

Altivar 71 Plus

90 ... 2000 kW

Configuration guide

English

07/2010



General remarks

The following symbols should assist you in handling the instructions:



Advice, tip !



General information, note exactly !

The requirements for successful commissioning are correct selection of the device, proper planning and installation. If you have any further questions, please contact the supplier of the device.

Capacitor discharge !

Before performing any work on or in the device, disconnect it from the mains and wait at least 15 minutes until the capacitors have been fully discharged to ensure that there is no voltage on the device.

Automatic restart !

With certain parameter settings it may happen that the frequency inverter restarts automatically when the mains supply returns after a power failure. Make sure that in this case neither persons nor equipment is in danger.

Commissioning and service !

Work on or in the device must be done only by duly qualified staff and in full compliance with the appropriate instructions and pertinent regulations. In case of a fault contacts which are normally potential-free and/or PCBs may carry dangerous voltages. To avoid any risk to humans, obey the regulations concerning "Work on Live Equipment" explicitly.

Terms of delivery

The latest edition "General Terms of Delivery of the Austrian Electrical and Electronics Industry Association" form the basis of our deliveries and services.

Specifications in this document

We are always anxious to improve our products and adapt them to the latest state of the art. Therefore, we reserve the right to modify the specifications given in this document at any time, particular those referring to weights and dimensions. All planning recommendations and connection examples are non-binding suggestions for which we cannot assume liability, particularly because the regulations to be complied depend on the type and place of installation and on the use of the devices.

All foreign-language translations result from the German or English version. Please consider those in case of unclarity.

Basis of contract

The specifications in text and drawings of this document are no subject of contract in the legal sense without explicit confirmation.

Regulations

The user is responsible to ensure that the device and its components are used in compliance with the applicable regulations. It is not permitted to use these devices in residential environments without special measures to suppress radio frequency interferences.

Trademark rights

Please note that we do not guarantee that the connections, devices and processes described herein are free from patent or trademark rights of third parties.

Copyright



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Altivar 71 Plus

Configuration Guide for 90...2000 kW

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Type of drive	Pumps and fans (industrial environment)	Complex machines
		
Type	ATV 61	ATV 71
Power range	0.37...800 kW	0.37...630 kW
Voltage ranges	1 AC 200...240 V (0.37...5.5 kW) 3 AC 200...240 V (0.75...90 kW) 3 AC 380...480 V (0.75...630 kW) 3 AC 500...690 V (2.2...800 kW)	1 AC 200...240 V (0.37...5.5 kW) 3 AC 200...240 V (0.37...75 kW) 3 AC 380...480 V (0.75...500 kW) 3 AC 500...690 V (1.5...630 kW)
Output frequency	0.1...500 Hz for the whole power range 0.1...1000 Hz up to 37 kW	0.1...500 Hz for the whole power range 0.1...1000 Hz up to 37 kW
Control method	V/f characteristic (2 or 5 points), vector-oriented flux control without feedback, energy saving system	V/f characteristic (2 or 5 points), vector-oriented flux control with/without encoder, ENA system
Interfaces	Removable operating panel, extensible terminals, programmable card "Drive-Controller", multi-pump card, Profibus DP, CANopen, Ethernet TCP/IP, Fipio, Modbus Plus, INTERBUS, Modbus/Uni-Telway, DeviceNet, LonWorks, METASYS N2, APOGEE FLN, BACnet	Removable operating panel, extensible terminals, programmable card "Drive-Controller", multi-pump card, Profibus DP, CANopen, Ethernet TCP/IP, Fipio, Modbus Plus, INTERBUS, Modbus/Uni-Telway, DeviceNet
Protection degree	Built-in units: IP31 / IP20 Wall-mounting devices: IP31	Built-in units: IP31 / IP20 Wall-mounting devices: IP31
Further reading	All information about project planning and order can be found in the product catalogue "Variable speed drives for asynchronous motors Altivar 61".	All information about project planning and order can be found in the product catalogue "Variable speed drives for asynchronous motors Altivar 71".

Type of drive	Pumps and fans	All drives with high performance in industry, machine building and automation																
																		
Type	ATV 61 Plus	ATV 71 Plus																
Brief description	Altivar Drive Systems with increased protection degree, alternatively in the standard design, with additionally installed options or as a customized solution	Altivar Drive Systems with increased protection degree, alternatively in the standard design, with additionally installed options or as a customized solution																
Power ranges	<table><tr><td>ATV61ES5●●●N4</td><td>90...630 kW</td></tr><tr><td>ATV61EX●●●●N4</td><td>90...1400 kW</td></tr><tr><td>ATV61EX●●●●N</td><td>90...1800 kW</td></tr><tr><td>ATV61EX●●●●Y</td><td>110...2400 kW</td></tr></table>	ATV61ES5●●●N4	90...630 kW	ATV61EX●●●●N4	90...1400 kW	ATV61EX●●●●N	90...1800 kW	ATV61EX●●●●Y	110...2400 kW	<table><tr><td>ATV71ES5●●●N4</td><td>90...500 kW</td></tr><tr><td>ATV71EX●●●●N4</td><td>90...1300 kW</td></tr><tr><td>ATV71EX●●●●N</td><td>90...1500 kW</td></tr><tr><td>ATV71EX●●●●Y</td><td>110...2000 kW</td></tr></table>	ATV71ES5●●●N4	90...500 kW	ATV71EX●●●●N4	90...1300 kW	ATV71EX●●●●N	90...1500 kW	ATV71EX●●●●Y	110...2000 kW
ATV61ES5●●●N4	90...630 kW																	
ATV61EX●●●●N4	90...1400 kW																	
ATV61EX●●●●N	90...1800 kW																	
ATV61EX●●●●Y	110...2400 kW																	
ATV71ES5●●●N4	90...500 kW																	
ATV71EX●●●●N4	90...1300 kW																	
ATV71EX●●●●N	90...1500 kW																	
ATV71EX●●●●Y	110...2000 kW																	
Voltage ranges	<table><tr><td>ATV61ES5●●●N4</td><td>380...415 V</td></tr><tr><td>ATV61EX●●●●N4</td><td>400 (380, 415) V</td></tr><tr><td>ATV61EX●●●●N</td><td>500 (525) V</td></tr><tr><td>ATV61EX●●●●Y</td><td>690 V</td></tr></table> <p>Other voltages are available on request.</p>	ATV61ES5●●●N4	380...415 V	ATV61EX●●●●N4	400 (380, 415) V	ATV61EX●●●●N	500 (525) V	ATV61EX●●●●Y	690 V	<table><tr><td>ATV71ES5●●●N4</td><td>380...415 V</td></tr><tr><td>ATV71EX●●●●N4</td><td>400 (380, 415) V</td></tr><tr><td>ATV71EX●●●●N</td><td>500 (525) V</td></tr><tr><td>ATV71EX●●●●Y</td><td>690 V</td></tr></table> <p>Other voltages are available on request.</p>	ATV71ES5●●●N4	380...415 V	ATV71EX●●●●N4	400 (380, 415) V	ATV71EX●●●●N	500 (525) V	ATV71EX●●●●Y	690 V
ATV61ES5●●●N4	380...415 V																	
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ATV71EX●●●●N	500 (525) V																	
ATV71EX●●●●Y	690 V																	
Output frequency	0.1 ... 500 Hz	0.1 ... 500 Hz																
Control method	V/f characteristic (2 or 5 points), vector-oriented flux control without feedback, energy saving system	V/f characteristic (2 or 5 points), vector-oriented flux control with/without encoder, ENA system																
Interfaces	Operating panel in the enclosure door with a transparent cover, control terminals alternatively directly in the inverter or in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen	Operating panel in the enclosure door with a transparent cover, control terminals alternatively directly in the inverter or in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen																
Protection degree	IP23 design of the enclosure IP54 design of the enclosure IP54 design of the enclosure with separated air flow	IP23 design of the enclosure IP54 design of the enclosure IP54 design of the enclosure with separated air flow																
Further reading	All information about project planning and order can be found in this document.	All information about project planning and order can be found in this document.																

Frequency inverter standard enclosures



The ATV71 Plus "Ready to use version" is an optimised concept for enclosures that guarantees delivery dates as short as possible due to the standardised components!

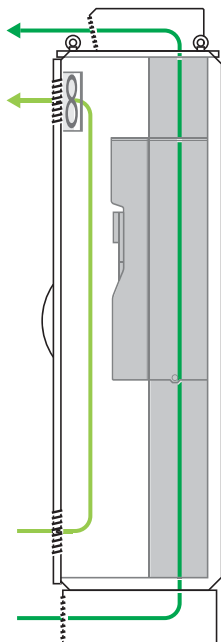
The cooling concept IP54 with separated air flow for power part and control part of the frequency inverter provides manifold applications for this inverter series.

Configuration features of the "Ready to use version"

These Altivar enclosure units are an extension to the Altivar frequency inverter offer. The basic equipment contains a frequency inverter ATV61 or ATV71, a circuit breaker and a DC choke to reduce the harmonics.

The design is based on the standard enclosure system Sarel S6000 with an enclosure plinth which is 200 mm high and an operating panel integrated into the enclosure door.

Device features



Enclosure system

The Sarel S6000 enclosure system with additional internal reinforcement elements and slide bars for easy installation and removal of the inverter devices and other power components can be added to any existing enclosure systems.

Cooling concept

In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

Operation / parameterization

For safe control, clear parameterization and fast diagnosis, the operating panel is installed in the enclosure door at an ideal height. A transparent protective cover and an adjustable locking code prevent the unintended parameter adjustments.

Connection

The power cables are connected at the mains side directly at the circuit breaker. There are terminals or bars provided for the motor output. The cables are to be connected at the bottom.

"Ready to use version"

Altivar 71 Plus

Drive Systems

Mains voltage 400 V

Enclosure design 400 V "Ready to use version"

General technical data

Mains voltage	380...415 V $\pm 10\%$, 50/60 Hz $\pm 5\%$ for TT, TN-C, TN-S or IT networks
Maximum current	120 % for 60 s per 10 minutes, 135 % for 2 seconds
Operating temperature	0 ... +40°C, up to +50°C with derating possible
Standards	CE, EMC filter for 2nd "industrial environment" C3 integrated
General design	Enclosure system S6000 in RAL 7032, enclosure plinth in RAL 7022 Controls in the enclosure door with additional protective cover, Cable entry from below, enclosure depth 616 mm (659 mm incl. door handle)
Interfaces	Control terminals directly at the inverter, fieldbus connection via Modbus or CANopen

ATV71ES5...N4

IP54SA with separated air flow	Air flow through enclosure plinth and mounted air guidance hood, cooling of the control part by means of filter fans in the enclosure door, Enclosure height of 2359 mm incl. 200 mm plinth
Standard equipment	Frequency inverter ATV71, circuit breaker, DC coke, motor terminals, terminals for external braking resistor (only ATV71ES5D90N4 ... ATV71ES5C16N4), operating panel in the door
Options	There are no options available for the "Ready to use version" design!

Type	Motor output	Output current	Dimensions in mm		
			Width	Depth (without door handle)	Height
ATV71ES5					
D90N4	90 kW	179 A	616	616	2359
C11N4	110 kW	215 A	616	616	2359
C13N4	132 kW	259 A	616	616	2359
C16N4	160 kW	314 A	616	616	2359
C20N4	200 kW	387 A	816	616	2359
C25N4	250 kW	481 A	816	616	2359
C28N4	280 kW	550 A	816	616	2359
C31N4	315 kW	616 A	1420	616	2359
C40N4	400 kW	759 A	1420	616	2359
C50N4	500 kW	941 A	1420	616	2359

Frequency inverter standard enclosures

The concept of the Altivar enclosure units offers standard enclosures ready to connect. The modular construction makes it possible to adapt the enclosure to the individual requests. The economic enclosure version makes the planning easy and ensures a quick installation and commissioning of the drive.

Basic equipment of the Altivar enclosure units

The Altivar enclosure units are an extension to the Altivar frequency inverter offer. The basic equipment contains a frequency inverter ATV61 or ATV71, semiconductor fuses, a main switch, a choke to reduce the harmonics and terminals. The design is based on the enclosure system Sarel S6000 with the operating panel built-in into the door.

The control is located on a spacious swing frame. That ensures compact dimensions, nevertheless it is enough space for additional extensions and accessibility in case of maintenance.

Device features**Enclosure system**

The Sarel S6000 enclosure system with additional internal reinforcement elements and slide bars for easy installation and removal of the inverter devices and other power components can be added to any existing enclosure systems.

Operation / parameterization

For safe control, clear parameterization and fast diagnosis, the operating panel is installed in the enclosure door at an ideal height. A transparent protective cover and an adjustable locking code prevent the unintended parameter adjustments.

Displays on the enclosure

Permanently present status displays that show the actual device state at any time.

Up to 5 analog actual values can be parameterized for the display and thus provide information on the relevant drive data at any time.

Connection

Generous space is provided to connect the power cables. The extensibility and accessibility of the control terminals is also taken into consideration.

In the standard design, the cables are to be connected at the bottom of the inverter.

Extensibility

All enclosure units are equipped with a large, swivelling control panel that permits subsequent extensions.

Enclosure design 400 V

General technical data

Mains voltage	400 (380, 415) V $\pm 10\%$, 50/60 Hz $\pm 5\%$ for TT, TN-C, TN-S or IT networks
Maximum current	150 % for 60 s per 10 minutes, 165 % for 2 seconds
Operating temperature	0 ... +40°C, up to +50°C with derating possible
Standards	CE, EMC filter for 2nd "industrial environment" C3 integrated
General design	Enclosure system Sarel S6000 in RAL 7032 Controls in the enclosure door with additional protective cover, Cable entry from below, enclosure depth of 616 mm (659 mm incl. door handle)
Interfaces	Control terminals directly on the inverter or alternatively in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen

ATV71EXC●●●●N4

ATV71EXS5●●●●N4

IP23CV Compact version	Air flow through grid in enclosure door and mounted air guidance hood, Enclosure height of 2159 mm
IP54CV Compact version	Air flow through filter mats in enclosure door and a top mounted fan, Enclosure height of 2264 mm
IP54SA with separated air flow	Air flow through enclosure plinth and mounted air guidance hood, cooling of the control part by means of filter fans in the enclosure door, Enclosure height of 2359 mm incl. 200 mm plinth
Standard equipment	Frequency inverter ATV71, main switch, mains fuses, AC or DC choke, motor terminals, terminals for an external braking resistor (only ATV71EX●●D90N4 ... ATV71EX●●C16N4), control panel and operating panel in the door
Options	Line contactor, braking unit (from ATV71EX●●C20N4), motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

ATV71EXA●●●●N4

IP23 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
IP54 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional filter fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
Standard equipment	Frequency inverter ATV71, main switch, mains fuses, motor terminals, control panel and operating panel in the door
Options	Line contactor, line reactor, motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

Type	Motor output	Output current	Dimensions in mm		
			Width	Depth (without door handle)	Height
ATV71EXC● ATV71EXS5					
D90N4	90 kW	179 A	616	616	IP23: 2159 mm
C11N4	110 kW	215 A	616	616	
C13N4	132 kW	259 A	616	616	
C16N4	160 kW	314 A	616	616	
C20N4	200 kW	387 A	816	616	
C25N4	250 kW	481 A	816	616	IP54: 2264 (2359) mm
C28N4	280 kW	550 A	816	616	
C31N4	315 kW	616 A	1016 (1420)	616	
C40N4	400 kW	759 A	1016 (1420)	616	
C50N4	500 kW	941 A	1216 (1620)	616	
ATV71EXA●					
C50N4	500 kW	920 A	1828	616	2004
C63N4	630 kW	1100 A	1828	616	2004
C71N4	710 kW	1260 A	3440	616	2004
C90N4	900 kW	1580 A	3440	616	2004
M11N4	1100 kW	1860 A	3440	616	2004
M13N4	1300 kW	2200 A	3440	616	2004

Values in brackets for IP54SA with separated air flow

Enclosure design 500 V

General technical data

Mains voltage	500 (525) V $\pm 10\%$, 50/60 Hz $\pm 5\%$ for TT, TN-C, TN-S or IT networks
Maximum current	150 % for 60 s per 10 minutes, 165 % for 2 seconds
Operating temperature	0 ... +40°C, up to +50°C with derating possible
Standards	CE, EMC filter for 2nd "industrial environment" C3 integrated, at IT networks for C4
General design	Enclosure system Sarel S6000 in RAL 7032 Controls in the enclosure door with additional protective cover, Cable entry from below, enclosure depth of 616 mm (659 mm incl. door handle)
Interfaces	Control terminals directly on the inverter or alternatively in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen

