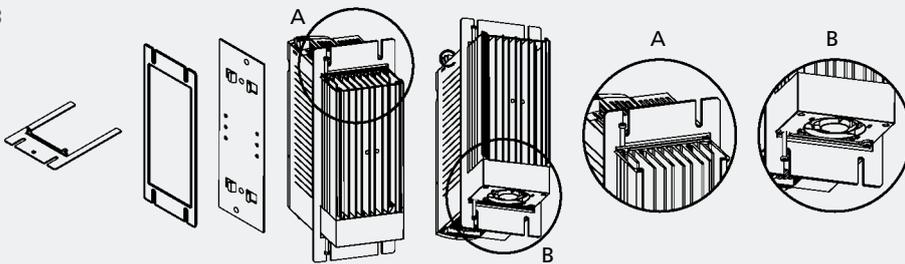
# Size 3

| INVERTER BONFIGLIOLI         | MOUNTING | DESCRIPTION            |
|------------------------------|----------|------------------------|
| 210-xx 3 ...<br>410-xx 3 ... | Standard | Standard mounting      |
|                              | MPSV3    | Thru-type mounting     |
|                              | MNVIB3   | Antivibration mounting |

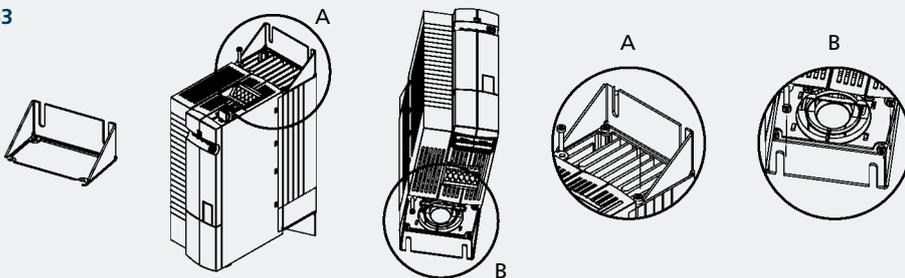
**MSTD3**  
(STANDARD MOUNTING)



**MPSV3**



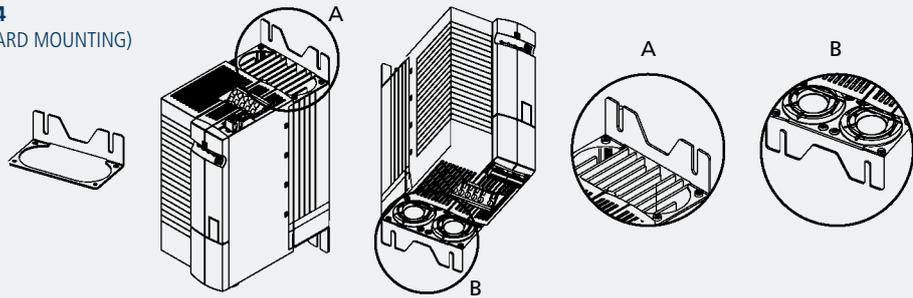
**MNVIB3**



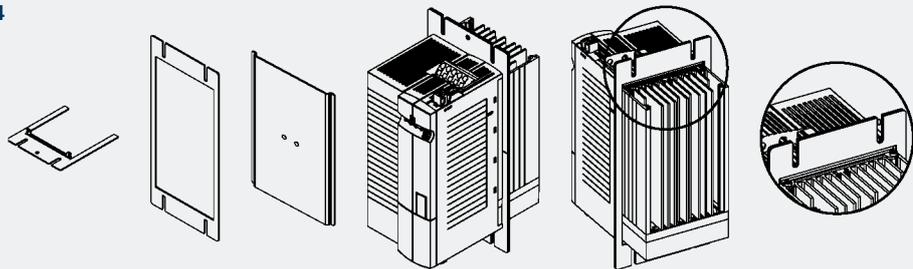
## Size 4

| INVERTER BONFIGLIOLI         | MOUNTING | DESCRIPTION            |
|------------------------------|----------|------------------------|
| 210-xx 4 ...<br>410-xx 4 ... | Standard | Standard mounting      |
|                              | MPSV4    | Thru-type mounting     |
|                              | MNVIB4   | Antivibration mounting |

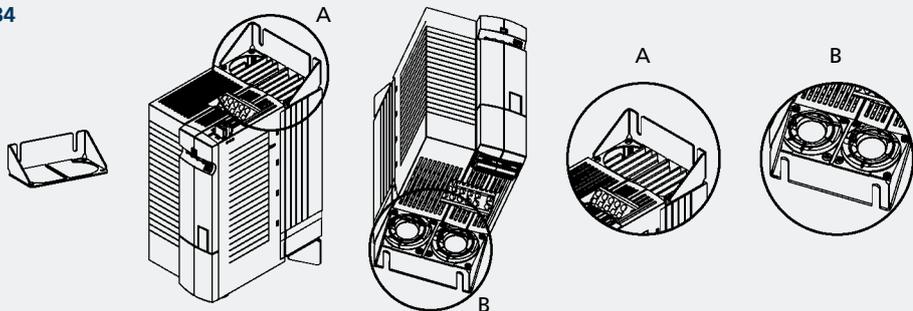
### MSTD4 (STANDARD MOUNTING)



### MPSV4



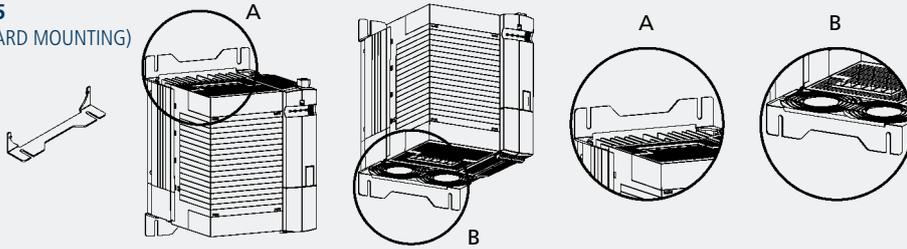
### MNVIB4



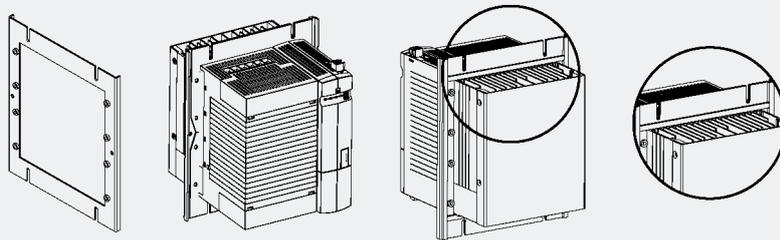
# Size 5

| INVERTER BONFIGLIOLI | MOUNTING | DESCRIPTION            |
|----------------------|----------|------------------------|
| 410-xx 5 ...         | Standard | Standard mounting      |
|                      | MPSV5    | Thru-type mounting     |
|                      | MNVIB5   | Antivibration mounting |

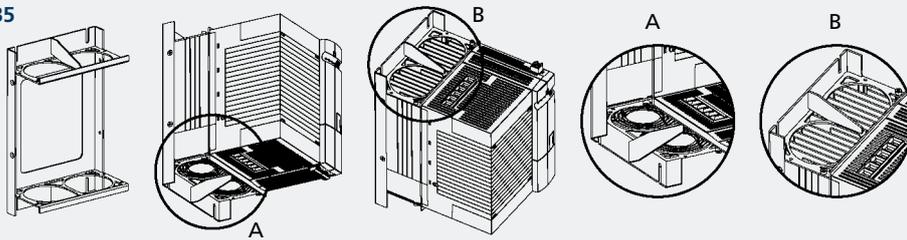
**MSTD5**  
(STANDARD MOUNTING)



**MPSV5**



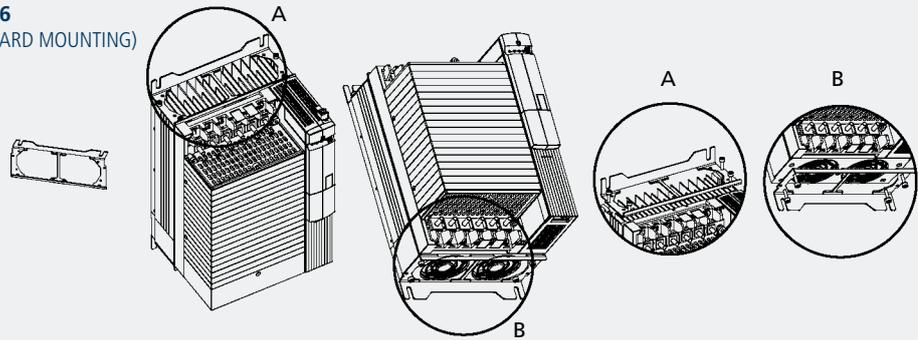
**MNVIB5**



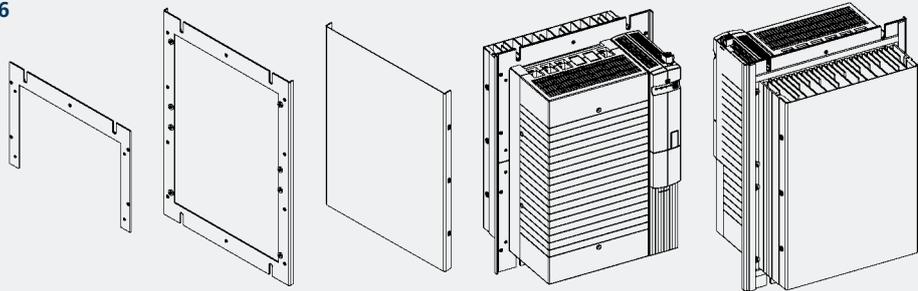
# Size 6

| INVERTER BONFIGLIOLI | MOUNTING | DESCRIPTION            |
|----------------------|----------|------------------------|
| 410-xx 6 ...         | Standard | Standard mounting      |
|                      | MPSV6    | Thru-type mounting     |
|                      | MNVIB6   | Antivibration mounting |

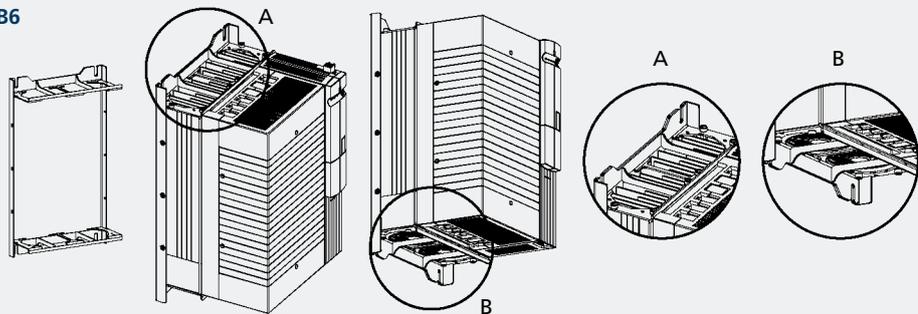
**MSTD6**  
(STANDARD MOUNTING)



**MPSV6**



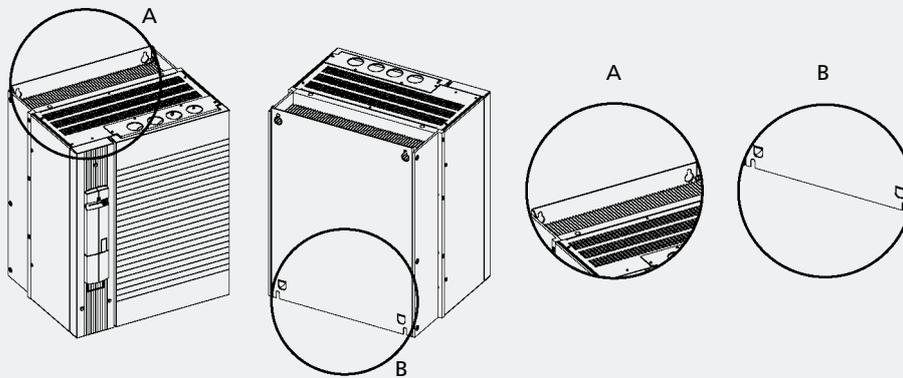
**MNVIB6**



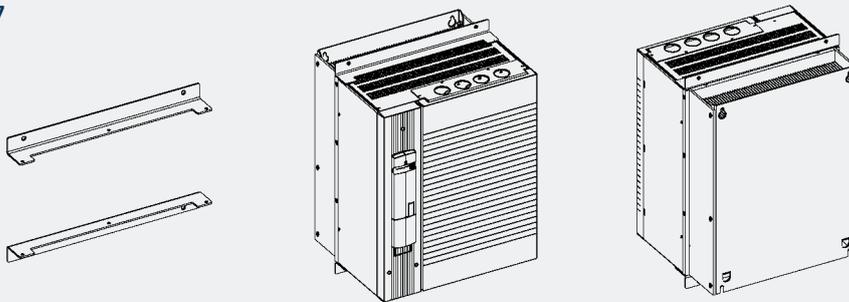
# Size 7

| INVERTER BONFIGLIOLI | MOUNTING | DESCRIPTION        |
|----------------------|----------|--------------------|
| 410-xx 7 ...         | Standard | Standard mounting  |
|                      | MPSV7    | Thru-type mounting |

## STANDARD MOUNTING



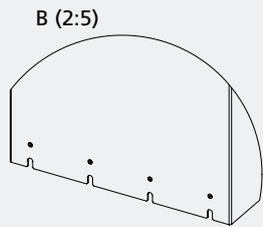
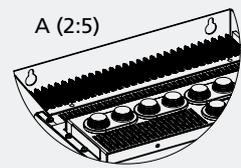
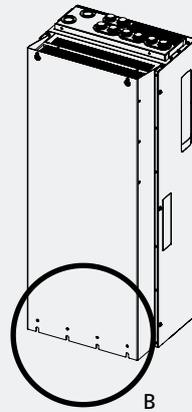
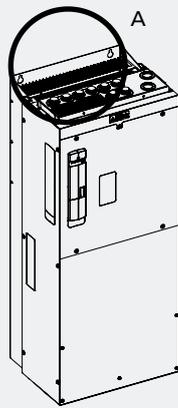
## MPSV7



## Size 8

| INVERTER BONFIGLIOLI                         | MOUNTING | DESCRIPTION       |
|--|----------|-------------------|
| 410-xx 8 ...<br>510-xx 8 ...<br>610-xx 8 ... | Standard | Standard mounting |

### STANDARD MOUNTING



# Input filter

## Why an input filter?

An Input Filter is a filtration device to be installed up-line from the frequency inverter and down-line from the power feeding contactor. The AC/DC rectifier at the inverter input generates harmonic disturbance on the absorbed current and emits disturbance generated by switching components towards the mains.

This harmonic current causes voltage distortions on the mains resulting in electromagnetic interference phenomena.

This harmonic distortion is reduced by means of line chokes, while disturbance is countered with EMI filters (attenuation of EMI voltages) such as those described below.

*Note: the use of input filters reduces the inverter input voltage. If required, these filters should be installed up-line from the inverter in the following order:*

1. Mains supply
2. Line choke
3. EMI filter
4. Inverter

## Line choke

- The use of Line chokes depends on the system engineer's need to reduce harmonic distortion in the short circuit point and the need to reinforce the action of the EMI filter. A line choke is normally used if the mains short circuit power is lower than 1%.
- A line choke is recommended for the ANG210 and ANG410 frequency inverter series in the presence of high continuous input current required by the application, in order to increase the lifetime of the electrolytic capacitors.
- A line choke is always required in single and two-phase operation of the ANG210 frequency inverters and in sizes 7 and 8 for all supported voltage ranges. For other devices please check the markings in the technical data tables.

## EMI filter

- An EMI filter can be used in order to achieve Class "A" (groups 1, 2) or Class "B" interference suppression
- The EMI filter is available in a low leakage current version for special applications.
- The EMI - filter is part of the standard outfit in mechanical sizes 1 & 2 and it is supplied as an internal option in mechanical size 3 and external option in size 3 and bigger.

## Active Next Generation inverter - Line choke / EMI filter combination

| Motor cable length                  | COMPLIANCE WITH CLASS A (GROUP 2)       |   | COMPLIANCE WITH CLASS A (GROUP 1)      |  | COMPLIANCE WITH CLASS B                |  |
|-------------------------------------|---|---|--|--|--|--|
|                                     | < 10 m                                  | < max*                                  | < 10 m                                 | < max*                                 | < 10 m                                 | < max*                                 |
| ANG 1<br>(standard internal filter) | Standard                                | external choke                          | external choke                         | external filter                        | external choke                         | external filter                        |
| ANG 2<br>(standard internal filter) | Standard                                | external choke                          | external choke                         | external filter                        | external choke                         | external filter                        |
| ANG 3                               | internal filter<br>or<br>external choke | internal filter<br>or<br>external choke | internal filter<br>+<br>external choke | internal filter<br>+<br>external choke | internal filter<br>+<br>external choke | external filter                        |
| ANG 4                               | external choke                          | external choke                          | external filter                        | external filter                        | external filter                        | external filter<br>+<br>external choke |
| ANG 5                               | external choke                          | external choke                          | external filter                        | external filter                        | external filter                        | external filter<br>+<br>external choke |
| ANG 6                               | external choke                          | external choke                          | external filter                        | external filter                        | external filter                        | external filter                        |
| ANG 7                               | external choke                          | external filter                         | external filter                        | external filter                        | —                                      | —                                      |
| ANG 8                               | external choke                          | external choke                          | external filter<br>+<br>external choke | external filter<br>+<br>external choke | —                                      | —                                      |

\* See the operation manual

## Line choke



The line choke must be installed between the mains connection point and the EMI filter. Both the line choke and inverter should be installed on a common metal baseplate and each should be connected to the metal mounting plate and earthed by means of a large contact area copper braid.