ATV71EXC●●●●N

ATV71EXS●●●●N

IP23CV Compact version	Air flow through grid in enclosure door and mounted air guidance hood, Enclosure height of 2159 mm
IP54CV Compact version	Air flow through filter mats in enclosure door and a top mounted fan, Enclosure height of 2264 mm
IP54SA with separated air flow	Air flow through enclosure plinth and mounted air guidance hood, cooling of the control part by means of filter fans in the enclosure door, Enclosure height of 2359 mm incl. 200 mm plinth
Standard equipment	Frequency inverter ATV71, main switch, mains fuses, AC or DC choke, motor terminals, control panel, terminals for an external braking resistor (only ATV71EX●●D90N...ATV71EX●●C16N) and operating panel in the door
Options	Line contactor, braking unit (from ATV71EX●●C20N), motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

ATV71EXA●●●●N

IP23 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
IP54 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional filter fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
Standard equipment	Frequency inverter ATV71, main switch, mains fuses, motor terminals, control panel and operating panel in the door
Options	Line contactor, line reactor, motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

Type	Motor output	Output current	Dimensions in mm		
			Width	Depth (without door handle)	Height
ATV71EXC● ATV71EXS5					
D90N	90 kW	136 A	616 (1020)	616	IP23: 2159 mm
C11N	110 kW	165 A	616 (1020)	616	
C13N	132 kW	200 A	616 (1020)	616	
C16N	160 kW	240 A	816 (1220)	616	
C20N	200 kW	312 A	816 (1220)	616	
C25N	250 kW	390 A	816 (1220)	616	IP54: 2264 (2359) mm
C31N	315 kW	462 A	1216 (1620)	616	
C40N	400 kW	590 A	1216 (1620)	616	
C50N	500 kW	740 A	1216 (1620)	616	
ATV71EXA●					
C50N	500 kW	740 A	1828	616	2004
C63N	630 kW	920 A	1828	616	2004
C80N	800 kW	1100 A	1828	616	2004
C90N	900 kW	1260 A	3440	616	2004
M11N	1100 kW	1580 A	3440	616	2004
M13N	1300 kW	1860 A	3440	616	2004
M15N	1500 kW	2020 A	3440	616	2004

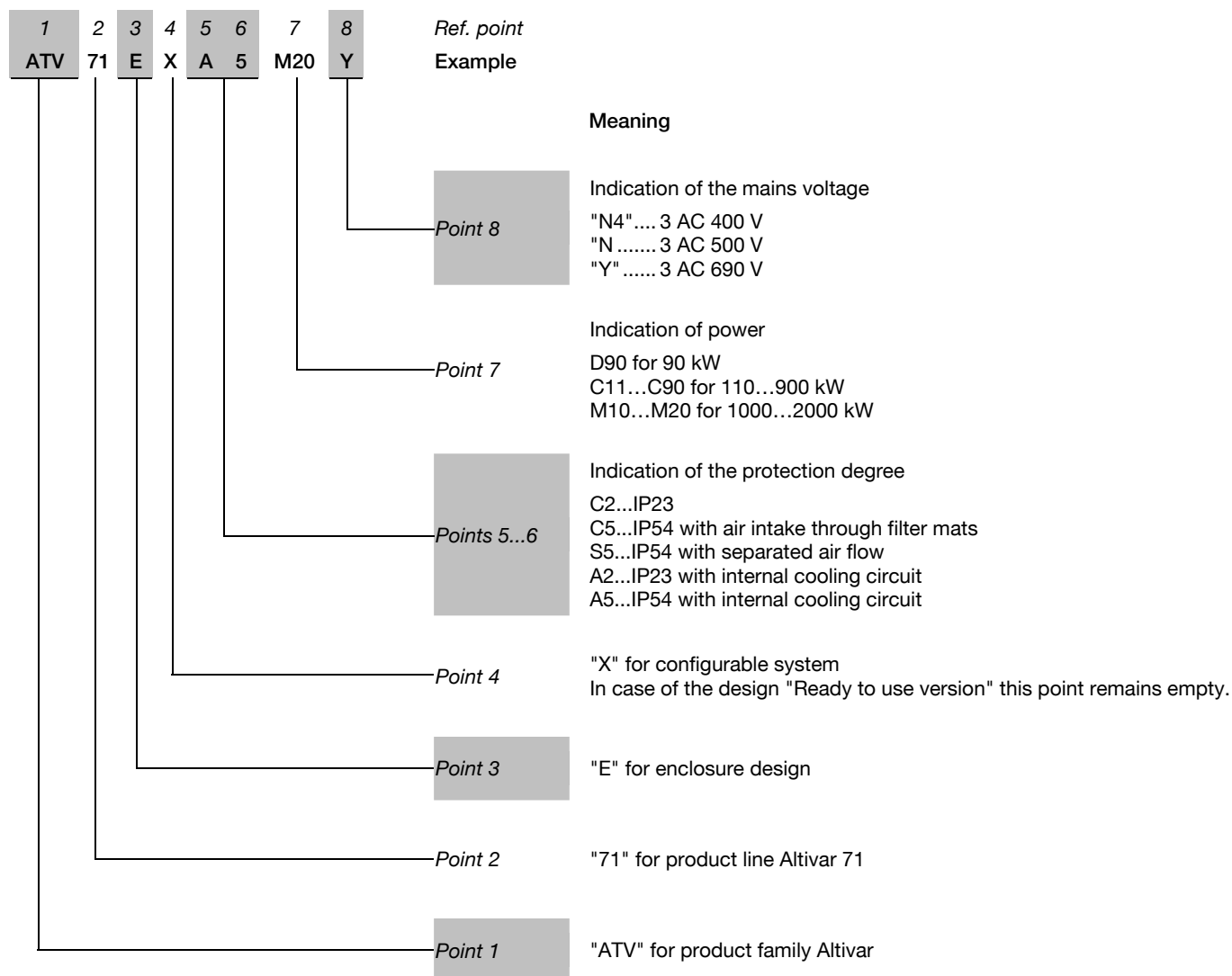
Values in brackets for IP54SA with separated air flow

Enclosure design 690 V					
General technical data					
Mains voltage	690 V ±10%, 50/60 Hz ±5 % for TT, TN-C, TN-S or IT networks				
Maximum current	150 % for 60 s per 10 minutes, 165 % for 2 seconds				
Operating temperature	0 ... +40°C, up to +50°C with derating possible				
Standards	CE, EMC filter for 2nd "industrial environment" C3 integrated				
General design	Enclosure system Sarel S6000 in RAL 7032 Controls in the enclosure door with additional protective cover, Cable entry from below, enclosure depth of 616 mm (659 mm incl. door handle)				
Interfaces	Control terminals directly on the inverter or alternatively in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen				
ATV71EXC●●●●Y ATV71EXS●●●●Y					
IP23CV Compact version	Air flow through grid in enclosure door and mounted air guidance hood, Enclosure height of 2159 mm				
IP54CV Compact version	Air flow through filter mats in enclosure door and a top mounted fan, Enclosure height of 2264 mm				
IP54SA with separated air flow	Air flow through enclosure plinth and mounted air guidance hood, cooling of the control part by means of filter fans in the enclosure door, Enclosure height of 2359 mm incl. 200 mm plinth				
Standard equipment	Frequency inverter ATV71, main switch, mains fuses, AC or DC choke, motor terminals, terminals for an external braking resistor (only ATV71EX●●D90Y...ATV71EX●●C16Y), control panel and operating panel in the door				
Options	Line contactor, braking unit (from ATV71EX●●C20Y), motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more				
ATV71EXA●●●●Y					
IP23 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm				
IP54 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional filter fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm				
Standard equipment	Frequency inverter ATV71, main switch, mains fuses, motor terminals, control panel and operating panel in the door				
Options	Line contactor, line reactor, motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more				

Type	Motor output	Output current	Dimensions in mm		
			Width	Depth (without door handle)	Height
ATV71EXC● ATV71EXS5					
C11Y	110 kW	125 A	616 (1020)	616	IP23: 2159 mm
C13Y	132 kW	150 A	616 (1020)	616	
C16Y	160 kW	180 A	616 (1020)	616	
C20Y	200 kW	220 A	816 (1220)	616	
C25Y	250 kW	290 A	816 (1220)	616	
C31Y	315 kW	355 A	816 (1220)	616	IP54: 2264 (2359) mm
C40Y	400 kW	420 A	1216 (1620)	616	
C50Y	500 kW	543 A	1216 (1620)	616	
C63Y	630 kW	675 A	1216 (1620)	616	
ATV71EXA●					
C63Y	630 kW	675 A	1828	616	2004
C80Y	800 kW	840 A	1828	616	2004
M10Y	1000 kW	1010 A	1828	616	2004
M12Y	1200 kW	1260 A	3440	616	2004
M15Y	1500 kW	1580 A	3440	616	2004
M18Y	1800 kW	1860 A	3440	616	2004
M20Y	2000 kW	2020 A	3440	616	2004

Values in brackets for IP54SA with separated air flow

The product designation of the Altivar frequency inverters consists of several points of reference (characters and figures). The meaning of each point is illustrated in the following example.



Order process for standard enclosures "Configured drive systems"

1. Choose the standard enclosure on the basis of the voltage, the power and the protection degree first.
e.g. mains voltage: 400 V; motor power: 315 kW; protection degree IP54 compact

– 1x ATV71EXC5C31N4	Standard enclosure in protection degree IP54 compact
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2. Now you can select the desired options, which should be installed into the enclosure in the factory, by means of the option lists.

– 1x VW3 AE 0105	Isolating handle for switch
– 1x VW3 AE 1601	Enclosure lighting



Some options affect the dimensions of the enclosure. Please observe chapter "Width of the cubicle", page 179 for this purpose.

3. List the enclosure unit including the respective options in the order:

– 1x ATV71EXC5C31N4	Standard enclosure in protection degree IP54 compact
– 1x VW3 AE 0105	Isolating handle for switch
– 1x VW3 AE 1601	Enclosure lighting



Specify only one standard enclosure including the respective options per order! Otherwise the assignment of the options to be installed is not possible!



Enclosure options cannot be ordered on its own! This is only possible in combination with a standard enclosure!

4. When you want to order the same enclosure configuration several times, you can simply multiply the individual positions.

– 3x ATV71EXC5C31N4	Standard enclosure in protection degree IP54 compact
– 3x VW3 AE 0105	Isolating handle for switch
– 3x VW3 AE 1601	Enclosure lighting

Request and order of "Flexible drive systems" enclosures

For all orders which contain "Options on request" or special options, proceed as follows.

1. Choose the standard enclosure on the basis of the voltage, the power and the protection degree.
e.g.: mains voltage: 690 V; motor power: 2000 kW; protection degree IP54 with internal cooling circuit

– 1x ATV71EXA5M20Y	Standard enclosure in protection degree IP54 with internal cooling circuit
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2. Now you can select the desired options, which should be installed into the enclosure afterwards, by means of the option lists.
Additionally specify your requests.

– 1x VW3 AE 1601	Enclosure lighting
– 1x VW3 AE 2420	12-pulse supply
– 1x <i>on request</i>	Special colour RAL7035 "Light grey"
– 1x <i>on request</i>	Cable entry via the top



Some options affect the dimensions of the enclosure. Please observe chapter "Width of the cubicle", page 179 for this purpose.

3. List the enclosure unit including the respective options for the request. Send this request to Schneider Electric Power Drives.

– 1x ATV71EXA5M20Y	Standard enclosure in protection degree IP54 with internal cooling circuit
– 1x VW3 AE 1601	Enclosure lighting
– 1x VW3 AE 2420	12-pulse supply
– 1x <i>on request</i>	Special colour RAL7035 "Light grey"
– 1x <i>on request</i>	Cable entry via the top



Specify additionally the requirements for the special design in the request!

4. You will receive a quotation with a quotation number (e.g. VA-1002-09A-AL) including transfer price (net price), delivery time, terms of delivery and technical descriptions to the individual positions.

5. Please always quote in the order "ATVCBL" as reference. Add the quotation number and the position in the description.

– 1x ATVCBL	as per quotation number VA-1002-09A-AL (position 1)
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It is absolutely necessary to quote the position in addition to the quotation number so that the amount of the order is well-defined!

Altivar 71 Plus

General specification

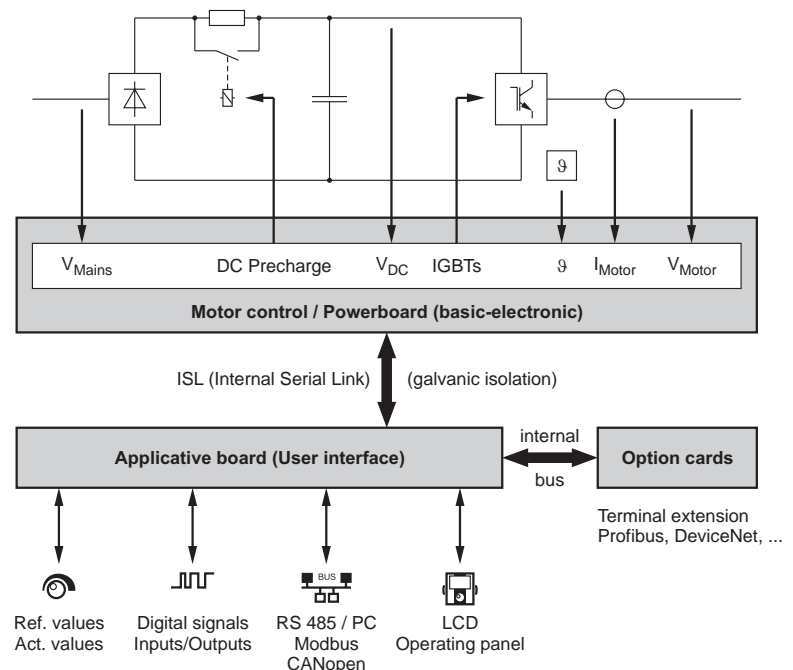
Altivar frequency inverters use modern components and solutions for the control of asynchronous three-phase motors and synchronous three-phase motors. This enables an extremely compact design and userfriendly device features.

Our high degree of quality awareness ranges from the basic requests in the product specification over the development of the cooling system, of the mechanical design, of the electrical circuit diagram and the individual functions up to the production of the device. This quality level is also long-term guaranteed by means of the corresponding quality assurance systems in the individual business processes and is certified every year by independent authorities according to DIN EN ISO 9001.

The range of Altivar 61 frequency inverters has been developed especially for applications in the area of industrial and commercial buildings (ventilation, air conditioning and pump technology). Due to the integrated energy saving function a reduction of the operating costs is permitted by improved power consumption.

The Altivar 71 is equipped with several motor control methods and numerous integrated functions. Thus it meets the highest demands in industry, machine building and automation.

Altivar frequency inverters are independent working devices with internal supply of the control and forced ventilation. They feature alternatively an integrated LED operating panel or a removable operating panel with large LCD display and extensive control terminals.



Depending on the local conditions and the requests on the drive the basic device can or must be supplemented by options. Options for the power path, options for control and operation as well as mechanical options are available.

Altivar frequency inverters fulfil the relevant international standards and regulations of the EN-standard, IEC-standards up to UL and CSA regulations.

CE Marking

All devices and drives of the electric drive engineering may cause electromagnetic interferences and otherwise they may be influenced by such interferences. Therefore, they are subject to the **EMC directive 2004/108/EC** since 1.1.1996.

The frequency inverters have an operating voltage which is clearly in the range of 50...1000 V AC or 75...1500 V DC. Therefore, they are also subject to the **Low-voltage directive 2006/95/EC** since 1.1.1997.

Because of the EMC filters which are built into the frequency inverters they are in conformity with **EN 61800-3** and **EN 61800-5-1**.

Frequency inverters are not considered as machines with at least one mechanically moving part. Therefore, they are not subject to the Machine directive 2006/42/EC.



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

The frequency inverters have a CE marking on the rating plate. However, it is necessary to observe the installation regulations to achieve the corresponding limits.