The simplest way of reducing high harmonic components and hence reactive power is connecting a choke in series on the mains side of the inverter. Depending on the system, reactive power consumption can be reduced by approximately 20% of the figure without line choke.

The line choke increases inductance towards the mains. Mains feed line choke can be regarded as sufficient if short-circuit power is from 20 to 40 times higher than the inverter nominal output.

The inverter is suitable for connection to public or industrial mains supplies in compliance with technical data. If the supply mains transformer output is  $\leq 500$  kVA, the optional mains choke is needed only if specified in the inverter technical data. The other inverters are suitable for the connection to the mains without a mains choke with relative impedance  $\geq 1\%$ . If it is desired to connect more than one inverter, use the sum of the nominal outputs as a basis.

Since experience has shown that the nominal short circuit power on the inverter connection point is often unknown, BONFIGLIOLI recommends the use of mains chokes with 4% relative short circuit voltage.

The relative short circuit voltage equivalent to a 4% voltage drop represents the percentage of the nominal voltage at which a current equal to rated current flows in the case of a short circuit.

## Technical data

### Nominal voltages

- 230V +/- 10%
- 400V +/- 10%

### Frequencies

- 50/60 Hz
- uk (a IN / 50 Hz) 4%

### Insulating material class

- T40/F

### Ambient temperature

- 40°C

### Protection degree (EN 60529)

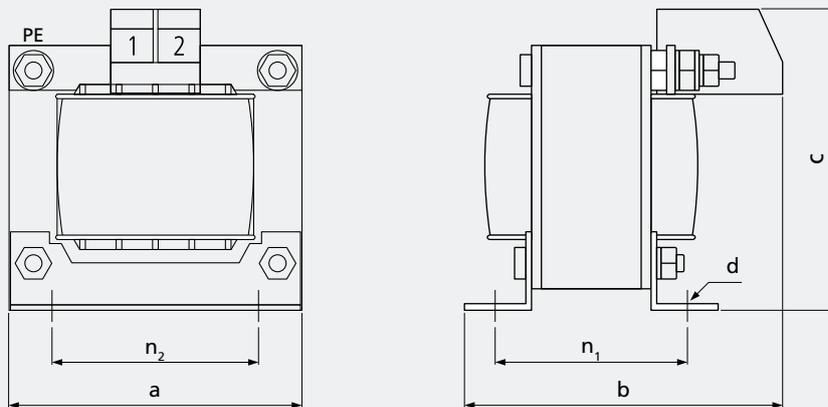
- IP00

### Connection type

- Contact-protected terminals

# Line choke

LCVS006 ... LCVS018



## TECHNICAL DATA

Bonfiglioli frequency inverter - Line choke combination, **1x230V~**

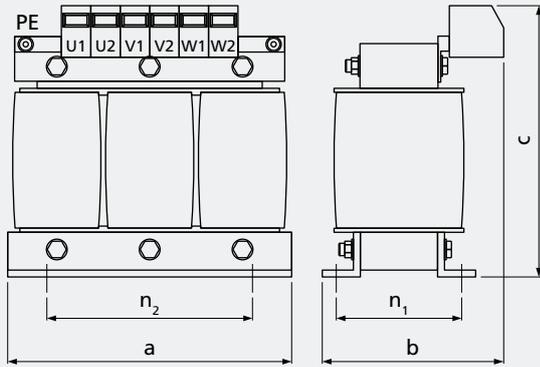
| BONFIGLIOLI INVERTER | BONFIGLIOLI CHOKE | NOMINAL CURRENT | POWER DISSIPATION |
|----------------------|-------------------|-----------------|-------------------|
|                      |                   | [A]             | [W]               |
| ANG 210-01           | LCVS006           | 6               | 8.0               |
| ANG 210-03           |                   |                 |                   |
| ANG 210-05           |                   |                 |                   |
| ANG 210-07           | LCVS008           | 8               | 8.0               |
| ANG 210-09           | LCVS010           | 10              | 10.0              |
| ANG 210-11           | LCVS015           | 15              | 12.0              |
| ANG 210-13           | LCVS018           | 18              | 15.0              |

## TECHNICAL ASSEMBLY DATA

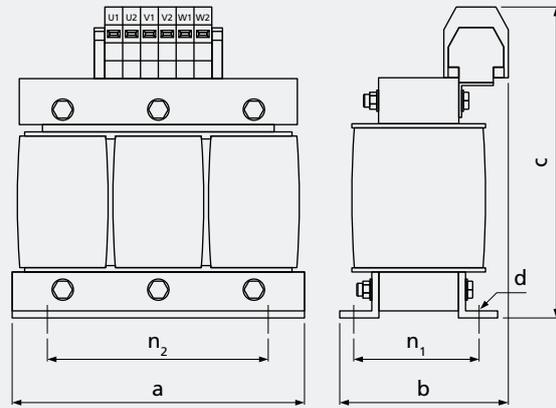
| BONFIGLIOLI CHOKE | DIMENSIONS |        |        | ASSEMBLY            |                     |        | WEIGHT | CONNECTION TERMINAL |         |                     |
|-------------------|------------|--------|--------|---------------------|---------------------|--------|--------|---------------------|---------|---------------------|
|                   | a [mm]     | b [mm] | c [mm] | n <sub>2</sub> [mm] | n <sub>1</sub> [mm] | d [mm] | [kg]   | [mm]                | [Nm]    | PE                  |
| LCVS006           | 60         | 62     | 75     | 44                  | 38                  | 3.6    | 0.5    | 0.75-2.5            | 1.0-1.2 | 2.5 mm <sup>2</sup> |
| LCVS008           | 60         | 67     | 75     | 44                  | 43                  | 3.6    | 0.6    | 0.75-2.5            | 1.0-1.2 | 2.5 mm <sup>2</sup> |
| LCVS010           | 66         | 80     | 70     | 50                  | 51                  | 4.8    | 0.8    | 0.75-2.5            | 1.0-1.2 | M4                  |
| LCVS015           | 78         | 78     | 80     | 56                  | 49                  | 4.8    | 1.1    | 0.75-4.0            | 1.5-1.8 | M4                  |
| LCVS018           | 85         | 85     | 95     | 64                  | 50                  | 4.8    | 1.8    | 0.75-4.0            | 1.5-1.8 | M4                  |

# Line choke

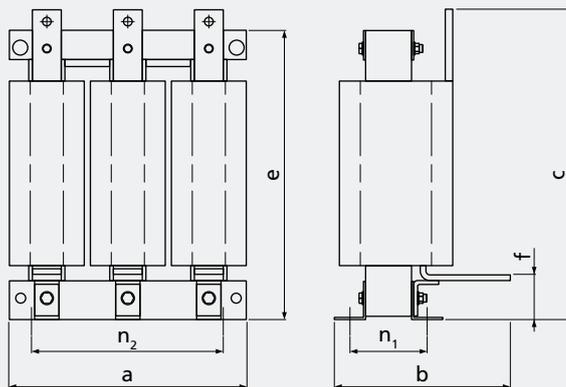
LCVT004 ... LCVT025



LCVT034 ... LCVT250



LCVT280AL-xxx ... LCVT690AL-xxx



**TECHNICAL DATA**

Bonfiglioli frequency inverter – Line choke combination, **3x230V~**

| BONFIGLIOLI INVERTER | BONFIGLIOLI CHOKE | NOMINAL CURRENT | CHOKE | POWER DISSIPATION |
|----------------------|-------------------|-----------------|-------|-------------------|
|                      |                   | [A]             | [mH]  | [W]               |
| ANG 210-01           | LCVT004           | 4               | 7.32  | 20                |
| ANG 210-03           |                   |                 |       |                   |
| ANG 210-05           |                   |                 |       |                   |
| ANG 210-07           |                   |                 |       |                   |
| ANG 210-09           | LCVT006           | 6               | 4.88  | 25                |
| ANG 210-11           | LCVT008           | 8               | 3.66  | 30                |
| ANG 210-13           | LCVT010           | 10              | 2.93  | 30                |
| ANG 210-15           | LCVT015           | 15              | 1.95  | 45                |
| ANG 210-18           | LCVT018           | 18              | 1.63  | 70                |
| ANG 210-19           | LCVT025           | 25              | 1.17  | 70                |
| ANG 210-21           | LCVT034           | 34              | 0.86  | 85                |
| ANG 210-22           |                   |                 |       |                   |

# Line choke

**TECHNICAL DATA**

 Bonfiglioli frequency inverter – Line choke combination, **3x400V~**, **3x525V~**, **3x690V**

| BONFIGLIOLI INVERTER | BONFIGLIOLI CHOKE | NOMINAL CURRENT | CHOKE | POWER DISSIPATION |
|----------------------|-------------------|-----------------|-------|-------------------|
|                      |                   | [A]             | [mH]  | [W]               |
| ANG 410-01           | LCVT004           | 4               | 7.32  | 20                |
| ANG 410-03           |                   |                 |       |                   |
| ANG 410-05           |                   |                 |       |                   |
| ANG 410-07           |                   |                 |       |                   |
| ANG 410-09           |                   |                 |       |                   |
| ANG 410-11           |                   |                 |       |                   |
| ANG 410-12           |                   |                 |       |                   |
| ANG 410-13           | LCVT006           | 6               | 4.88  | 25                |
| ANG 410-15           | LCVT008           | 8               | 3.66  | 30                |
| ANG 410-18           | LCVT010           | 10              | 2.93  | 30                |
| ANG 410-19           | LCVT015           | 15              | 1.95  | 45                |
| ANG 410-21           | LCVT018           | 18              | 1.63  | 70                |
| ANG 410-22           | LCVT025           | 25              | 1.17  | 70                |
| ANG 410-23           | LCVT025           | 25              | 0.86  | 85                |
| ANG 410-25           | LCVT034           | 34              | 0.86  | 85                |
| ANG 410-27           | LCVT050           | 50              | 0.59  | 100               |
| ANG 410-29           | LCVT060           | 60              | 0.49  | 100               |
| ANG 410-31           |                   |                 |       |                   |
| ANG 410-33           | LCVT075           | 75              | 0.37  | 110               |
| ANG 410-35           | LCVT090           | 90              | 0.33  | 120               |
| ANG 410-37           | LCVT115           | 115             | 0.25  | 140               |
| ANG 410-39           | LCVT135           | 135             | 0.22  | 180               |
| ANG 410-43           | LCVT160           | 160             | 0.18  | 180               |
| ANG 410-45           | LCVT180           | 180             | 0.16  | 185               |
| ANG 410-47           | LCVT210           | 210             | 0.14  | 200               |
| ANG 410-49           | LCVT250           | 250             | 0.12  | 210               |
| ANG 410-51           | LCVT280AL-525     | 280             | 0.105 | 460               |
| ANG 410-53           | LCVT350AL-525     | 350             | 0.084 | 500               |
| ANG 410-55           | LCVT440AL-525     | 440             | 0.068 | 630               |
| ANG 410-57           | LCVT550AL-525     | 550             | 0.052 | 680               |
| ANG 410-59           | LCVT690AL-400     | 620             | 0.046 | 640               |
| ANG 410-61           | LCVT690AL-400     | 690             | 0.046 | 790               |
| ANG 510-51           | LCVT215AL-525     | 215             | 0.13  | 370               |
| ANG 510-53           | LCVT280AL-525     | 270             | 0.105 | 430               |
| ANG 510-55           | LCVT350AL-525     | 335             | 0.084 | 460               |
| ANG 510-57           | LCVT440AL-525     | 420             | 0.068 | 575               |
| ANG 510-59           | LCVT470AL-525     | 470             | 0.06  | 610               |
| ANG 510-61           | LCVT550AL-525     | 525             | 0.052 | 620               |
| ANG 610-51           | LCVT160AL-690     | 160             | 0.33  | 350               |
| ANG 610-53           | LCVT200AL-690     | 200             | 0.27  | 420               |
| ANG 610-55           | LCVT250AL-690     | 250             | 0.21  | 480               |
| ANG 610-57           | LCVT320AL-690     | 320             | 0.18  | 570               |
| ANG 610-59           | LCVT360AL-690     | 360             | 0.15  | 630               |
| ANG 610-61           | LCVT410AL-690     | 410             | 0.13  | 660               |

# Line choke

## TECHNICAL ASSEMBLY DATA

| BONFIGLIOLI CHOKE | DIMENSIONS |        |        | ASSEMBLY            |                     |        | WEIGHT | CONNECTION TERMINAL |           |                   |
|-------------------|------------|--------|--------|---------------------|---------------------|--------|--------|---------------------|-----------|-------------------|
|                   | a [mm]     | b [mm] | c [mm] | n <sub>2</sub> [mm] | n <sub>1</sub> [mm] | d [mm] | [kg]   | [mm]                | [Nm]      | PE                |
| LCVT004           | 80         | 65     | 95     | 55                  | 37                  | 4      | 0.8    | 0.75-2.5            | 1.0-1.2   | 4 mm <sup>2</sup> |
| LCVT006           | 100        | 65     | 115    | 60                  | 39                  | 4      | 1.0    | 0.75-2.5            | 1.0-1.2   | 4 mm <sup>2</sup> |
| LCVT008           | 100        | 75     | 115    | 60                  | 48                  | 4      | 1.5    | 0.75-2.5            | 1.0-1.2   | 4 mm <sup>2</sup> |
| LCVT010           | 100        | 75     | 115    | 60                  | 48                  | 4      | 1.5    | 0.75-2.5            | 1.0-1.2   | 4 mm <sup>2</sup> |
| LCVT015           | 125        | 85     | 135    | 100                 | 55                  | 5      | 3.0    | 0.75-4.0            | 1.5-1.8   | 4 mm <sup>2</sup> |
| LCVT018           | 155        | 90     | 135    | 130                 | 57                  | 8      | 4.0    | 0.75-4.0            | 1.5-1.8   | 4 mm <sup>2</sup> |
| LCVT025           | 155        | 100    | 160    | 130                 | 57                  | 8      | 4.0    | 0.75-10             | 4.0-4.5   | 4 mm <sup>2</sup> |
| LCVT034           | 155        | 100    | 190    | 130                 | 57                  | 8      | 4.5    | 2.5-16              | 2.0-4.0   | M5                |
| LCVT050           | 155        | 115    | 190    | 130                 | 72                  | 8      | 4.5    | 2.5-16              | 2.0-4.0   | M5                |
| LCVT060           | 190        | 110    | 220    | 170                 | 58                  | 8      | 9.0    | 2.5-35              | 2.5-5.0   | M5                |
| LCVT075           | 190        | 120    | 250    | 170                 | 68                  | 8      | 12     | 25-50               | 3.0-6.0   | M6                |
| LCVT090           | 190        | 130    | 250    | 170                 | 78                  | 8      | 12     | 25-50               | 3.0-6.0   | M6                |
| LCVT115           | 210        | 140    | 270    | 180                 | 82                  | 8      | 14     | 25-50               | 3.0-6.0   | M6                |
| LCVT135           | 240        | 160    | 300    | 190                 | 100                 | 11     | 20     | 16-70               | 6.0-7.0   | M8                |
| LCVT160           | 240        | 160    | 310    | 190                 | 100                 | 11     | 20     | 50-95               | 6.0-12.0  | M8                |
| LCVT180           | 240        | 175    | 320    | 190                 | 106                 | 11     | 22     | 50-95               | 6.0-12.0  | M8                |
| LCVT210           | 240        | 200    | 335    | 190                 | 121                 | 11     | 26     | 95-150              | 10.0-20.0 | M8                |
| LCVT250           | 240        | 210    | 350    | 190                 | 126                 | 11     | 28     | 95-150              | 10.0-20.0 | M8                |