Installation regulations

- The frequency inverters have a basic radio frequency interference filter for grounded mains built-in.
- Take care of good HF connection between motor cable screen and filter.
- Use of screened motor cables, proper connection of the motor cables on both ends or proper laying in a metallic, closed and interconnected cable conduit
- Use of a motor choke in case of high motor cable lengths
- Use and proper connection of screened control cables
- Grounding of the frequency inverter for human protection
- Consider the protective separation when preparing control lines and coupling relays
- Laying of the motor cables separated from other cables, especially from the control wiring

Machine safety

The function "Safe Standstill" (page 150) is available as selectable option in various safety and stop categories. So an optimal adaptation of the drive to the required safety category for the machine is possible.

Following variants of the option "Safe Standstill" are selectable:

- **Safety category 1 with stop category 0**
alternatively with line contactor or safety input at the inverter
- **Safety category 3 with stop category 0**
with Preventa safety relay
- **Safety category 3 with stop category 1**
with Preventa safety relay and monitored deceleration of the drive



For all selectable safety options the implementation of external safety-relevant contacts is provided. So the ATV71 Plus does not act as a closed safety system in terms of the Machine directive and safety standards EN/IEC 61508, EN 954-1, ISO 13849-1 and NF EN 62061. It has to be accounted as component in any case. The safety-relevant components which are installed in the ATV71 Plus and their safety-relevant functionality have to be included in the whole machine safety by the engine builder.

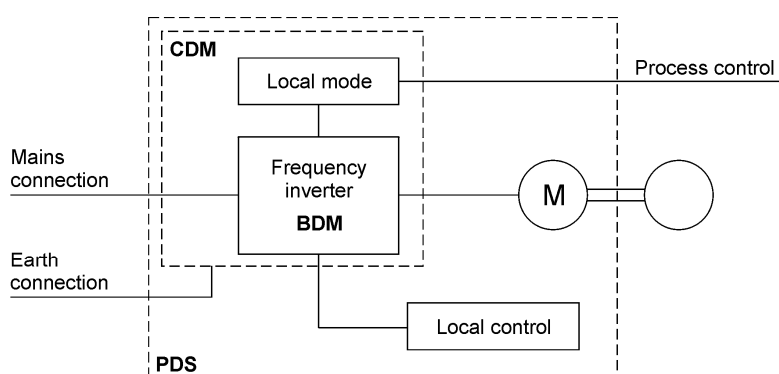
EMC product standard for PDS (Power Drive Systems) EN 61800-3

For frequency inverter drives the product standard EN/IEC 61800-3 edition 1 and 2 appeared. It has first priority over the existing general standards (generic standards). If a drive is installed into another device for which a separate EMC product standard exists, then this standard applies.

The aim of the **EMC directive 2004/108/EEC** is the ability of electric and electronic installations to operate satisfactorily in their electromagnetic environment without influencing the environment or other loads therein.

Therefore, the PDS product standard contains both limits for admissible interferences and requirements for the necessary interference resistance.

The power drive standard EN 61800-3 covers the complete drive from the mains supply to the motor shaft.



BDM:	Base-Drive-Module	Basic drive consisting of the power part and the control electronics (e.g. frequency inverter - built-in unit)
CDM:	Complete-Drive-Module	Drive modules consisting of BDM (basic drive) and extensions, if existing (e.g. enclosure including EMC filter, motor choke, line contactor, ...)
PDS:	Power-Drive-System	Drive system consisting of CDM (drive module) and motor, motor cable, local control, power transformer, ... (e.g. the complete electric drive of a machine)

The differentiation in respect of the sales method and the range of use is essential for the handling of frequency inverters.

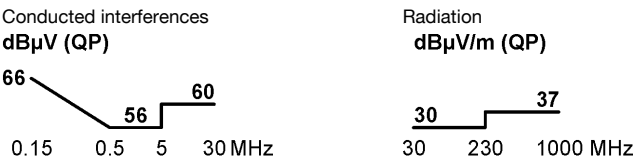
Use in residential environment

Drives that are connected without an intermediate transformer to the power supply network which also supplies residential areas. The standard refers to these application areas as "first environment".

The valid limits for interferences are very low and can only be observed by compliance with all installation instructions.

Category C1

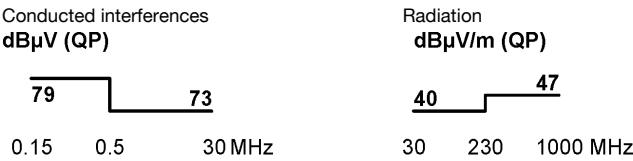
Use in residential environments with general sales (unrestricted to every person)



The admissible limits for interferences comply with the applied standard EN 55011 class B; i.e. 66-56/56/60 dB(μ V) quasi-peak and 30/37 dB(μ V/m) at a distance of 10 m.

Category C2

Use in residential environments with restricted sales (only EMC qualified resellers)



All drives must comply with the limits of interferences of the former class A group 1.

i.e. 79/73/73 dB(μ V) quasi-peak and 40/47 dB(μ V/m) at a distance of 10 m

Use in industrial environment

The standard refers to these application areas as "second environment". These are areas that are separated from the public network by means of an own transformer. The user must ensure that the suppression components recommended by the manufacturer are used and that the introductions of the manufacturer are observed. Moreover, the user must ensure that strong interferences do not couple into neighbouring low-voltage networks.

If the neighbouring network is a public network with residential areas, the limits 66-56/56/60 dB(μ V) quasi-peak apply. In case of industrial networks the higher limits 79/73/73 dB(μ V) quasi-peak can be used.

Furthermore, it is necessary to enhance the suppression of interferences if other devices are influenced. The operator of the plant is responsible for this improvement.

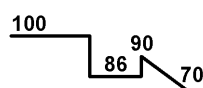
The limits for immunity are much stricter because they are based on a generally higher level of interferences.

Category C3

Use in industrial environments

Conducted interferences
drive ≤ 100 A

dB μ V (QP)



0.15 0.5 5 30 MHz

Radiation

dB μ V/m (QP)

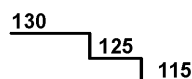


30 230 1000 MHz

For drives with a size ≤ 100 A the admissible limits for interferences are 100/86/90-70 dB(μ V) quasi-peak and 50/60 dB(μ V/m) at a distance of 10 m (class A group 2).

Conducted interferences
drive > 100 A

dB μ V (QP)



0.15 0.5 5 30 MHz

Radiation

dB μ V/m (QP)



30 230 1000 MHz

For drives with a size > 100 A the admissible limits for interferences are 130/125/115 dB(μ V) quasi-peak and 50/60 dB(μ V/m) at a distance of 10 m (class A group 2).

Category C4

Use in industrial environments for drives > 1000 V or > 400 A

For these drives are no limits defined. An EMC concept has to be compiled within project planning.

In case of non-grounded mains it is usually not possible to keep the limits. Filter capacitors make detection of insulation faults difficult and thus they interfere with the concept of a floating power supply. However, filters that are developed especially for IT mains can be used because they also cause a high reduction of the conducted interferences in non-grounded mains.



The basic requirements for compliance with the relevant limits are the observance and compliance of the installation requirements and the use of the recommended options.

Mains voltage

The Altivar devices are designed for the following mains voltages:

- ATV71ES5●●●N4: 3 AC 380...415 V \pm 10 %, 50/60 Hz \pm 5 %
- ATV71EX●●●●N4: 3 AC 400 (380, 415) V \pm 10 %, 50/60 Hz \pm 5 %
- ATV71EX●●●●N: 3 AC 500 (525) V \pm 10 %, 50/60 Hz \pm 5 %
- ATV71EX●●●●Y: 3 AC 690 V \pm 10 %, 50/60 Hz \pm 5 %

The existing nominal mains voltage must be set at the inverter by means of a parameter. Thereby an optimal adjustment of the undervoltage protective function takes place.

Braking unit / Braking resistor

The Altivar frequency inverters have parameters to monitor the braking power.



If the braking resistor does not match the overload characteristic to be used or the local regulations require an additional protective device, a thermal relay should be integrated into the mains disconnection mechanism.

The correct setting of the braking parameters is essential for the protection of the braking resistor in normal operation. In case of malfunction of the internal braking transistor or of the external braking unit, the braking resistor can be only protected by mains disconnection. Therefrom, a line contactor is necessary when using the braking function. Furthermore, the use of the function "Line contactor control" is recommended.

Nongrounded mains

The use of the Altivar frequency inverters is basically in all network variants permitted. But the Altivar frequency inverters with a mains voltage of 500 V or 690 V must not be operated in "Corner Grounded Networks".

With the option "Design for IT networks" (page 153) the frequency inverter is prepared for connection to non-grounded networks.

In case of nongrounded networks a single earth fault in the supplying mains has no effect to the function of the inverter. If the earth fault occurs in the motor or the motor cables, the inverter is switched off. But the recognition heavily depends on the earth capacitance of the mains.



Especially for IT networks the option "Insulation monitoring for IT networks" is available. This option monitors each phase to earth fault. See page 153.



Due to human protection, in IT networks only the use of special RFI filters with very low leakage current is permitted (increase of earth capacitance, ...).

Radio interferences

The frequency inverters include an EMC filter built-in as standard. This filter complies with the requirements for category "C3 – Industrial environments" according to EN/IEC 61800-3 (in the past: EN 55011 class A group 2).



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

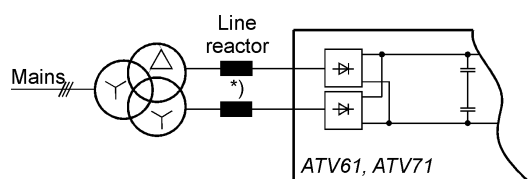
12-pulse supply

The frequency inverters of the enclosure units ATV71EXA●●●●● are standard equipped with two parallel input rectifiers. Thus it is easy to equip them with 12-pulse rectification optionally.

The supply results from a separate transformer with two out-of-phase secondary windings (e.g. superimposing transformer Yy6 Yd5).

If the existing mains distortion is mainly caused by frequency inverters with normal 6-pulse-circuit, a superimposing transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at each secondary windings e.g. Yy1130 Yy0030) will be highly recommended.

On the main side of the transformer the 5th and 7th current harmonics are practically non-existent as they have been cancelled by the shifted transformer windings.



*) Line reactors are only necessary if a transformer is used for several inverters or if the transformer power is notably larger than the inverter power (see chapter "Mains impedance / Short-circuit current", page 27).

The following specifications must be kept at a minimum in order to ensure trouble-free operation and even current sharing:

Transformer:

- | | |
|--|-------------------------------|
| • Converter transformer for 12-pulse supply with two non-controlled rectifier bridges in a common voltage DC link. | |
| • Recommended design: | superimposing |
| • Nominal voltage at the primary side: | according to application |
| • Voltage adaptation at the primary side: | +5% / +2.5% / 0 / -2.5% / -5% |
| • Nominal output current: | see the following table |
| • Current harmonics at the secondary side: | see the following table |
| • Nominal output voltage (= no-load voltage): | see the following table |
| • Tolerance of the secondary voltages to each other: | < 0.3% (< 0.1%) of V_{NOM} |
| • Short circuit voltage: | see the following table |
| • Tolerance of the relative short circuit voltage: | $\pm 10\%$ of v_{SC_NOM} |
| • Tolerance of the relative short circuit voltage between both secondary windings: | < 5% (< 2%) of v_{SC_NOM} |
| • Further specifications: | according to the application |
| • Tolerance for unbalance of phaseshift | ($\pm 0.5^\circ$) |

Mains:

- allowed mains distortion: THD(u) < 5%
- max. single harmonic (5th): < 3%

() Values in brackets for transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at both secondary windings e.g. Yy1130 Yy0030)

Recommended values for dimensioning a "12-pulse transformer"									
Inverter power [kW]	Transformer			Inverter power [HP]			Transformer		
	Output current 400V	Output current 500V	Output current 690V		Output current 480V	Output current 600V	Hamonics Secondary (THDi LV)	Short-circuit voltage	Hamonics Primary (THDi HV)
90	2x 90 A	2x 70 A	2x 60 A	125	2x 80 A	2x 65 A	42 %	4 %	12 %
110	2x 110 A	2x 80 A	2x 65 A	150	2x 95 A	2x 75 A	42 %	4 %	12 %
132	2x 130 A	2x 95 A	2x 75 A	200	2x 125 A	2x 115 A	42 %	4 %	12 %
160	2x 155 A	2x 120 A	2x 90 A	250	2x 155 A	2x 140 A	42 %	4 %	12 %
200	2x 190 A (2x 175 A)	2x 145 A (2x 140 A)	2x 120 A (2x 100 A)	300	2x 185 A (2x 170 A)	2x 160 A (2x 140 A)	42 %	4 %	12 %
220	2x 210 A (2x 195 A)	2x 160 A (2x 150 A)	2x 130 A (2x 110 A)	350	2x 215 A (2x 185 A)	2x 175 A (2x 160 A)	42 %	4 %	12 %
250	2x 240 A (2x 215 A)	2x 180 A (2x 175 A)	2x 145 A (2x 130 A)	400	2x 245 A (2x 220 A)	2x 200 A (2x 180 A)	42 %	4 %	12 %
280	2x 265 A (2x 240 A)	2x 205 A (2x 195 A)	2x 160 A (2x 145 A)	450	2x 275 A (2x 245 A)	2x 225 A (2x 200 A)	42 %	4 %	12 %
315	2x 300 A (2x 275 A)	2x 230 A (2x 215 A)	2x 180 A (2x 160 A)	500	2x 305 A (2x 275 A)	2x 250 A (2x 225 A)	42 %	4 %	12 %
355	2x 340 A (2x 310 A)	2x 250 A (2x 245 A)	2x 210 A (2x 180 A)	550	2x 330 A (2x 310 A)	2x 275 A (2x 255 A)	42 %	4 %	12 %
400	2x 380 A (2x 355 A)	2x 285 A (2x 275 A)	2x 230 A (2x 200 A)	600	2x 365 A (2x 330 A)	2x 290 A (2x 270 A)	42 %	4 %	12 %
500	2x 490 A (2x 455 A)	2x 385 A (2x 360 A)	2x 285 A (2x 255 A)	700	2x 420 A (2x 390 A)	2x 340 A (2x 315 A)	35 %	6 %	10 %
560	2x 550 A (2x 510 A)	2x 440 A (2x 410 A)	2x 320 A (2x 275 A)	800	2x 480 A (2x 440 A)	2x 395 A (2x 370 A)	35 %	6 %	10 %
630	2x 610 A (2x 565 A)	2x 490 A (2x 460 A)	2x 365 A (2x 335 A)	900	2x 540 A (2x 500 A)	2x 430 A (2x 400 A)	35 %	6 %	10 %
710	2x 680 A (2x 630 A)	2x 540 A (2x 505 A)	2x 420 A (2x 385 A)	1000	2x 600 A	2x 480 A (2x 445 A)	35 %	6 %	10 %
800	2x 770 A (2x 710 A)	2x 610 A (2x 570 A)	2x 465 A (2x 430 A)	1150	–	2x 540 A (2x 505 A)	35 %	6 %	10 %
900	2x 860 A (2x 800 A)	2x 685 A (2x 635 A)	2x 525 A (2x 485 A)	1250	–	2x 590 A (2x 550 A)	35 %	6 %	10 %
1000	2x 940 A (2x 870 A)	2x 770 A (2x 710 A)	2x 570 A (2x 525 A)	1400	–	2x 660 A (2x 615 A)	35 %	6 %	10 %
1100	2x 1040 A (2x 960 A)	2x 840 A (2x 780 A)	2x 620 A (2x 575 A)	1600	–	2x 755 A (2x 705 A)	35 %	6 %	10 %
1200	2x 1110 A (2x 1030 A)	2x 900 A (2x 840 A)	2x 665 A (2x 620 A)	1700	–	2x 790 A (2x 740 A)	35 %	6 %	10 %
1300	2x 1200 A (2x 1120 A)	2x 980 A (2x 910 A)	2x 725 A (2x 670 A)	1900	–	2x 885 A (2x 825 A)	35 %	6 %	10 %
1400	2x 1300 A (2x 1200 A)	2x 1050 A (2x 980 A)	2x 780 A (2x 720 A)	2000	–	2x 930 A (2x 865 A)	35 %	6 %	10 %
1500	–	2x 1120 A (2x 1040 A)	2x 840 A (2x 770 A)	2100	–	2x 980 A (2x 905 A)	35 %	6 %	10 %
1800	–	2x 1330 A (2x 1230 A)	2x 1000 A (2x 920 A)	2200	–	2x 1020 A (2x 950 A)	35 %	6 %	10 %
2000	–	–	2x 1100 A (2x 1000 A)	2500	–	2x 1150 A (2x 1070 A)	35 %	6 %	10 %
2100	–	–	2x 1150 A (2x 1050 A)	–	–	–	35 %	6 %	10 %
2400	–	–	2x 1300 A (2x 1200 A)	–	–	–	35 %	6 %	10 %

() Values in brackets for transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at both secondary windings e.g. Yy1130 Yy0030)

Recommended output voltage for the transformer

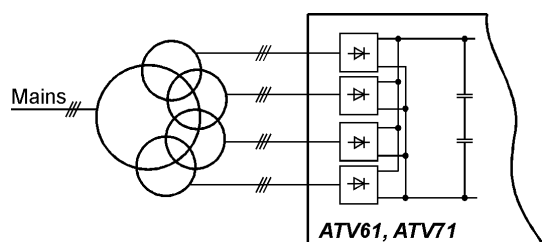
The nominal output voltage of a transformer is specified at no load operation. Therefore this value should be 3...5 % higher than the rated voltage of the drive.