| BONFIGLIOLI CHOKE | DIMENSIONS |        |        |        |        | ASSEMBLY            |                     | WEIGHT | CONNECTION TERMINAL |       |     |       |
|-------------------|------------|--------|--------|--------|--------|---------------------|---------------------|--------|---------------------|-------|-----|-------|
|                   | a [mm]     | b [mm] | c [mm] | e [mm] | f [mm] | n <sub>2</sub> [mm] | n <sub>1</sub> [mm] | [kg]   | Phases              | [Nm]  | PE  | [Nm]  |
| <b>ANG410</b>     |            |        |        |        |        |                     |                     |        |                     |       |     |       |
| LCVT280AL-525     | 360        | 213    | 335    | 362    | 65     | 325                 | 112                 | 47     | M10                 | 25-30 | M8  | 20-25 |
| LCVT350AL-525     | 360        | 225    | 335    | 361    | 65     | 325                 | 124                 | 55     | M10                 | 25-30 | M10 | 40-50 |
| LCVT440AL-525     | 394        | 266    | 450    | 434    | 74     | 325                 | 127                 | 70     | 2xM12               | 25-30 | M10 | 40-50 |
| LCVT550AL-525     | 394        | 291    | 470    | 435    | 75     | 325                 | 142                 | 83     | 2xM12               | 25-30 | M10 | 40-50 |
| LCVT690AL-400     | 394        | 291    | 520    | 485    | 75     | 325                 | 142                 | 85     | 2xM12               | 25-30 | M12 | 75-85 |
| <b>ANG510</b>     |            |        |        |        |        |                     |                     |        |                     |       |     |       |
| LCVT215AL-525     | 360        | 195    | 285    | 311    | 65     | 325                 | 99                  | 35     | M10                 | 25-30 | M8  | 20-25 |
| LCVT280AL-525     | 360        | 213    | 335    | 362    | 65     | 325                 | 112                 | 47     | M10                 | 25-30 | M8  | 20-25 |
| LCVT350AL-525     | 360        | 225    | 335    | 361    | 65     | 325                 | 124                 | 55     | M10                 | 25-30 | M10 | 40-50 |
| LCVT440AL-525     | 394        | 266    | 450    | 434    | 74     | 325                 | 127                 | 70     | 2xM12               | 25-30 | M10 | 40-50 |
| LCVT470AL-525     | 394        | 325    | 449    | 433    | 74     | 325                 | 127                 | 72     | 2xM12               | 25-30 | M10 | 40-50 |
| LCVT550AL-525     | 394        | 291    | 470    | 435    | 75     | 325                 | 142                 | 83     | 2xM12               | 25-30 | M10 | 40-50 |
| <b>ANG610</b>     |            |        |        |        |        |                     |                     |        |                     |       |     |       |
| LCVT160AL-690     | 360        | 220    | 284    | 310    | 65     | 325                 | 124                 | 50     | M8                  | 15-20 | M8  | 20-25 |
| LCVT200AL-690     | 394        | 221    | 343    | 381    | 74     | 325                 | 127                 | 65     | M10                 | 25-30 | M8  | 20-25 |
| LCVT250AL-690     | 394        | 221    | 394    | 433    | 74     | 325                 | 126                 | 73     | M10                 | 25-30 | M8  | 20-25 |
| LCVT320AL-690     | 465        | 291    | 517    | 515    | 87     | 400                 | 143                 | 110    | 2xM12               | 25-30 | M10 | 40-50 |
| LCVT360AL-690     | 465        | 291    | 517    | 515    | 86     | 400                 | 143                 | 105    | 2xM12               | 25-30 | M10 | 40-50 |
| LCVT410AL-690     | 465        | 291    | 517    | 515    | 87     | 400                 | 143                 | 112    | 2xM12               | 25-30 | M10 | 40-50 |

## EMI filters

Because of their intrinsic characteristics, all frequency inverters often generate undesired high frequency voltages generally referred to as "interference". Mains filters are installed to reduce this interference.

The reference standard EN 61800-3 defines the thresholds for electromagnetic interference for different classes of equipment.

Active Next Generation series frequency inverters up to size 9.2 kW can be ordered with a built-in EMI filter conforming to the requirements of the standard for "class A – group 2" environments.

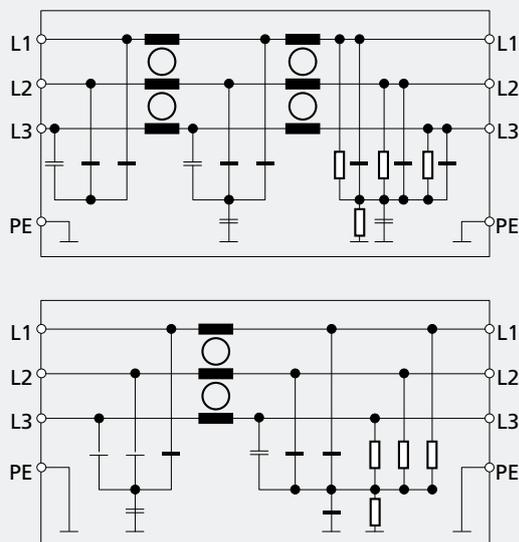
Two series of external interference filters are available for larger size Active Next Generation frequency inverters and for installations where conformity to the stricter requirements of class B is necessary. The two series differ both in construction and power range.

The first set of filters are "backplate filters or foot print". They are available in sizes 7 to 40 A (suitable for Active Next Generation frequency inverters up to size 4), and allow the frequency inverter to be installed on board the filter itself.

The second series of filters are "book filters". They cover all other Active Next Generation sizes up to 630 A and are designed for installation on the same mounting panel alongside the drive.

Mains filters with very low dispersion currents are available upon request for specific applications.

*Basic circuit diagram*



## Backplate EMI filters

### Mains voltage

- 3 x 480V~ maximum +10%

### Nominal current

- 8A ... 40A

### Frequency

- 50/60 Hz

### Operating and storage temperature

- -25 °C ... +100 °C (climate class acc. to EN60721-3-3)

### Ambient temperature

- +40°C maximum

### Protection degree (EN 60529)

- IP00

### Connection type

- Contact-protected terminals
- Strand connection on load side (only up to ANG 410-18)
- Metal fasteners are included in the supply

### Note

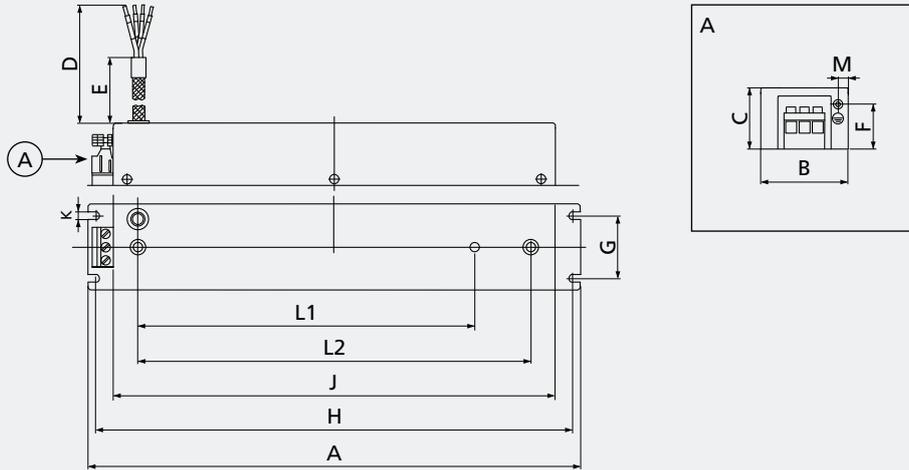
These mains filters are installed between the line choke and the frequency inverter. The frequency inverter installed on the EMI filter must be connected to the metal baseplate with a short, large section earth connection.

Overload capacity is 1.5 times rated current for 1 minute, every 30 minutes.

| BONFIGLIOLI INVERTER |            | BONFIGLIOLI EMI FILTER | RATED CURRENT | LEAKAGE CURRENT | POWER DISSIPATION | WEIGHT |
|----------------------|------------|------------------------|---------------|-----------------|-------------------|--------|
| Size                 | Type       |                        | [A]           | [mA]            | [W]               | [kg]   |
| 1                    | ANG 210-01 | FTV007B                | 8             | 5               | 10                | 1.5    |
|                      | ANG 210-03 |                        |               |                 |                   |        |
|                      | ANG 210-05 |                        |               |                 |                   |        |
|                      | ANG 210-07 |                        |               |                 |                   |        |
|                      | ANG 210-09 |                        |               |                 |                   |        |
|                      | ANG 410-01 |                        |               |                 |                   |        |
|                      | ANG 410-03 |                        |               |                 |                   |        |
|                      | ANG 410-05 |                        |               |                 |                   |        |
|                      | ANG 410-07 |                        |               |                 |                   |        |
|                      | ANG 410-09 |                        |               |                 |                   |        |
|                      | ANG 410-11 |                        |               |                 |                   |        |
| 2                    | ANG 210-11 | FTV018B                | 18            | 1.5             | 20                | 3.5    |
|                      | ANG 410-12 |                        |               |                 |                   |        |
|                      | ANG 410-13 |                        |               |                 |                   |        |
|                      | ANG 410-15 |                        |               |                 |                   |        |
|                      | ANG 410-18 |                        |               |                 |                   |        |
| 3                    | ANG 410-19 | FTV018B                | 18            | 1.5             | 20                | 3.5    |
|                      | ANG 410-21 |                        |               |                 |                   |        |
| 4                    | ANG 410-23 | FTV040B                | 40            | 1.2             | 35                | 3.5    |
|                      | ANG 410-25 |                        |               |                 |                   |        |

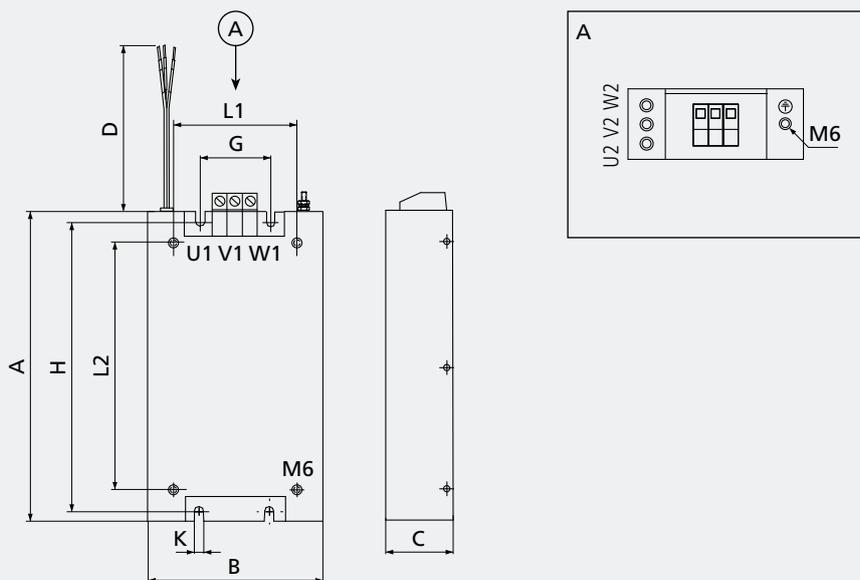
# Backplate EMI filters

## Dimensions FTV007B



| EMI FILTER | A   | B  | C  | D      | E      | F  | G      | H       | J   | K   | L1      | L2      | M |
|------------|-----|----|----|--------|--------|----|--------|---------|-----|-----|---------|---------|---|
| [mm]       |     |    |    |        |        |    |        |         |     |     |         |         |   |
| FTV007B    | 351 | 62 | 45 | 200±10 | 160±10 | 33 | 45±0.2 | 340±0.3 | 315 | 5.5 | 240±0.2 | 280±0.2 | 7 |

## Dimensions FTV018B - FTV040B



| EMI FILTER | A   | B   | C  | D   | G  | H   | K   | L1  | L2  |
|------------|-----|-----|----|-----|----|-----|-----|-----|-----|
| [mm]       |     |     |    |     |    |     |     |     |     |
| FTV018B    | 315 | 100 | 65 | 300 | 35 | 300 | 6.3 | 76  | 270 |
| FTV040B    | 315 | 125 | 65 | 300 | 60 | 300 | 6.3 | 125 | 270 |

## Book type EMI filters

### Mains voltage

- 3 x 480 VAC

### Rated current

- 7 A ... 630 A

### Frequency

- up to 60 Hz

### Operating and storage temperature

- -25 °C ... +80 °C (climate class acc. to EN60721-3-3)

### Protection degree (EN 60529)

- IP20

### Maximum length of motor cables:

- ANG 410-01 to -15: 25 m class B
- ANG 410-18 to -25: 50 m class B
- ANG 410-27 to -39: 10 m class B, 100 m class A group 1
- ANG 410-43 to -49: 10 m class B, 100 m class A group 1

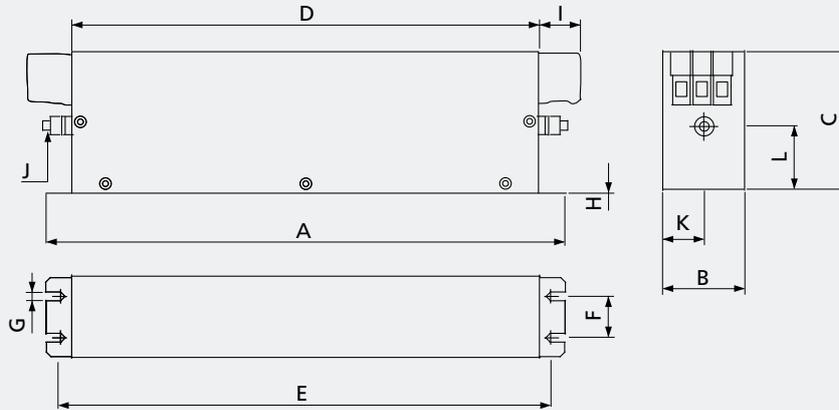
### Note

Overload capacity is 4 times rated current at switch-on; 1.5 times rated current for 1 minute, once per hour.

| BONFIGLIOLI INVERTER |             | BONFIGLIOLI EMI FILTER | RATED CURRENT | LEAKAGE CURRENT | POWER DISSIPATION | WEIGHT |      |
|----------------------|-------------|------------------------|---------------|-----------------|-------------------|--------|------|
| Size                 | Type        |                        | [A]           | [mA]            | [W]               | [kg]   |      |
| 1                    | ANG 210-01  | FTV007A                | 7             |                 | 3.8               | 0.5    |      |
|                      | ANG 210-03  |                        |               |                 |                   |        |      |
|                      | ANG 210-05  |                        |               |                 |                   |        |      |
|                      | ANG 210-07  |                        |               |                 |                   |        |      |
|                      | ANG 210-09  |                        |               |                 |                   |        |      |
|                      | ANG 410-01  |                        |               |                 |                   |        |      |
|                      | ANG 410-03  |                        |               |                 |                   |        |      |
|                      | ANG 410-05  |                        |               |                 |                   |        |      |
|                      | ANG 410-07  |                        |               |                 |                   |        |      |
|                      | ANG 410-09  |                        |               |                 |                   |        |      |
|                      | ANG 410-11  |                        |               |                 |                   |        |      |
| 2                    | ANG 210-11  | FTV016A                | 16            | 33              | 6.1               | 0.8    |      |
|                      | ANG 410-12  |                        |               |                 |                   |        |      |
|                      | ANG 410-13  |                        |               |                 |                   |        |      |
|                      | ANG 410-15  |                        |               |                 |                   |        |      |
|                      | ANG 210-13  |                        |               |                 |                   |        |      |
| 3                    | ANG 210-15  | FTV030A                | 30            |                 | 11.8              | 1.2    |      |
|                      | ANG 410-18  |                        |               |                 |                   |        |      |
|                      | ANG 410-19  |                        |               |                 |                   |        |      |
|                      | ANG 410-21  |                        |               |                 |                   |        |      |
| 4                    | ANG 210-18  | FTV055A                | 55            |                 | 25.9              | 2.0    |      |
|                      | ANG 210-19  |                        |               |                 |                   |        |      |
|                      | ANG 410-22  |                        |               |                 |                   |        |      |
| 5                    | ANG 210-21  | FTV075A                | 75            |                 | 32.2              | 2.7    |      |
|                      | ANG 410-23  |                        |               |                 |                   |        |      |
| 6                    | ANG 410-25  | FTV100A                | 100           |                 | 34.5              | 4.3    |      |
|                      | ANG 210-22  |                        |               |                 |                   |        |      |
|                      | ANG 410-27  |                        |               |                 |                   |        |      |
|                      | ANG 410-29  |                        |               |                 |                   |        |      |
| 7                    | ANG 410-31  | FTV130A                | 130           |                 | 43.1              | 4.5    |      |
|                      | ANG 410-33  |                        |               |                 |                   |        |      |
|                      | ANG 410-35  |                        |               |                 |                   |        |      |
|                      | ANG 410-37  |                        |               |                 |                   |        |      |
|                      | ANG 410-39  |                        |               |                 |                   |        |      |
| 8                    | ANG 410-43  | FTV180A                | 180           | 33              | 58.3              | 6.0    |      |
|                      | ANG 410-45  |                        |               |                 |                   |        |      |
|                      | ANG 410-47  |                        |               |                 |                   |        |      |
|                      | ANG 410-49  |                        |               |                 |                   |        |      |
| 8                    | ANG 410-51  | FTV401A                | 400           | 42              | 55                | 15.2   |      |
|                      | ANG 410-53  |                        |               |                 |                   |        |      |
|                      | ANG 410-55  |                        |               |                 |                   |        |      |
|                      | ANG 410-57  | FTV630A                | 630           |                 |                   | 65     | 17.8 |
|                      | ANG 410-59  |                        |               |                 |                   |        |      |
|                      | ANG 410-61  |                        |               |                 |                   |        |      |
|                      | ANG 510-51  | FTV401A                | 400           |                 |                   | 55     | 15.2 |
|                      | ANG 510-53  |                        |               |                 |                   |        |      |
|                      | ANG 510-55  |                        |               |                 |                   |        |      |
|                      | ANG 510-57  | FTV630A                | 630           |                 |                   | 65     | 17.8 |
|                      | ANG 510-59  |                        |               |                 |                   |        |      |
| ANG 510-61           |             |                        |               |                 |                   |        |      |
| ANG 610-51           | FTV400A-690 | 400                    | 17            |                 | 55                | 11.0   |      |
| ANG 610-53           |             |                        |               |                 |                   |        |      |
| ANG 610-55           |             |                        |               |                 |                   |        |      |
| ANG 610-57           |             |                        |               |                 |                   |        |      |
| ANG 610-59           |             |                        |               |                 |                   |        |      |
| ANG 610-61           |             |                        |               |                 |                   |        |      |