Inverter	Transformer output voltage phase / phase (no load)						
	Nominal voltage 380V	Nominal voltage 400V	Nominal voltage 440V	Nominal voltage 480V	Nominal voltage 500V	Nominal voltage 600V	Nominal voltage 690V
400 V range	400V	425V	460V	500V	–	–	–
690 V range	–	–	–	–	525V	630V	715V

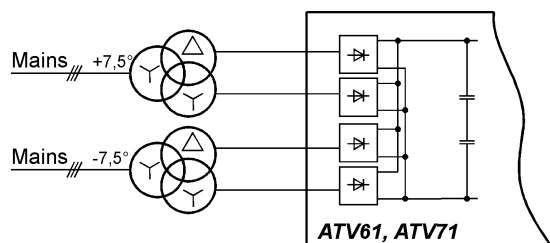
24-pulse supply

The frequency inverters of the following enclosure units are standard equipped with four parallel input rectifiers. Thus it is easy to equip them with 24-pulse rectification optionally:

from ATV71EXA•C71N4
from ATV71EXA•C90N
from ATV71EXA•M12Y



The supply results from a separate transformer with four secondary windings each separated by 15°.



Alternatively the supply can also occur via two transformers each with two out-of-phase secondary windings (e.g. superimposing transformer Yy6 Yd5) and a phase displacement of +7.5° and -7.5° at the primary winding.

The symmetry of the two transformers is a major factor for reducing the harmonics.

On the medium voltage line the 5th, 7th, 11th, 13th, 17th and 19th current harmonics are practically non-existent as they have been cancelled by the shifted transformer windings.

The following specifications must keep at a minimum in order to ensure trouble-free operation and even current sharing:

Transformer:

- | | |
|--|-------------------------------|
| • Converter transformer(s) for 24-pulse supply with four non-controlled rectifier bridges in a common voltage DC link. | |
| • Recommended design: | superimposing |
| • Nominal voltage at the primary side: | according to application |
| • Voltage adaptation at the primary side: | +5% / +2.5% / 0 / -2.5% / -5% |
| • Nominal output current: | see the following table |
| • Current harmonics at the secondary side: | see the following table |
| • Nominal output voltage (= no-load voltage): | see the following table |
| • Tolerance of the secondary voltages to each other: | < 0.3% (< 0.1%) of V_{NOM} |
| • Short circuit voltage: | see the following table |
| • Tolerance of the relative short circuit voltage: | ±10% of v_{SC_NOM} |
| • Tolerance of the relative short circuit voltage between both secondary windings: | < 5% (< 2%) of v_{SC_NOM} |
| • Further specifications: | according to the application |
| • Tolerance for unbalance of phaseshift | (±0.5°) |

Mains:

- allowed mains distortion: THD(u) < 5%
- max. single harmonic (5th): < 3%

() Values in brackets for transformer in zig-zag-connection (±15° phase shift at both secondary windings e.g. Yy1130 Yy0030)

Recommended values for dimensioning a "24-pulse transformer"									
Inverter power [kW]	Transformer			Inverter power [HP]	Transformer		Transformer		
	Output current 400V	Output current 500V	Output current 690V		Output current 480V	Output current 600V	Harmonics Secondary (THDi LV)	Short-circuit voltage	Harmonics Primary (THDi HV)
710	4x 350 A (4x 320 A)	—	—	1000	4x 310 A (4x 280 A)	—	35 %	6 %	10 %
900	4x 440 A (4x 400 A)	4x 350 A (4x 320 A)	—	1250	4x 400 A (4x 360 A)	4x 300 A (4x 280 A)	35 %	6 %	10 %
1100	4x 530 A (4x 480 A)	4x 430 A (4x 390 A)	—	1600	4x 480 A (4x 440 A)	4x 390 A (4x 360 A)	35 %	6 %	10 %
1200	—	—	4x 340 A (4x 320 A)	1800	4x 550 A (4x 500 A)	—	35 %	6 %	10 %
1300	4x 620 A (4x 570 A)	4x 500 A (4x 460 A)	—	1900	—	4x 450 A (4x 420 A)	35 %	6 %	10 %
1400	4x 675 A (4x 610 A)	—	—	2000	4x 620 A (4x 560 A)	—	35 %	6 %	10 %
1500	—	4x 530 A (4x 520 A)	4x 430 A (4x 390 A)	2100	—	4x 500 A (4x 460 A)	35 %	6 %	10 %
1800	—	4x 675 A (4x 620 A)	4x 510 A (4x 460 A)	2200	—	4x 520 A (4x 480 A)	35 %	6 %	10 %
2000	—	—	4x 560 A (4x 500 A)	2500	—	4x 590 A (4x 540 A)	35 %	6 %	10 %
2100	—	—	4x 585 A (4x 530 A)	—	—	—	35 %	6 %	10 %
2400	—	—	4x 660 A (4x 600 A)	—	—	—	35 %	6 %	10 %

1) THDi for each transformer

() Values in brackets for transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at both secondary windings e.g. Yy1130 Yy0030)

Recommended output voltage for the transformer

The nominal output voltage of a transformer is specified at no load operation. Therefore this value should be 3...5 % higher than the rated voltage of the drive.

Inverter	Transformer output voltage phase / phase (no load)						
	Nominal voltage 380V	Nominal voltage 400V	Nominal voltage 440V	Nominal voltage 480V	Nominal voltage 500V	Nominal voltage 600V	Nominal voltage 690V
400 V range	400V	425V	460V	500V	—	—	—
690 V range	—	—	—	—	525V	630V	715V

Mains current harmonics / Mains voltage distortion

Because of using a diode rectifier on the input of the inverter harmonics occur in the mains current which lead to a voltage distortion of the supplying mains.

There are DC chokes or line reactors available for the enclosure unit in order to reduce these current harmonics and to decrease the total mains current.

Mains impedance / Short-circuit current

The frequency inverters are designed considering a maximal permitted mains short-circuit current of the supply (values see technical data of the respective frequency inverter).



Optionally the devices can be also designed for higher mains short-circuit currents.

Power factor correction systems

Frequency inverters cause current harmonics in the supplying mains. When a power factor correction system is used, their capacitors are additionally stressed by means of the harmonics.



To protect against overload, we recommend the installation of chokes for those parts.

Switching rate

Altivar frequency inverters can be directly switched on and off by means of the line contactor which can be easily controlled via a relay output of the inverters.

In case of frequent start/stop commands it is recommended to realize them by means of the logic control inputs (or via a serial bus) directly to the electronics of the inverter.



By means of the certificated control input "PWR" a "Safe Standstill" of the drive is guaranteed considering the safety category according to EN 954-1 / ISO 13849-1 (and IEC/EN 61800-5-2). Thus a line or motor contactor can be saved.

Inverter control	Switching rate
The inverter is controlled by means of connecting and disconnecting the line supply voltage.	max. 60 switching operations per hour (safety category 1, stop category 0)
Electronic start/stop commands by means of the logic inputs of the inverter	arbitrary
Electronic lock of the inverter by means of the control input PWR "Safe Standstill"	arbitrary (safety category 3, stop category 0 or 1)

Responsibility



The users are responsible to integrate the frequency inverters into the protection and safety concept of the plant or machine.

All stated connection recommendations and planning remarks are to be taken merely as suggestions which must be adapted to the local conditions and regulations concerning installation and usage.

This applies especially to the safety regulations for machines, the EMC regulations and the general regulations for human protection.

Frequencies > 60 Hz



For operating the motors and drives with frequencies higher than 60 Hz check all used components whether they are also qualified.

You should ask the manufacturer of the motor and the machine on principle. Typically, 4- to 8-pole motors are qualified for operation up to 100 Hz.

Overvoltage protective circuit



All inductivities like relays, contactors, magnetic brakes, etc. have to be equipped with an overvoltage protective circuit. It prevents malfunctions of the conventional device control as well as of the fieldbus.

A free-wheeling diode is provided for DC control circuits.

For AC control circuits the R/C wiring is preferable compared to a wiring with varistors because as a result not only the peak overvoltage is reduced but also the rise-time.



The protective circuit must be qualified for inverter operation !

Earth leakage circuit breaker

Frequency inverters, especially those with additional EMC filters and screened motor cables, lead an increased leakage current against earth.

The leakage current depends on:

- the length of the motor cable
- the type of laying and whether the motor cable is screened or not
- the set pulse frequency
- the use of an additional EMC filter
- the grounding of the motor at its installation place (grounded or non-grounded))



Particularly because of the capacitors of the filter, an unintentional triggering of an earth leakage circuit breaker may occur at the moment of switching on. As well, the earth capacitances may cause an incorrect triggering during operation.

On the other hand, it is possible that the triggering is blocked by means of DC components which are caused by the mains rectification at the input of the inverter.

Therefrom, you should observe following:

- Only use short-time delayed and pulse current sensitive earth leakage circuit breakers with considerably higher tripping current.
- Protect the other loads by means of a separate earth leakage circuit breaker.
- Earth leakage circuit breakers in front of an inverter do not provide absolutely reliable protection in case of direct contact !! So they should be always used in combination with other protective measures.
- The frequency inverters have no current-limiting effect (in case of earth leakage currents) and therefore they do not violate the protective multiple earthing.

Depending on the conditions, the leakage current of plants with high cable lengths can be absolutely higher than 100 mA !!



The built-in earth leakage detection has no current-limiting effect. It only protects the drive and is no human protection.

Automatic restarting

The internal function "automatic restart" switches the inverter automatically on after each mains switch-on or mains recurrence without the power failure having to be confirmed. This is an important and valuable function for the increase in availability, especially for drives that are not integrated into the plant control via a fieldbus system.

The automatic restart takes place in case of:

- Switch-on of the line supply voltage (only in case of 2-wire control and dependent on the selected undervoltage behaviour)
- after a mains failure (only in case of 2-wire control and dependent on the selected undervoltage behaviour)
- completion of the standby-mode
- after each trip confirmation (only in case of 2-wire control – level rated)
- after a fast stop or emergency stop (only in case of 2-wire control – level rated)

Locking of the frequency inverter

The ATV71 devices include the standard protective function "Safe Standstill" ("Power Removal") which prevents any unintended start-up of the motor. This function fulfills, when correctly wired, the machine standard EN 954-1 / ISO 13849-1 safety category 3, the IEC/EN 61508 SIL2 standard for functional safety and the power drive system standard IEC/EN 61800-5-2.

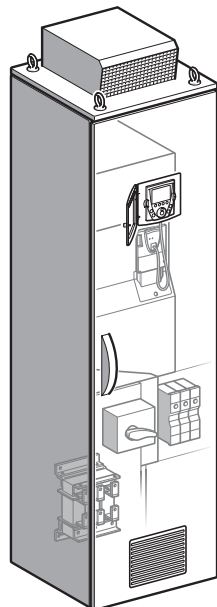
Connecting and disconnecting the motor

Alternatively to the use of the control terminal PWR "Safe Standstill" a safety switch or a motor contactor can be installed to connect and disconnect the motor. Because the inverter recognizes the respective switching state, there is no risk of demolition or fault switch-off.

After connection the motor restarts by means of the function "Catch on the fly".

Inverters in standard enclosures for 400 V networks

The basic equipment contains:



- Frequency inverter ATV71 with integrated EMC filter
- Mains connection on circuit breaker
- Circuit breaker (without door handle)
- DC choke
- LCD operating panel (mounted into the enclosure door)
- Terminals/bars for motor connection
- Protection degree IP54 with separated air flow:
air flow through the plinth of the enclosure and mounted air guidance hood. Cooling of the control part by means of filter fans in the enclosure door.
- Max. inflow coolant temperature 0...40°C
- Enclosure Sarel S6000, color RAL 7032
- Multilingual operating instructions
- Documentation-CD-ROM with parameterization instructions, fieldbus instructions, operating and parameterizing software,...
- Enclosure layout plans consisting of circuit diagram, terminal connection table, list of materials and design drawing

General technical data	
Input	
Voltage	380...415 V $\pm 10\%$ for TT, TN-C, TN-S or IT networks *)
Frequency	50 / 60 Hz $\pm 5\%$ *)
Overvoltage class	Class III according to EN 50178
*) Technical data and remarks for line supply voltages are given in chapter "Mains conditions", page 21.	
Output	
Control method	Vector-oriented flux control with/without encoder, V/f characteristic, ENA system
Voltage	3 AC 0...100% line supply voltage, dynamic voltage stabilization
Overload	50 % for 60 seconds per 10 minutes, 65 % for 2 seconds
Pulse frequency	2.5 kHz, adjustable from 2...8 kHz
Frequency / Base frequency	0.1...500 Hz / 25...500 Hz, adjustable
Short circuit protection	All-pole protected against short circuit and earth fault by means of overcurrent switch-off
Design	Floor-standing enclosure
Cooling	forced
Frequency resolution, digital	0.01 Hz / 50 Hz, frequency stability: $\pm 0.01\%$ / 50 Hz
Speed accuracy	V/f Mode: slip frequency VC without feedback 0.3 x slip frequency VC with feedback 0.01 % of maximum frequency
Mechanical strength	
Mechanical vibration	According to IEC/EN 60068-2-6 1.5 mm at 3...10 Hz, 0.6 g at 10...200 Hz (3M3 according to IEC/EN 60721-3-3)
Shock	According to IEC/EN 60068-2-27 4 g for 11 ms (3M2 according to IEC/EN 60721-3-3)
Ambient conditions	
Operating temperature	0...+40°C (-10...+40°C with enclosure heating) 3K3 according to IEC/EN 60721-3-3 up to +50°C with derating
Storage / Transport temperature	-25...+70°C
Protection degree	IP54 with separated air flow
Environmental class / Humidity	Class 3K3 in accordance with IEC/EN 60721-3-3 / no condensation, max. 95 % relative humidity
Altitude	Up to 1000 m, beyond power decrease of 1 % per 100 m up to 3000 m
Allowed pollution	Pollution degree: pollution degree 3 according to EN 61800-5-1 Chemical / mechanical classification: 3C2 and 3S2 according to EN 60721-3-3
Protection class	Class 1 according to EN 50178
Standards	
Basic standard	The devices are designed, built and tested on the basis of EN 50178.
EMC immunity	According to EN 61800-3, 1st and 2nd environment (IEC 1000-4-2; IEC 1000-4-3; IEC 1000-4-4; IEC 1000-4-5; IEC 1000-4-6)
EMC emission	In accordance with product standard EN 61800-3, 2nd environment, category C3
Insulation	Galvanic insulation in accordance with EN 50178 PELV (Protective Extra Low Voltage)
Standards	CE

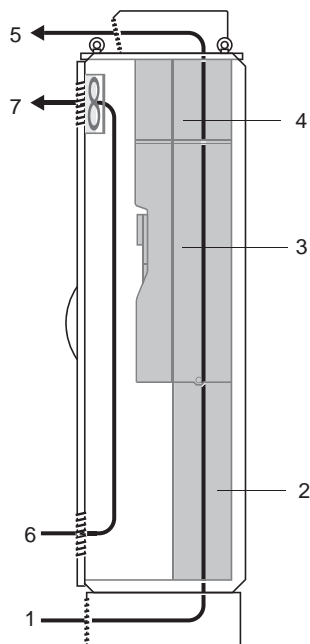


Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Protection degree

The standard design of the ATV71ES5●●●N4 enclosure units corresponds with protection degree IP54 with separated air flow. This solution contains a clearly specified and tested cooling system which provides highest operating safety.

ATV71ES5 - Enclosure design IP54 with separated air flow



In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

- 1 Cooling air for power part (via enclosure plinth)
- 2 Air guidance channel
- 3 Frequency inverter ATV71
- 4 DC choke
- 5 Air outlet through metal grid with splash water protection
- 6 Air inlet (with filter mat) for control part
- 7 Air outlet (with filter fan) for control part

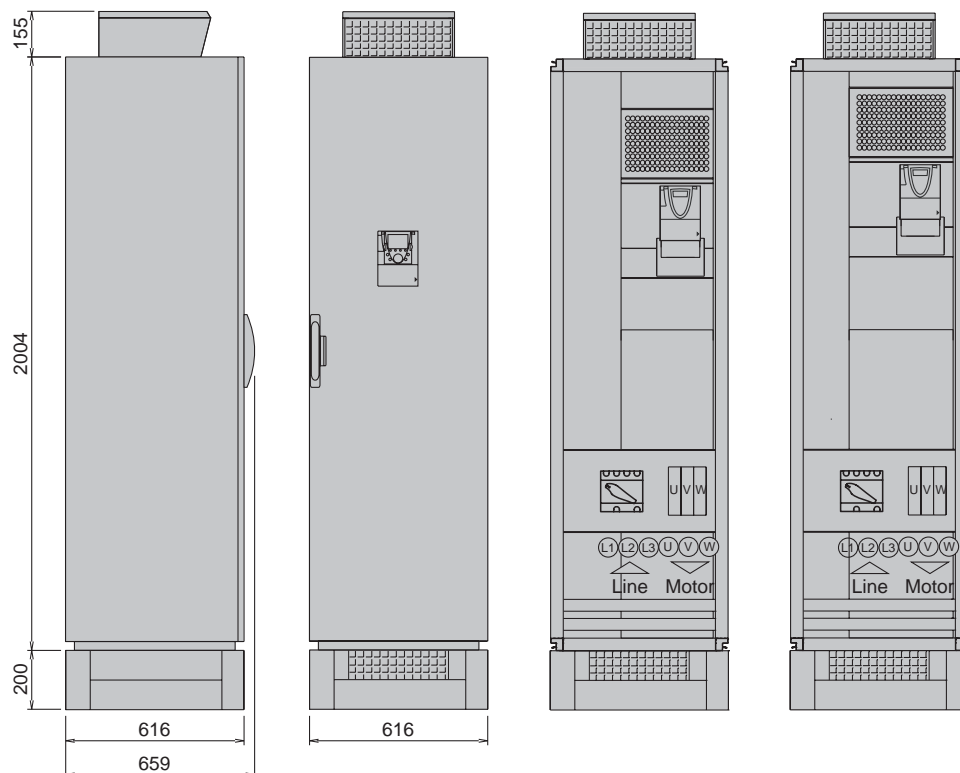
Protection degree: IP54

Air inlet temperature: 0...+40°C

Technical data				
Type		ATV71ES5 D90N4		C11N4
Built-in standard device		ATV71HD90N4		ATV71HC11N4
Nominal data				
Motor rating				
P _N [kW]		V _N = 400 V	90	110
Continuous output current				
I _N [A]		V _N = 400 V	179	215
Maximum current for 60 s per 10 minutes				
I _{MAX} [A]		V _N = 400 V	269	323
Input				
Input current				
I _{IN} [A]		V _N = 400 V	159	194
Continuous apparent power				
S _N [kVA]		V _N = 400 V	109	133
Characteristics				
Efficiency [%]			≥ 97.0	≥ 97.0
Losses [W]		at I _N	2590	2950
Weight net/gross [kg]			270/310	270/310
Ambient conditions				
Volume of cooling air [m³/h]			500	700
Sound pressure level [dB(A)]			64	64
Mains short circuit current [kA] *)			50	50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

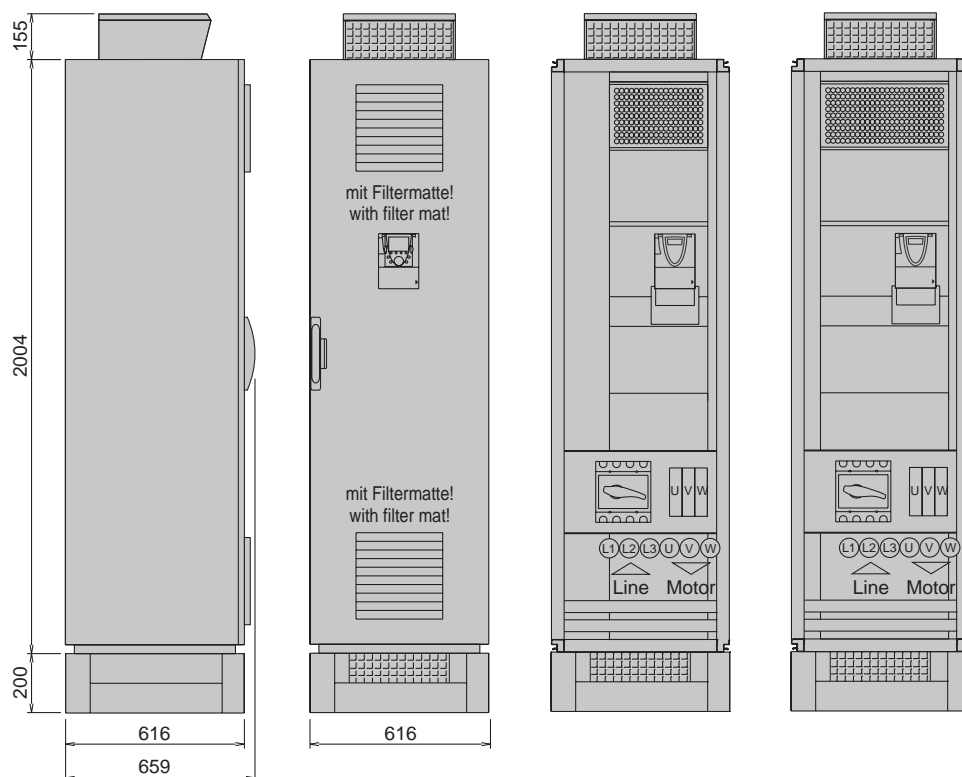
Dimensions:	ATV71ES5D90N4	ATV71ES5C11N4
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Type	ATV71ES5 C13N4		C16N4
Built-in standard device	ATV71HC13N4		ATV71HC16N4
Nominal data			
Motor rating			
P _N [kW]	V _N = 400 V	132	160
Continuous output current			
I _N [A]	V _N = 400 V	259	314
Maximum current for 60 s per 10 minutes			
I _{MAX} [A]	V _N = 400 V	389	471
Input			
Input current			
I _{IN} [A]	V _N = 400 V	229	277
Continuous apparent power			
S _N [kVA]	V _N = 400 V	157	190
Characteristics			
Efficiency [%]		≥ 97.3	≥ 97.3
Losses [W]	at I _N	3450	4130
Weight net/gross [kg]		295/335	305/345
Ambient conditions			
Volume of cooling air [m³/h]		750	950
Sound pressure level [dB(A)]		72	72
Mains short circuit current [kA] *)		50	50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions:	ATV71ES5C13N4	ATV71ES5C16N4
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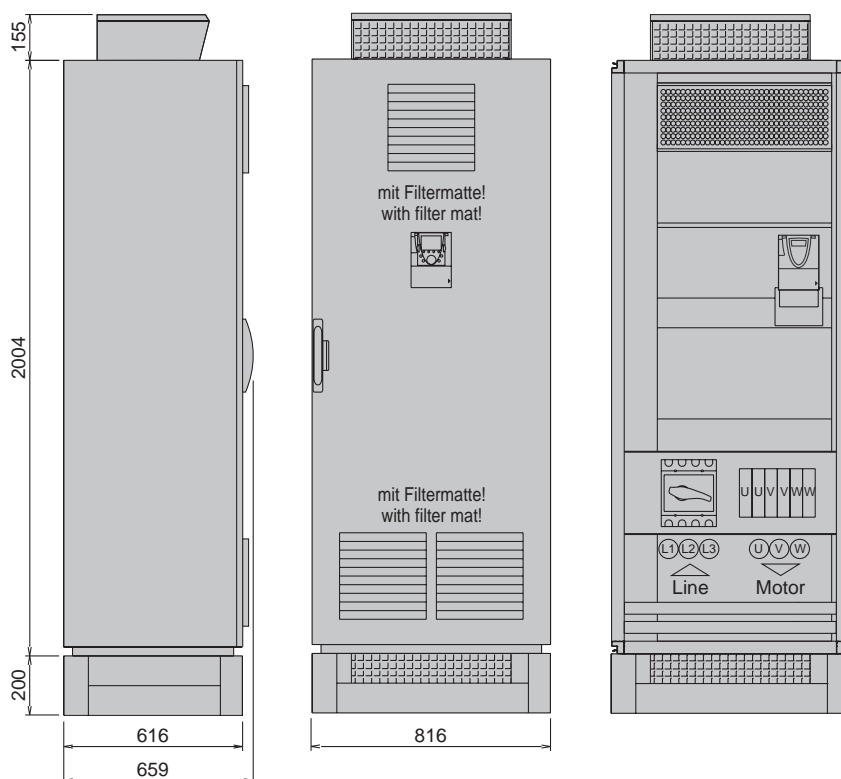


Type	ATV71ES5 C20N4			C25N4	C28N4
Built-in standard device	ATV71HC20N4			ATV71HC25N4	ATV71HC28N4
Nominal data					
Motor rating					
P _N [kW]	V _N = 400 V	200	250	280	
Continuous output current					
I _N [A]	V _N = 400 V	387	481	550	
Maximum current for 60 s per 10 minutes					
I _{MAX} [A]	V _N = 400 V	580	721	825	
Input					
Input current					
I _{IN} [A]	V _N = 400 V	340	424	471	
Continuous apparent power					
S _N [kVA]	V _N = 400 V	235	292	325	
Characteristics					
Efficiency [%]		≥ 97.3	≥ 97.3	≥ 97.3	
Losses [W]	at I _N	5330	6380	7350	
Weight net/gross [kg]		355/400	435/480	435/480	
Ambient conditions					
Volume of cooling air [m³/h]		1400	1400	1400	
Sound pressure level [dB(A)]		72	72	72	
Mains short circuit current [kA] *)		50	50	50	

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions:

ATV71EXS5C20N4, C25N, C28N4

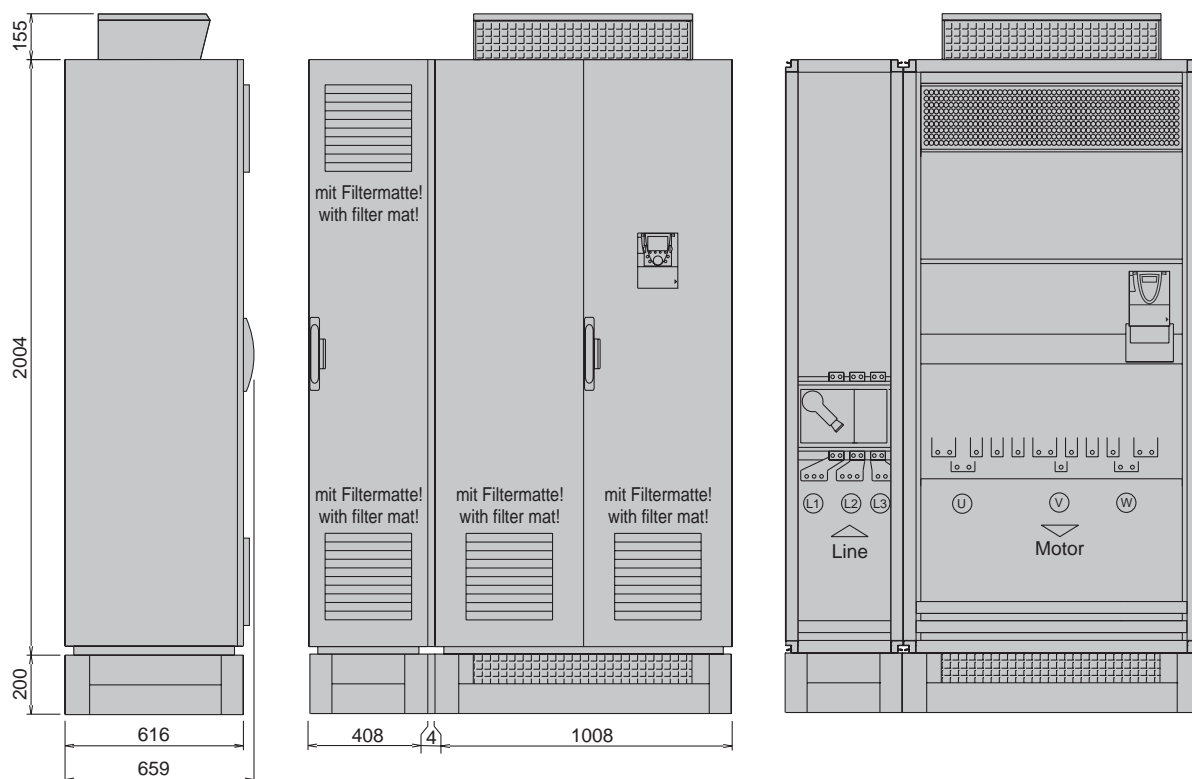


Type	ATV71ES5 C31N4		C40N4
Built-in standard device	ATV71HC31N4		ATV71HC40N4
Nominal data			
Motor rating			
P _N [kW]	V _N = 400 V	315	400
Continuous output current			
I _N [A]	V _N = 400 V	616	759
Maximum current for 60 s per 10 minutes			
I _{MAX} [A]	V _N = 400 V	924	1138
Input			
Input current			
I _{IN} [A]	V _N = 400 V	529	675
Continuous apparent power			
S _N [kVA]	V _N = 400 V	365	467
Characteristics			
Efficiency [%]		≥ 97.5	≥ 97.5
Losses [W]	at I _N	8060	10080
Weight net/gross [kg]		685/745	705/765
Ambient conditions			
Volume of cooling air [m³/h]		2200	2300
Sound pressure level [dB(A)]		73	73
Mains short circuit current [kA] *)		50	50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions:

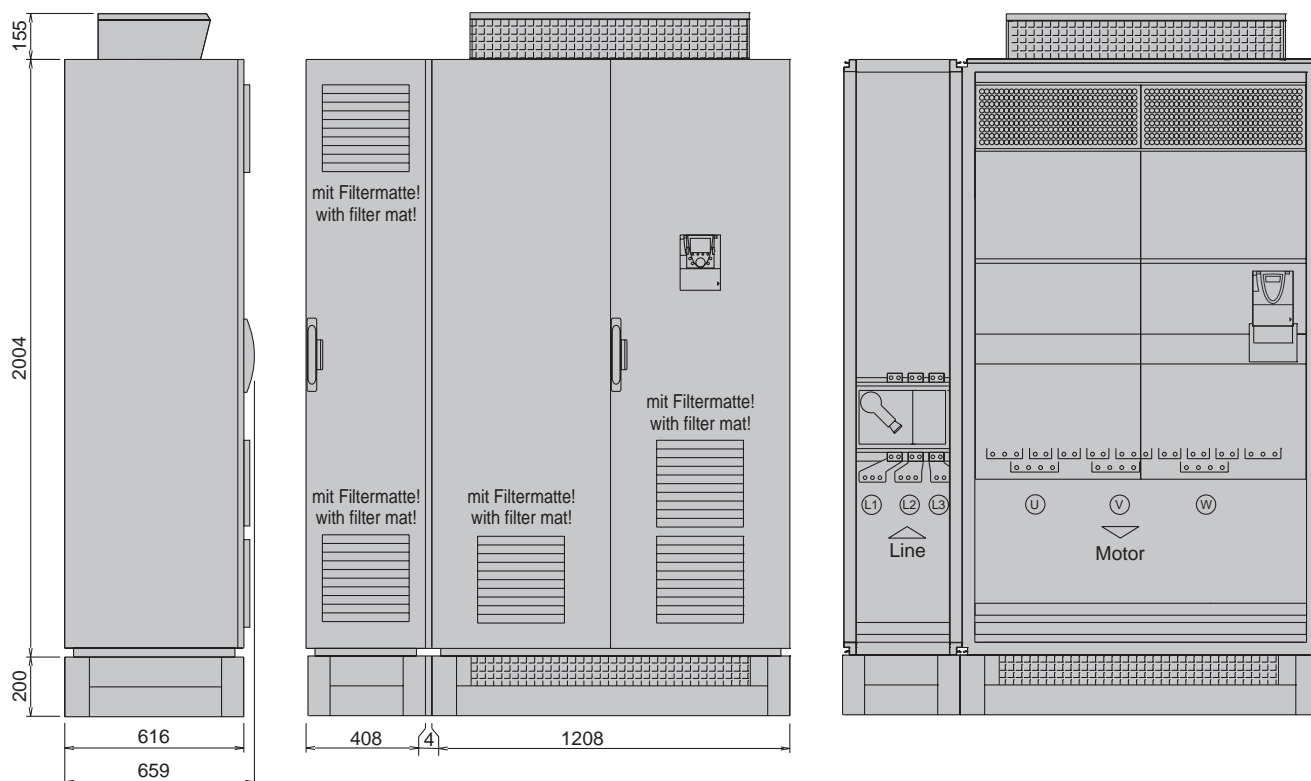
ATV71EXS5C31N4, C40N4



Type		ATV71ES5 C50N4
Built-in standard device		ATV71HC50N4
Nominal data		
Motor rating		
P_N [kW]	$V_N = 400$ V	500
Continuous output current		
I_N [A]	$V_N = 400$ V	941
Maximum current for 60 s per 10 minutes		
I_{MAX} [A]	$V_N = 400$ V	1411
Input		
Input current		
I_{IN} [A]	$V_N = 400$ V	834
Continuous apparent power		
S_N [kVA]	$V_N = 400$ V	577
Characteristics		
Efficiency [%]		≥ 97.5
Losses [W]	at I_N	12330
Weight net/gross [kg]		835/900
Ambient conditions		
Volume of cooling air [m ³ /h]		3000
Sound pressure level [dB(A)]		73
Mains short circuit current [kA] *)		50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