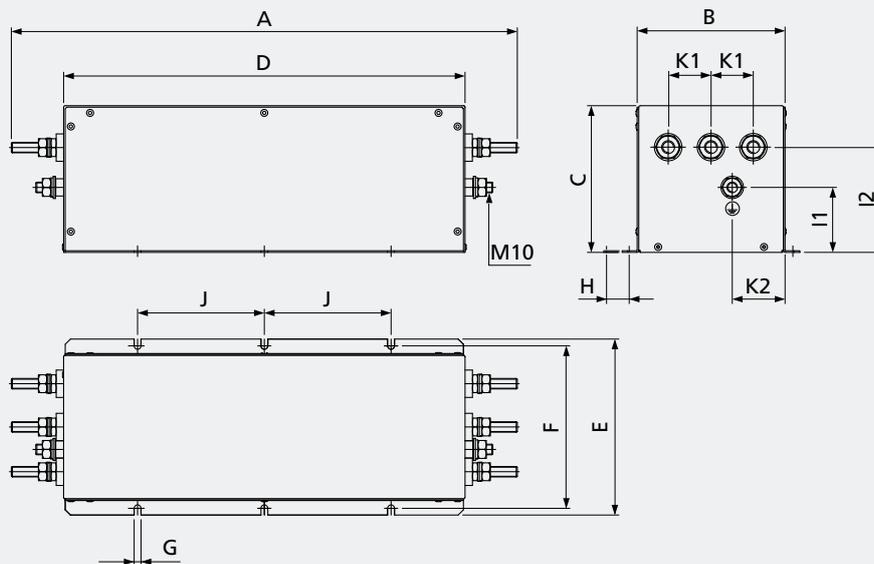
# Book type EMI filters

## Dimensions FTV007A ... FTV180A



| EMI FILTER | A   | B   | C   | D   | E   | F   | G   | H   | I    | J   | K    | L    |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|------|------|
| [mm]       |     |     |     |     |     |     |     |     |      |     |      |      |
| FTV007A    | 190 | 40  | 70  | 160 | 180 | 20  | 4.5 | 1   | 22   | M5  | 20   | 29.5 |
| FTV016A    | 250 | 45  | 70  | 220 | 235 | 25  | 5.4 | 1   | 22   | M5  | 22.5 | 29.5 |
| FTV030A    | 270 | 50  | 85  | 240 | 255 | 30  | 5.4 | 1   | 25   | M5  | 25   | 39.5 |
| FTV055A    | 250 | 85  | 90  | 220 | 235 | 60  | 5.4 | 1   | 39   | M6  | 42.5 | 26.5 |
| FTV075A    | 270 | 80  | 135 | 240 | 255 | 60  | 6.5 | 1.5 | 39   | M6  | 40   | 70.5 |
| FTV100A    | 270 | 90  | 150 | 240 | 255 | 65  | 6.5 | 1.5 | 45   | M10 | 45   | 64   |
| FTV130A    | 270 | 90  | 150 | 240 | 255 | 65  | 6.5 | 1.5 | 45   | M10 | 45   | 64   |
| FTV180A    | 380 | 120 | 170 | 350 | 365 | 102 | 6.5 | 1.5 | 49.5 | M10 | 60   | 47   |

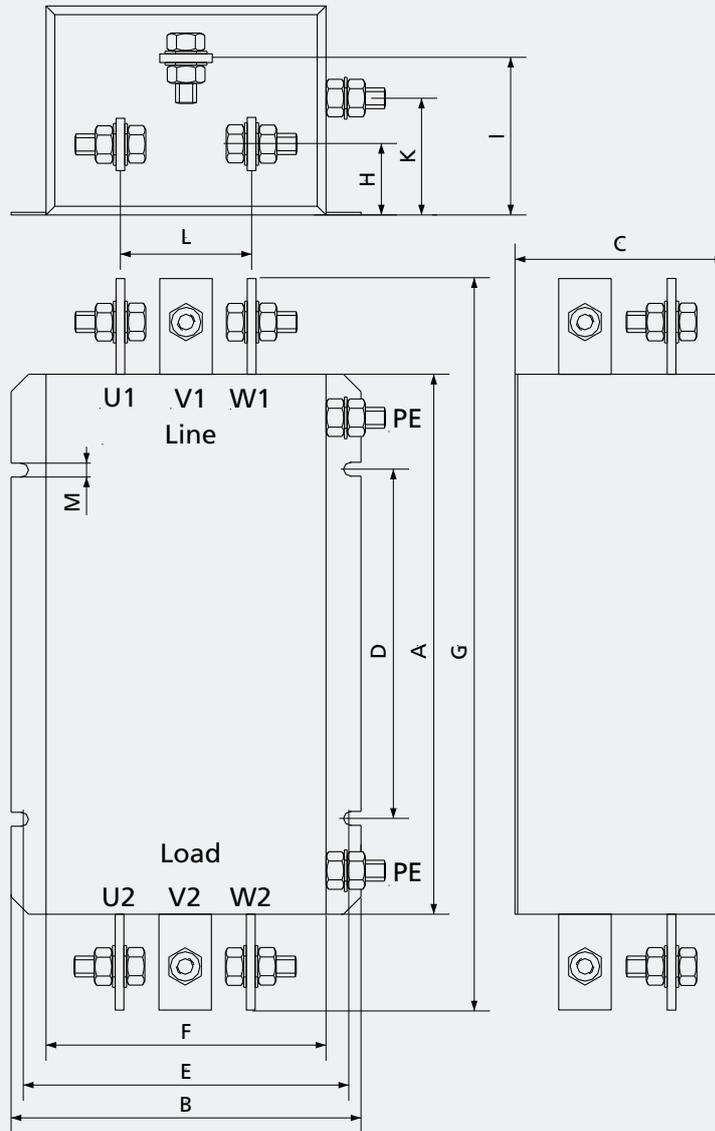
## Dimensions FTV250A



| EMI FILTER | A   | B   | C   | D   | E   | F   | G   | H   | I1 | I2  | J   | K1 | K2 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|----|----|
| [mm]       |     |     |     |     |     |     |     |     |    |     |     |    |    |
| FTV250A    | 482 | 140 | 140 | 380 | 168 | 155 | 6.5 | 1.5 | 62 | 100 | 120 | 40 | 50 |

# Book type EMI filters

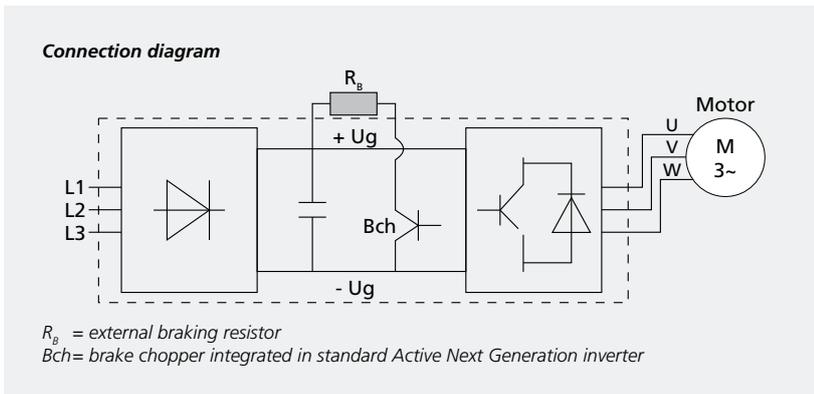
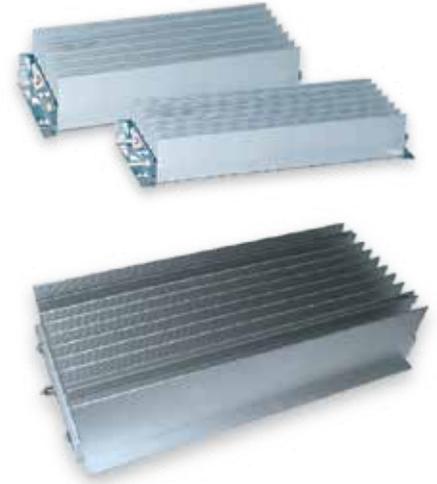
## Dimensions FTV401A ... FTV630A



| EMI FILTER  | A   | B   | C   | D   | E   | M ø | F   | G   | PE  | H  | I   | K  | L   | Bus Bar  |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|----------|
| [mm]        |     |     |     |     |     |     |     |     |     |    |     |    |     |          |
| FTV401A     | 350 | 240 | 150 | 200 | 220 | M8  | 200 | 480 | M12 | 69 | 110 | 30 | 128 | 8x25 M10 |
| FTV400A-690 | 350 | 240 | 150 | 200 | 220 | M8  | 200 | 480 | M12 | 69 | 110 | 30 | 128 | 8x25 M10 |
| FTV630A     | 350 | 240 | 150 | 200 | 220 | M8  | 200 | 480 | M12 | 69 | 110 | 30 | 128 | 8x25 M10 |