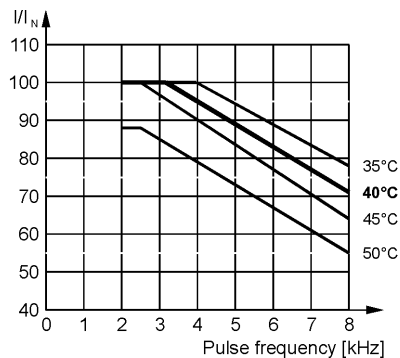
Dimensions:	ATV71EXS5C50N4
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Power decrease

Depending on the chosen pulse frequency and the maximum ambient temperature a power increase is possible or a power reduction is necessary. This can be determined by means of the following diagrams.

ATV 71ES5D90N4 ... ES5C50N4



Please observe the following guidelines to guarantee trouble-free operation of the drive:

- At higher pulse frequencies the allowed motor cable length is reduced (see chapter "Motor cable lengths").
- Select a motor that is at most one type bigger.



If the heat sink temperature is too high, the pulse frequency is automatically reduced to prevent an overload of the inverter.

Fuses and cable cross sections

The Altivar enclosure designs have input fuses built-in as standard. These fuses are for the case that the electronic protective mechanism of the inverter fails. So they are a secondary protection of the inverter to protect the power cables against overload and to protect the input rectifier against an internal short-circuit.

The below-mentioned diameters for 3-wire cables are recommended values for laying the cable in air at max. 40°C ambient temperature, based on the regulations ÖVN EN 1 and VDE 0100.

The lines in the enclosure are dimensioned according to the specification for single conductors XLPE/EPR copper 90°C.

The motor cables are dimensioned for the maximum continuous current. They apply to 0...100 Hz (up to 300 Hz the cable losses increase about 25 % because of the Skin-effect).



In case of other ambient conditions and different regulations the cable diameters must be adjusted.



If the mains fuses blow the inverter already has a primary defect. Therefore, exchanging the blown fuses and switching the inverter on again is not effective. Consequently, the use of circuit breakers is not advantageous and has additionally the disadvantage of a slower switch-off.



A low cost alternative to screened motor cables is the use of NYCY or NYCWY cables (power cables with concentric protective conductor).



The dimensioning of the pre-fuses, mains cable cross sections and mains cable length has to be done taking into account the available mains short circuit current to ensure a safe switch-off in case of a fault!

If required increase the power of the transformer to reach the necessary short circuit capability.

Cable cross sections

		Mains supply		Recommend ed cable [mm²]	Max. cable [mm²] (per phase)	Motor output		Recommended cable [mm²]
		No. of phases	Prefuse			Max. cable (without motor choke) [mm²] (per phase)	Max. cable (with motor choke) [mm²] (per phase)	
ATV71ES5	D90N4	3	250A	1x (3x 150)	2x 185 (M12)	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C11N4	3	315A	1x (3x 185)	2x 185 (M12)	2x 150 (M10)	2x 150 (M10)	1x (3x 120)
	C13N4	3	400A	2x (3x 150)	2x 150 (M10)	2x 240 (M12)	2x 240 (M12)	1x (3x 150)
	C16N4	3	400A	2x (3x 150)	2x 150 (M10)	2x 240 (M12)	4x 240 (M12)	3x (3x 50)
	C20N4	3	500 A	2x (3x 150)	2x 150 (M10)	4x 240 (M12)	4x 240 (M12)	3x (3x 70)
	C25N4	3	630A	2x (3x 240)	2x 300 (M10) ¹⁾	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C28N4	3	700A	3x (3x 185)	3x 185 (M12)	4x 240 (M12)	4x 240 (M12)	2x (3x 185)
	C31N4	3	800A	4x (3x 150)	4x 300 (M12)	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C40N4	3	1000A	4x (3x 185)	4x 300 (M12)	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
	C50N4	3	1250A	6x (3x 185)	6x 300 (M12) ¹⁾	6x 240 (M12)	6x 240 (M12)	4x (3x 185)

1)Connection only with special cable lugs for switching devices possible



Differing cable cross sections on request.

Motor cable lengths

Because of the permitted mains disturbances, the allowed overvoltages at the motor, the occurring bearing currents and the permitted losses the distance between inverter and motor(s) is limited. The maximum distance heavily depends on the type of motor cable (screened/unscreened) as well as from the used options.

Overvoltages at the motor

Overvoltages at the motor terminals result from reflection in the motor cable. Basically the motors are stressed with measurable higher voltage peaks from a motor cable length of 50 m. Thereby the motor load is nearly independent from the used inverter !

Line supply voltage 400 V	Motor insulation for 1300 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs
---------------------------	--

Line supply voltage 460 V	Motor insulation for 1600 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs
---------------------------	--

In order to use standard motors in this voltage range, the Altivar frequency inverters have a function to inhibit short output voltage pulses. With this function the reflection conditional overvoltages are attenuated. The slew rate as well as the EMC load are not influenced by changing this parameter.

At even longer motor cables the use of a "dv/dt filter" is required. Combined with the cable capacitance the option motor choke affects like a filter and limits the voltage peaks at the motor as well as the slew rate of the output pulses.

When the specified motor cable lengths are observed the motor life time can be significantly extended.

Line supply voltage 400 V	max. 1000 V phase-to-phase peak voltage and dv/dt < 500 V/μs
---------------------------	--

Line supply voltage 460 V	max. 1150 V phase-to-phase peak voltage and dv/dt < 500 V/μs
---------------------------	--



Observing the specified length of motor cables is absolutely necessary to protect the motor !

EMC interferences

The mains rectifier as well as the IGBT inverter cause high-frequent interferences which drain off more and more stronger to the earth potential with increasing motor cable length. As a result the line-conducted interferences to the mains increase. The attenuation of the line reactors is not longer sufficient and the permitted interference limits are exceeded.



Observing the specified length of motor cables is also necessary for compliance with the EMC limits !

Bearing currents

Common mode bearing currents which even cannot be prevented by means of motors equipped with an insulated bearing are significantly reduced by use of the option motor choke.

Especially in case of big motors with middle up to high motor cable lengths the option motor choke is considerable to increase the availability of the motor.

Multiplication factors



The specified lengths of motor cables are recommended limits based on typical motor cables, laying in cable channels, default pulse frequency and maximal output frequency of 100 Hz.

In case of different conditions the recommended cable lengths must be converted by means of the following factors.

If several factors apply, please multiply them.

- The pulse frequency does not correspond to factory default:

at 4 kHz	multiply all values by 0.7
at 8 kHz	multiply all values by 0.4

- In case of output frequencies higher than 100 Hz:

up to 200 Hz	multiply all values by 0.8
up to 300 Hz	multiply all values by 0.5

- Instead of two parallel cables one thicker cable is used: multiply all values by 1.5

- In case of 6-pole motor cabling (e.g. for star/delta starting circuit): multiply all values by 0.75

- In case of parallel motors with their centre near the inverter values must be converted in compliance with the number of motors. When an adjusted motor choke is used for each motor, the following values in brackets apply.

at 2 motors	multiply all values by 0.40 (0.80)
at 3 motors	multiply all values by 0.25 (0.60)
at 4 motors	multiply all values by 0.15 (0.40)
at 5 motors	multiply all values by 0.10 (0.25)

- If the centre of the parallel motors is near the motors, following factors for conversion apply:

at 2 motors	multiply all values by 0.80
at 3 motors	multiply all values by 0.60
at 4 motors	multiply all values by 0.40
at 5 motors	multiply all values by 0.25

Recommended maximum lengths of motor cables in 2nd environment (industrial environment)

C3 (EN 55011 - class A group 2)

no option *)	50 m	screened cable
with motor choke	80 m	screened cable

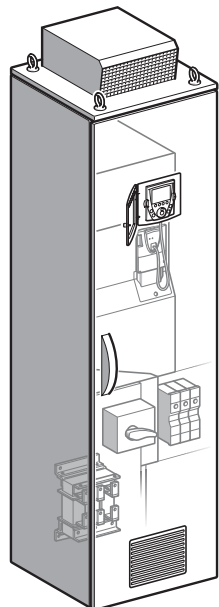
C4 (EMC concept)

no option *)	100 m	screened cable
with motor choke	300 m	screened cable
no option *)	150 m	unscreened cable
with motor choke	300 m	unscreened cable

*) By means of a software function to inhibit short output voltage pulses the overvoltage at the motor terminals is limited to the double DC voltage. Before you can use this function you have to ensure that the motor is suitable!

Inverters in standard enclosures for 400 V networks

The basic equipment contains:



- Frequency inverter ATV71 with integrated EMC filter
- Mains connection on main switch
- Main switch (without door handle)
- Superfast semiconductor fuses for inverter protection
- Line reactor (DC choke for ATV71EXS5●●●N4)
For ATV71EXA●●●N4 the line reactor is available as option.
- Control transformer for 230 V to supply the cooling system as well as optional components (only at ATV71EXA●●●N4)
- LCD operating panel (mounted into the enclosure door)
- Terminals/bars for motor connection
- Protection degree IP23:
air inlet through the enclosure door, air outlet through the enclosure roof.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid in the enclosure door.
- Protection degree IP54:
air inlet through the enclosure door, air outlet through fan on the top.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid with filter in the enclosure door.
- Protection degree IP54 with separated air flow:
air flow through the plinth of the enclosure and mounted air guidance hood. Cooling of the control part by means of filter fans in the enclosure door.
- Max. inflow coolant temperature 0...40°C
- Enclosure Sarel S6000, color RAL 7032
- Multilingual operating instructions
- Documentation-CD-ROM with parameterization instructions, fieldbus instructions, operating and parameterizing software,...
- Enclosure layout plans consisting of circuit diagram, terminal connection table, list of materials and design drawing

Description

Altivar 71 Plus

ATV71EX●●●●●N4

Line supply voltage 400 V

General technical data	
Input	
Voltage	400 (380, 415) V $\pm 10\%$ for TT, TN-C, TN-S or IT networks *)
Frequency	50 / 60 Hz $\pm 5\%$ *)
Overvoltage class	Class III according to EN 50178
*) Technical data and remarks for line supply voltages are given in chapter "Mains conditions", page 21.	
Output	
Control method	Vector-oriented flux control with/without encoder, V/f characteristic, ENA system
Voltage	3 AC 0...100% line supply voltage, dynamic voltage stabilization
Overload	50 % for 60 seconds per 10 minutes, 65 % for 2 seconds
Pulse frequency	2.5 kHz, adjustable from 2...8 kHz (at ATV71EXA●●●●●N4 max. 4.9 kHz)
Frequency / Base frequency	0.1...500 Hz / 25...500 Hz, adjustable
Short circuit protection	All-pole protected against short circuit and earth fault by means of overcurrent switch-off
Design	Floor-standing enclosure
Cooling	forced
Frequency resolution, digital	0.01 Hz / 50 Hz, frequency stability: $\pm 0.01\%$ / 50 Hz
Speed accuracy	V/f Mode: slip frequency VC without feedback 0.3 x slip frequency VC with feedback 0.01 % of maximum frequency
Mechanical strength	
Mechanical vibration	According to IEC/EN 60068-2-6 1.5 mm at 3...10 Hz, 0.6 g at 10...200 Hz (3M3 according to IEC/EN 60721-3-3)
Shock	According to IEC/EN 60068-2-27 4 g for 11 ms (3M2 according to IEC/EN 60721-3-3)
Ambient conditions	
Operating temperature	0...+40°C (-10...+40°C with enclosure heating) 3K3 according to IEC/EN 60721-3-3 up to +50°C with derating
Storage / Transport temperature	-25...+70°C
Protection degree	alternatively: ATV71EXC2●●●●●N4 ... IP23 ATV71EXC5●●●●●N4 ... IP54 with air intake through filter mats ATV71EXS5●●●●●N4 ... IP54 with separated air flow ATV71EXA2●●●●●N4 ... IP23 with internal cooling circuit ATV71EXA5●●●●●N4 ... IP54 with internal cooling circuit
Environmental class / Humidity	Class 3K3 in accordance with IEC/EN 60721-3-3 / no condensation, max. 95 % relative humidity
Altitude	Up to 1000 m, beyond power decrease of 1 % per 100 m up to 3000 m
Allowed pollution	Pollution degree: for IP23 design: pollution degree 2 according to EN 61800-5-1 for IP54 design: pollution degree 3 according to EN 61800-5-1 Chemical / mechanical classification: 3C2 and 3S2 according to EN 60721-3-3
Protection class	Class 1 according to EN 50178
Standards	
Basic standard	The devices are designed, built and tested on the basis of EN 50178.
EMC immunity	According to EN 61800-3, 1st and 2nd environment (IEC 1000-4-2; IEC 1000-4-3; IEC 1000-4-4; IEC 1000-4-5; IEC 1000-4-6)
EMC emission	In accordance with product standard EN 61800-3, 2nd environment, category C3
Insulation	Galvanic insulation in accordance with EN 50178 PELV (Protective Extra Low Voltage)
Standards	CE



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Protection degree ATV71EXC● and ATV71EXS5

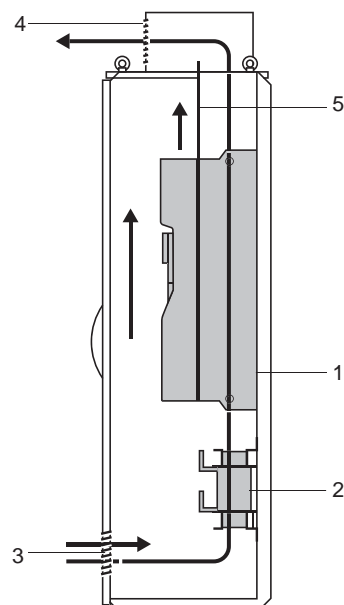
In order to adapt the utmost robust Altivar product line with enclosure design optimal to the individual requests of the system, these enclosure units are available in three different designs. Each solution contains a clearly specified and tested cooling system which provides highest operating safety.

The standard design of the ATV71 enclosure units complies with protection degree IP23. If a higher protection degree is desired or required, there are two IP54 solutions available.

- IP54 with filter mats
- IP54 with separated air flow

Overview of standardised protection degrees

ATV71EXC2 - Standard enclosure design IP23



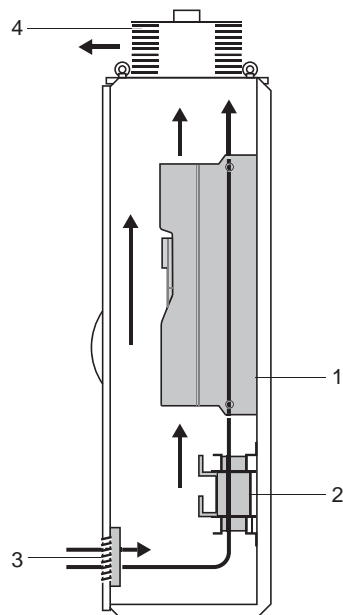
In this case the input of the cooling air takes place by the enclosure door and the output through the top of the enclosure. The air flow must not be constrained by means of fixtures or filter mats.

- 1 Frequency inverter ATV71
- 2 Line reactor
- 3 Air inlet grid (without filter mat) for control part and power part
- 4 Metal cover with splash water protection
- 5 Guided air flow to avoid internal air short-cuts

Protection degree: IP23

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV71EXC5 - Enclosure design IP54



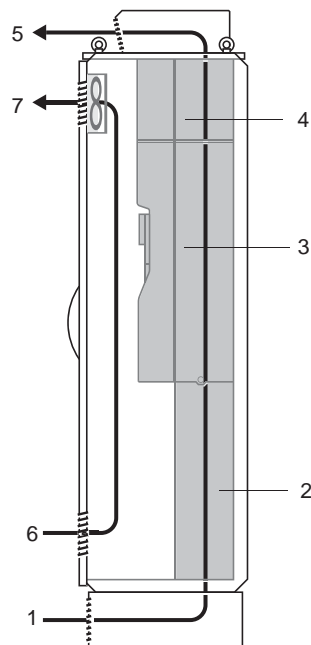
At protection degree IP54 with filter mats the input of the cooling air takes place through the filter mats in the enclosure door and the output through the fan at the top of the enclosure.

- 1 Frequency inverter ATV71
- 2 Line reactor
- 3 Air inlet grid (with filter mat)
- 4 Fan (with filter mat)

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV71EXS5 - Enclosure design IP54 with separated air flow



In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door or by an optional air condition.

- 1 Cooling air for power part (via enclosure plinth)
- 2 Air guidance channel
- 3 Frequency inverter ATV71
- 4 DC choke
(at ATV71EXS5●●●N and ATV71EXS5●●●Y instead of the DC choke a line reactor is delivered in a separate supply field)
- 5 Air outlet through metal grid with splash water protection
- 6 Air inlet (with filter mat) for control part
- 7 Air outlet (with filter fan) for control part

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

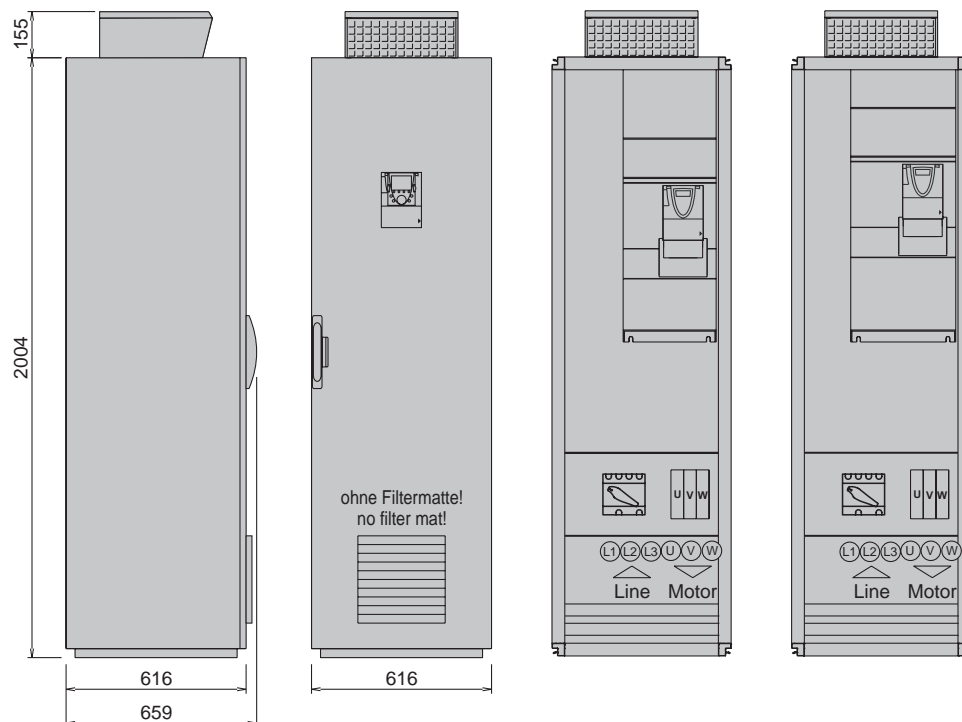
Technical data ATV71EXC● and ATV71EXS5

Type	ATV71EX●● D90N4		C11N4
Built-in standard device	ATV71HD90N4		ATV71HC11N4
Nominal data			
Motor rating			
P _N [kW]	V _N = 400 V	90	110
Continuous output current			
I _N [A]	V _N = 400 V	179	215
Maximum current for 60 s per 10 minutes			
I _{MAX} [A]	V _N = 400 V	269	323
Input			
Input current			
I _{IN} [A]	V _N = 400 V	159	194
Continuous apparent power			
S _N [kVA]	V _N = 400 V	109	133
Braking unit			
P _{CONT} /P _{MAX} [kW]	70/135		85/165
R _{MIN} /R _{MAX} [Ω]	2.5		2.1
Characteristics			
Efficiency [%]	≥ 97.0		≥ 97.0
Losses [W]	at I _N	2590	2950
Weight net/gross [kg]			
ATV71EXC2●●●N4	275/315		275/315
ATV71EXC5●●●N4	285/325		285/325
ATV71EXS5●●●N4	270/310		270/310
Ambient conditions			
Volume of cooling air [m³/h]	EXC2 / EXC5 / EXS5	400 / 400 / 500	600 / 600 / 700
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	64 / 65 / 64	64 / 65 / 64
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

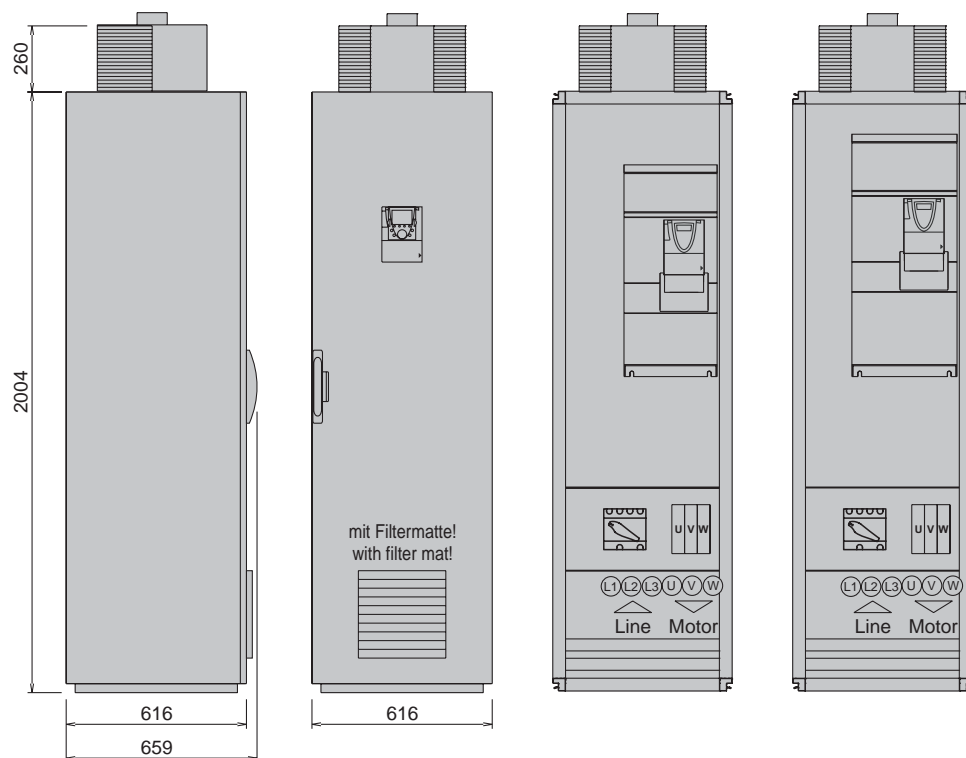
ATV71EXC2D90N4 ATV71EXC2C11N4



Dimensions: IP54CV Compact version

ATV71EXC5D90N4

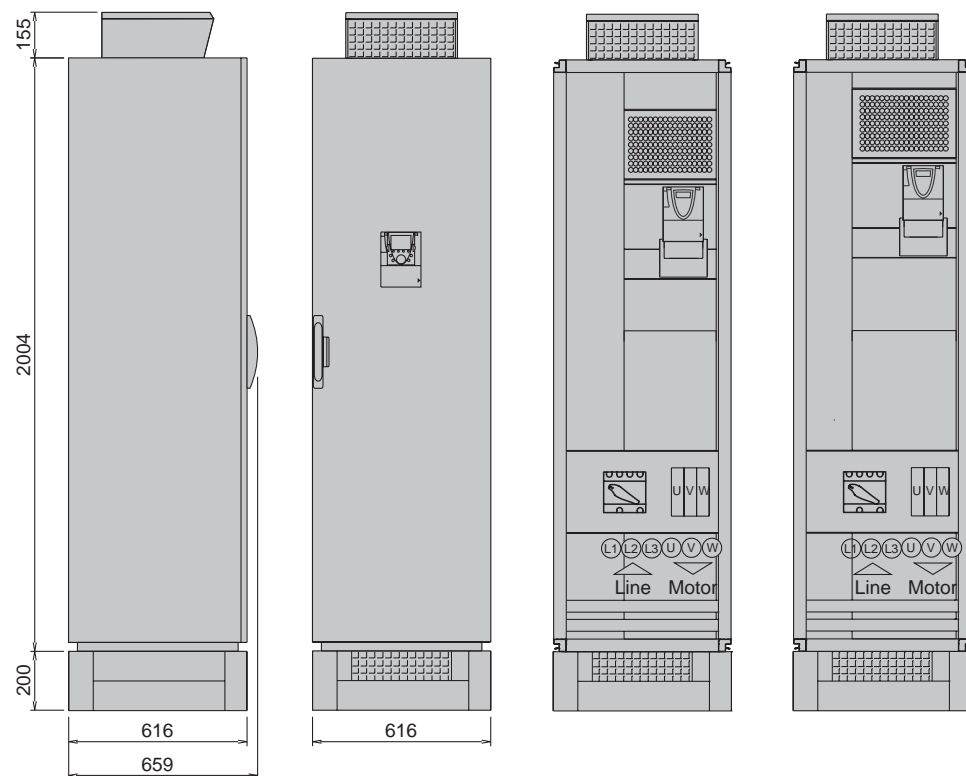
ATV71EXC5C11N4



Dimensions: IP54SA with separated air flow

ATV71EXS5D90N4

ATV71EXS5C11N4



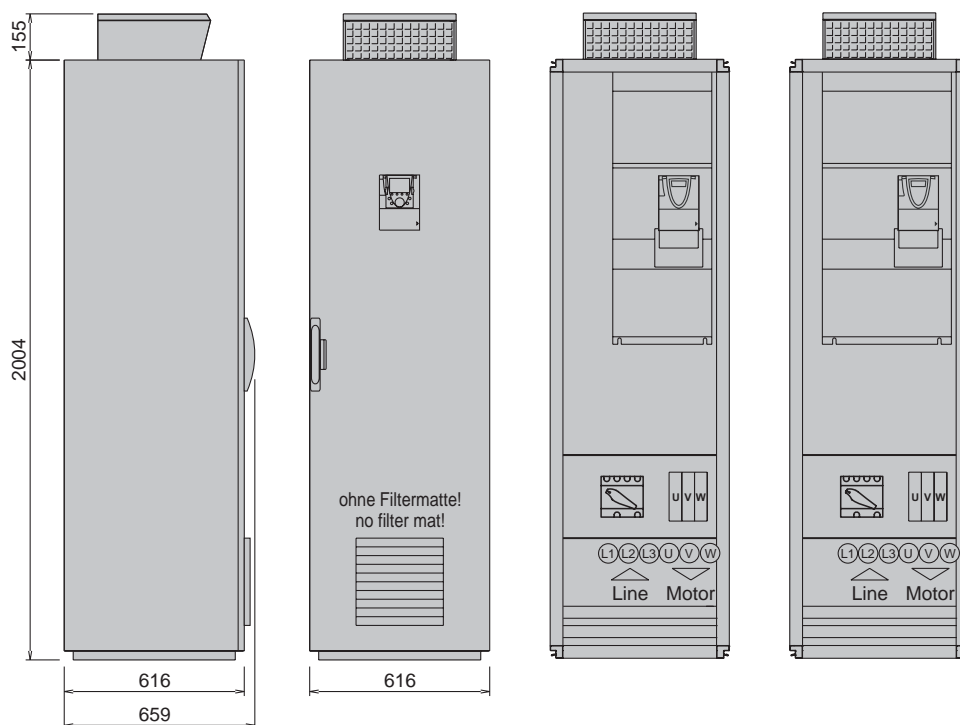
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type		ATV71EX●●	
		C13N4	C16N4
Built-in standard device		ATV71HC13N4	ATV71HC16N4
Nominal data			
Motor rating			
P _N [kW]	V _N = 400 V	132	160
Continuous output current			
I _N [A]	V _N = 400 V	259	314
Maximum current for 60 s per 10 minutes			
I _{MAX} [A]	V _N = 400 V	389	471
Input			
Input current			
I _{IN} [A]	V _N = 400 V	229	277
Continuous apparent power			
S _N [kVA]	V _N = 400 V	157	190
Braking unit			
P _{CONT} /P _{MAX} [kW]		100/200	120/240
R _{MIN} /R _{MAX} [Ω]		1.75	1.75
Characteristics			
Efficiency [%]		≥ 97.3	≥ 97.3
Losses [W]	at I _N	3450	4130
Weight net/gross [kg]			
ATV71EXC2●●●N4		295/335	310/350
ATV71EXC5●●●N4		305/345	320/360
ATV71EXS5●●●N4		295/335	305/345
Ambient conditions			
Volume of cooling air [m³/h]	EXC2 / EXC5 / EXS5	600 / 600 / 750	800 / 800 / 950
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	64 / 65 / 72	64 / 65 / 72
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