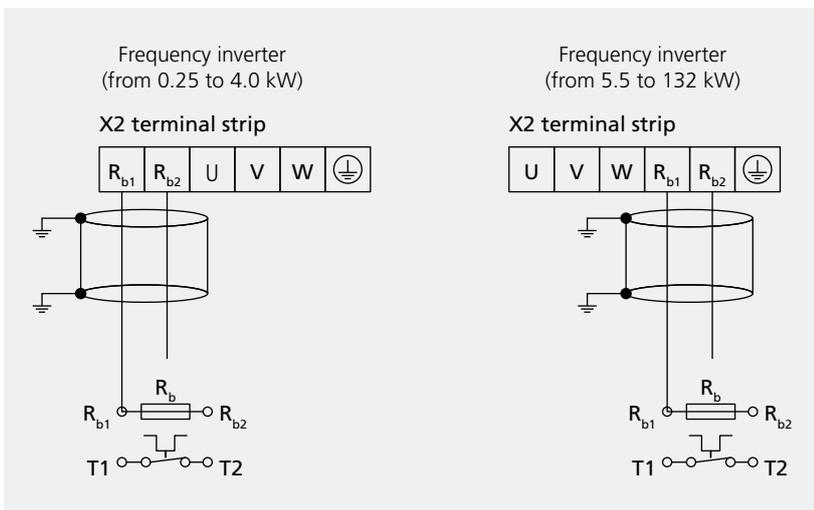
# Braking resistors

When speed of an inverter-controlled ac motor is reduced, the motor acts as a generator, feeding back energy to the frequency inverter. As a result, voltage in the intermediate circuit of the inverter increases. When a specific threshold is exceeded, the energy must flow to an external braking system in order to avoid drive failures. Braking resistors are designed to absorb such energy and to dissipate it into heating. The use of brake resistors allows drives to fulfil the requirements of particularly severe duty cycles, for example those featured by frequent braking, long lasting braking or impulsive braking. Bonfiglioli Vectron offers a wide range of safe and compact braking resistors with IP20 degree of protection: "BR series". BR series are designed for panel mounting. Mostly, they are equipped with built-in thermal protection.



## Connection terminals

The  $R_{b1}$  and  $R_{b2}$  braking resistor terminals on Active Next Generation frequency inverters are located on the X2 power output terminal strip. Access to these terminals on size 1 and 2 units is made even easier by the use of disconnectable power terminal strips. Refer to the manual provided with your frequency inverter for further details on materials and connection methods.



## Braking resistors

### Active Next Generation drive combination chart

These charts show recommended combinations for each model in the Active Next Generation range, and specify the corresponding duty cycles on the basis of rated drive power. Contact your nearest Bonfiglioli Drive Centre for particularly heavy-duty braking applications or if you need to customise a product.

| ANG SERIES |      | BONFIGLIOLI<br>BRAKING RESISTOR | RESISTANCE | CONTINUOUS<br>RATED POWER | DUTY CYCLE AT THE<br>DRIVE'S RATED POWER |
|------------|------|---------------------------------|------------|---------------------------|--|
|            | kW   |                                 | Ohm        |                           | [W]                                      |
| ANG 210-01 | 0.25 | BR 160/100                      | 100        | 160                       | 64%                                      |
| ANG 210-03 | 0.37 | BR 160/100                      | 100        | 160                       | 43%                                      |
| ANG 210-05 | 0.55 | BR 160/100                      | 100        | 160                       | 29%                                      |
| ANG 210-07 | 0.75 | BR 160/100                      | 100        | 160                       | 21%                                      |
| ANG 210-09 | 1.1  | BR 160/100                      | 100        | 160                       | 15%                                      |
| ANG 210-11 | 1.5  | BR 432/37                       | 37         | 432                       | 29%                                      |
| ANG 210-13 | 2.2  | BR 432/37                       | 37         | 432                       | 20%                                      |
| ANG 210-15 | 3    | BR 432/37                       | 37         | 432                       | 14%                                      |
| ANG 210-18 | 4    | BR 667/24                       | 24         | 667                       | 17%                                      |
| ANG 210-19 | 5.5  | BR 667/24                       | 24         | 667                       | 12%                                      |
| ANG 210-21 | 7.5  | BR 1333/12                      | 12         | 1333                      | 18%                                      |
| ANG 210-22 | 9.2  | BR 1333/12                      | 12         | 1333                      | 14%                                      |
| ANG 410-01 | 0.25 | BR 213/300                      | 300        | 213                       | 85%                                      |
| ANG 410-03 | 0.37 | BR 213/300                      | 300        | 213                       | 57%                                      |
| ANG 410-05 | 0.55 | BR 213/300                      | 300        | 213                       | 39%                                      |
| ANG 410-07 | 0.75 | BR 213/300                      | 300        | 213                       | 28%                                      |
| ANG 410-09 | 1.1  | BR 213/300                      | 300        | 213                       | 19%                                      |
| ANG 410-11 | 1.5  | BR 213/300                      | 300        | 213                       | 14%                                      |
| ANG 410-12 | 1.85 | BR 471/136                      | 136        | 471                       | 25%                                      |
| ANG 410-13 | 2.2  | BR 471/136                      | 136        | 471                       | 21%                                      |
| ANG 410-15 | 3    | BR 471/136                      | 136        | 471                       | 16%                                      |
| ANG 410-18 | 4    | BR 696/92                       | 92         | 696                       | 17%                                      |
| ANG 410-19 | 5.5  | BR 1330/48                      | 48         | 1330                      | 24%                                      |
| ANG 410-21 | 7.5  | BR 1330/48                      | 48         | 1330                      | 18%                                      |
| ANG 410-22 | 9.2  | BR 1330/48                      | 48         | 1330                      | 14%                                      |
| ANG 410-23 | 11   | BR 2000/32                      | 32         | 2000                      | 18%                                      |
| ANG 410-25 | 15   | BR 2000/32                      | 32         | 2000                      | 13%                                      |
| ANG 410-27 | 18.5 | BR 4000/16                      | 16         | 4000                      | 22%                                      |
| ANG 410-29 | 22   | BR 4000/16                      | 16         | 4000                      | 18%                                      |
| ANG 410-31 | 30   | BR 4000/16                      | 16         | 4000                      | 13%                                      |
| ANG 410-33 | 37   | BR 8000/7                       | 7.5        | 8000                      | 22%                                      |
| ANG 410-35 | 45   | BR 8000/7                       | 7.5        | 8000                      | 18%                                      |
| ANG 410-37 | 55   | BR 8000/7                       | 7.5        | 8000                      | 15%                                      |
| ANG 410-39 | 65   | BR 8000/7                       | 7.5        | 8000                      | 12%                                      |
| ANG 410-43 | 75   | BR8000/7                        | 7.5        | 8000                      | 11%                                      |
| ANG 410-45 | 90   | BR8000/7                        | 7.5        | 8000                      | 9%                                       |
| ANG 410-47 | 110  | 2xBR8000/7                      | 3.75       | 16000                     | 15%                                      |
| ANG 410-49 | 132  | 2xBR8000/7                      | 3.75       | 16000                     | 12%                                      |

For further information refer to the Bonfiglioli braking resistor catalogue.

# Global Presence



Bonfiglioli is a market force with a presence spanning 22 countries on 5 continents. Our organization makes the most of geographic proximity to offer complete solutions combining efficiency and competence.



3780  
EMPLOYEES



20  
BRANCHES



13  
PLANTS



550  
DISTRIBUTORS



80  
COUNTRIES

## We Are a Global Company

Thanks to an international network of sales branches and closely interconnecting production plants, we can guarantee the same high standards of Bonfiglioli quality anywhere at any given time. Aware that our direct presence in local markets is the key to long-lasting success, our family includes 20 sales branches, 13 production plants and more than 500 distributors around the world.

**Our organization is always close by, offering complete and efficient solutions and supporting our customers with dedicated services, such as co-engineering or after-sales assistance.**



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We have a relentless commitment to excellence, innovation and sustainability. Our team creates, distributes and services world-class power transmission and drive solutions to keep the world in motion.

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