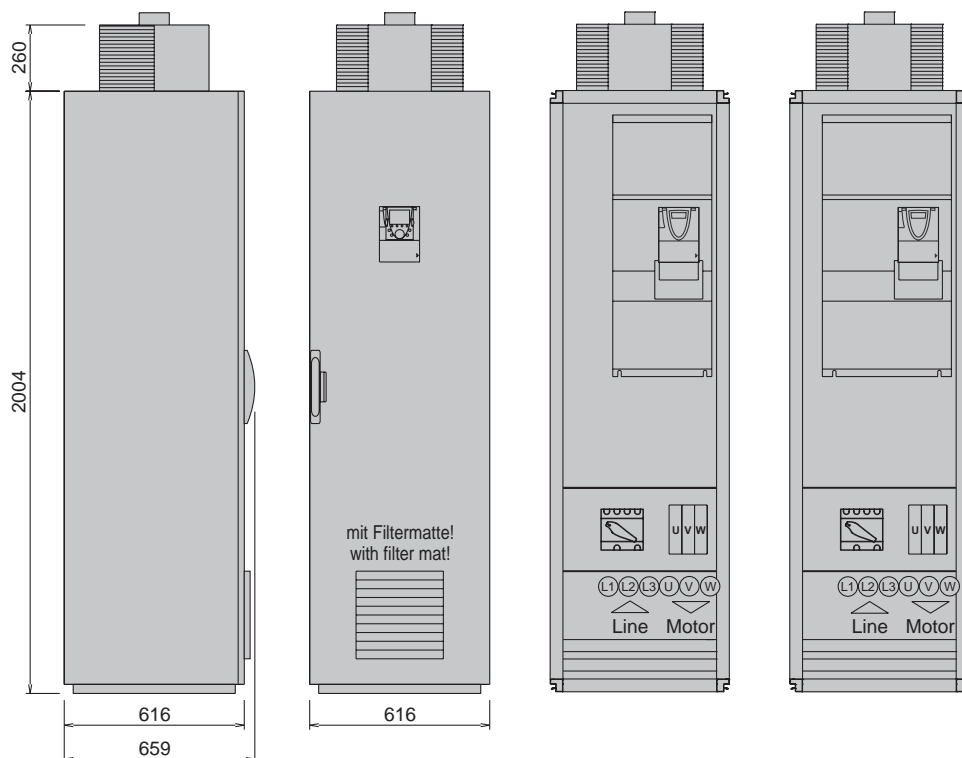
ATV71EXC2C13N4 ATV71EXC2C16N4



Dimensions: IP54CV Compact version

ATV71EXC5C13N4

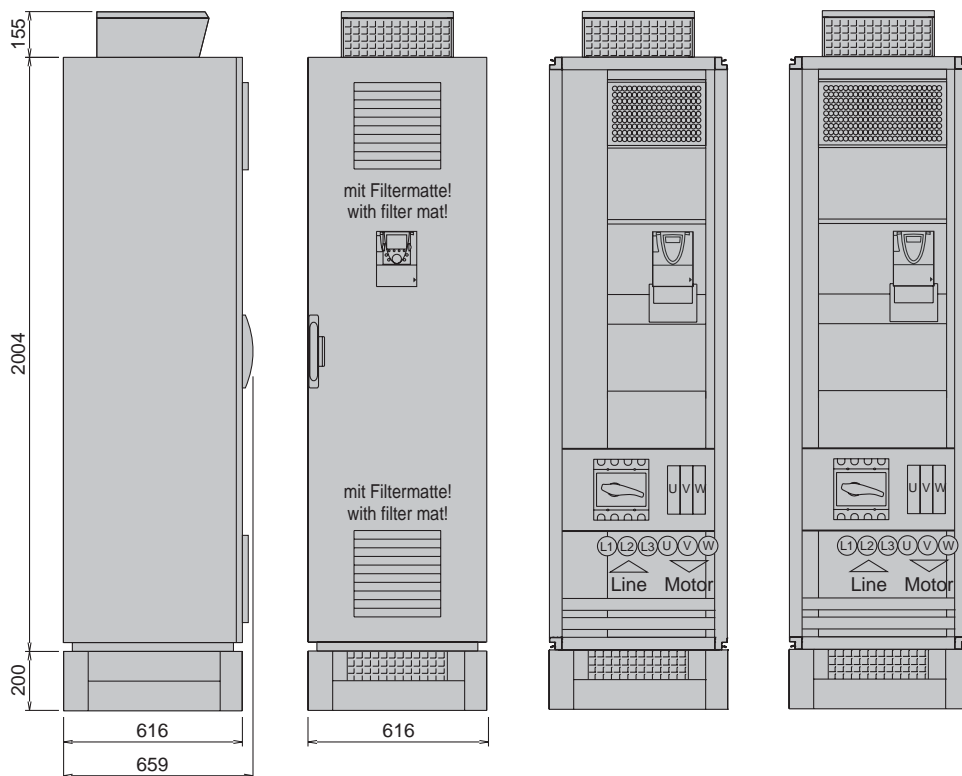
ATV71EXC5C16N4



Dimensions: IP54SA with separated air flow

ATV71EXS5C13N4

ATV71EXS5C16N4



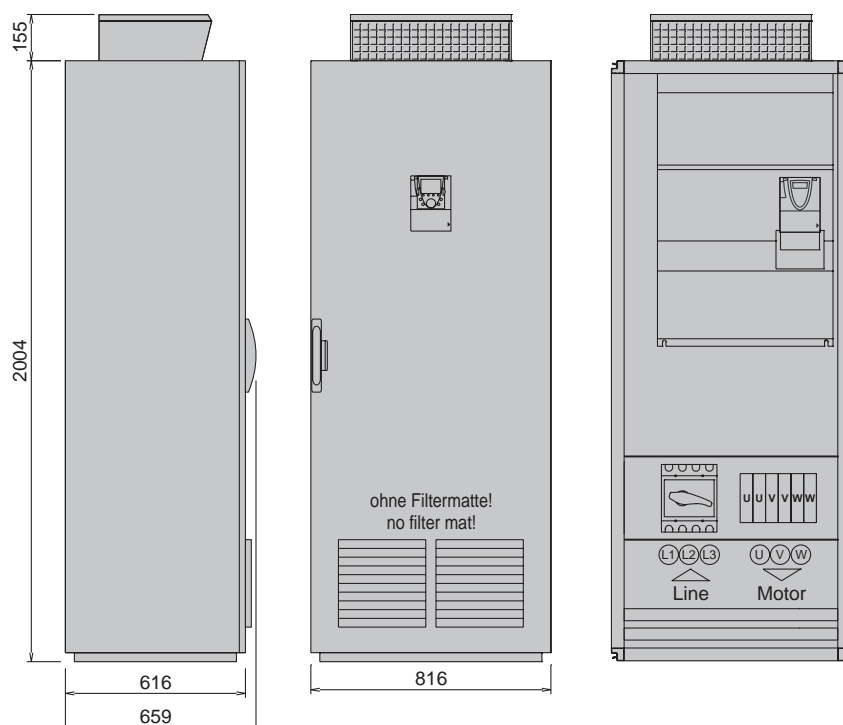
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV71EX●●	C20N4	C25N4	C28N4
Built-in standard device	ATV71HC20N4	ATV71HC25N4	ATV71HC28N4	
Nominal data				
Motor rating				
P_N [kW]	$V_N = 400\text{ V}$	200	250	280
Continuous output current				
I_N [A]	$V_N = 400\text{ V}$	387	481	550
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 400\text{ V}$	580	721	825
Input				
Input current				
I_{IN} [A]	$V_N = 400\text{ V}$	340	424	471
Continuous apparent power				
S_N [kVA]	$V_N = 400\text{ V}$	235	292	325
Braking unit				
P_{CONT}/P_{MAX} [kW]		200/300	200/375	200/420
R_{MIN}/R_{MAX} [Ω]		1.05	1.05	1.05
Characteristics				
Efficiency [%]		≥ 97.3	≥ 97.3	≥ 97.3
Losses [W]	at I_N	5330	6380	7350
Weight net/gross [kg]				
ATV71EXC2●●●N4		340/385	440/485	440/485
ATV71EXC5●●●N4		345/390	440/485	440/485
ATV71EXS5●●●N4		355/400	435/480	435/480
Ambient conditions				
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	1200 / 1200 / 1400	1200 / 1200 / 1400	1200 / 1200 / 1400
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	66 / 68 / 72	66 / 68 / 72	66 / 68 / 72
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50	100 / 100 / 50	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

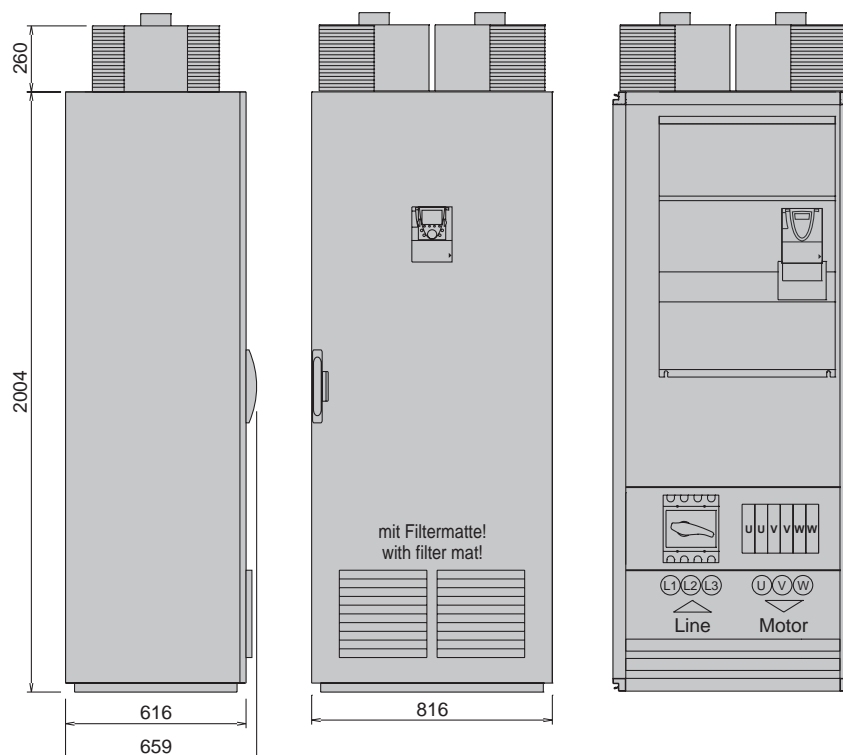
Dimensions: IP23CV Compact version

ATV71EXC2C20N4, C25N, C28N4



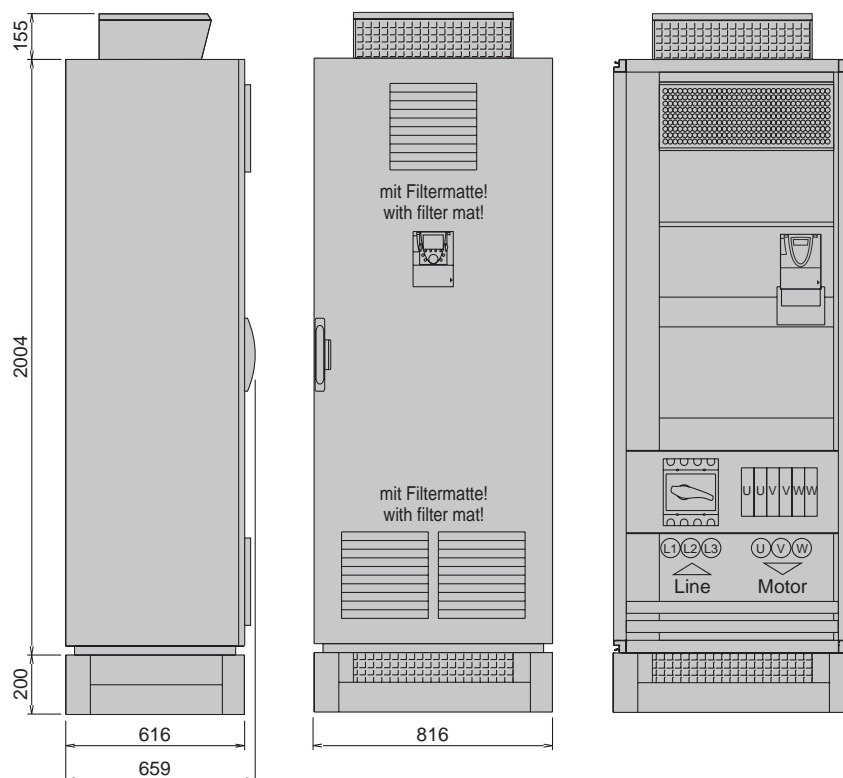
Dimensions: IP54CV Compact version

ATV71EXC5C20N4, C25N, C28N4



Dimensions: IP54SA with separated air flow

ATV71EXS5C20N4, C25N, C28N4



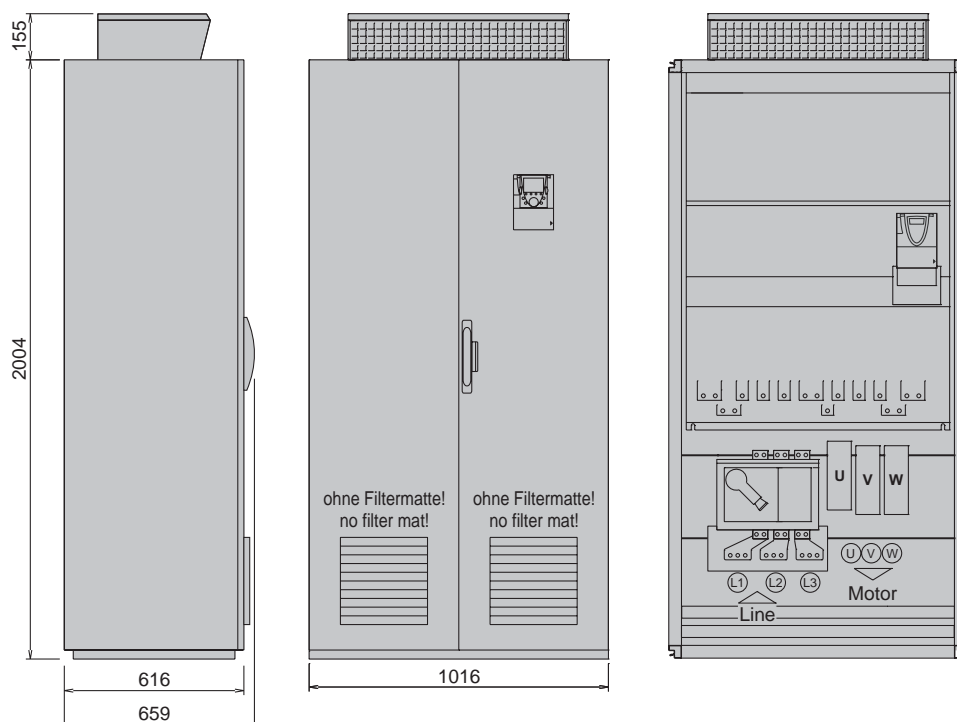
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type		ATV71EX●● C31N4	C40N4
Built-in standard device		ATV71HC31N4	ATV71HC40N4
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400$ V	315	400
Continuous output current			
I_N [A]	$V_N = 400$ V	616	759
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400$ V	924	1138
Input			
Input current			
I_{IN} [A]	$V_N = 400$ V	529	675
Continuous apparent power			
S_N [kVA]	$V_N = 400$ V	365	467
Braking unit			
P_{CONT}/P_{MAX} [kW]		400/475	400/600
R_{MIN}/R_{MAX} [Ω]		0.7	0.7
Characteristics			
Efficiency [%]		≥ 97.5	≥ 97.5
Losses [W]	at I_N	8060	10080
Weight net/gross [kg]			
ATV71EXC2●●●N4		590/640	630/680
ATV71EXC5●●●N4		610/660	650/700
ATV71EXS5●●●N4		685/745	705/765
Ambient conditions			
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	1800 / 1800 / 2200	1800 / 1800 / 2300
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	66 / 78 / 73	66 / 78 / 73
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

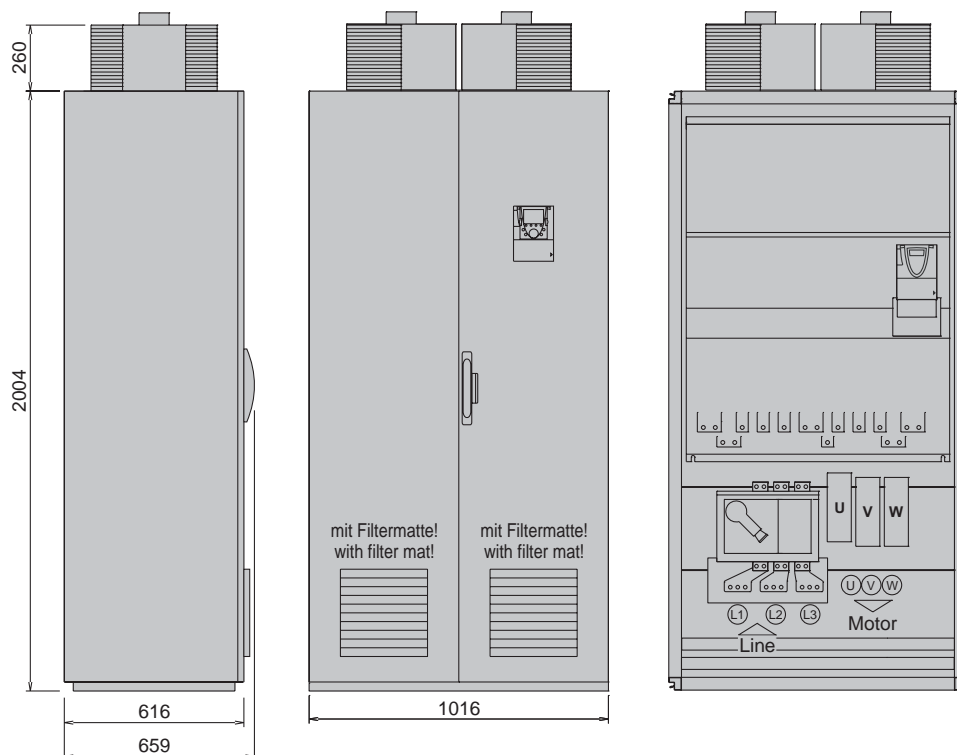
Dimensions: IP23CV Compact version

ATV71EXC2C31N4, C40N4



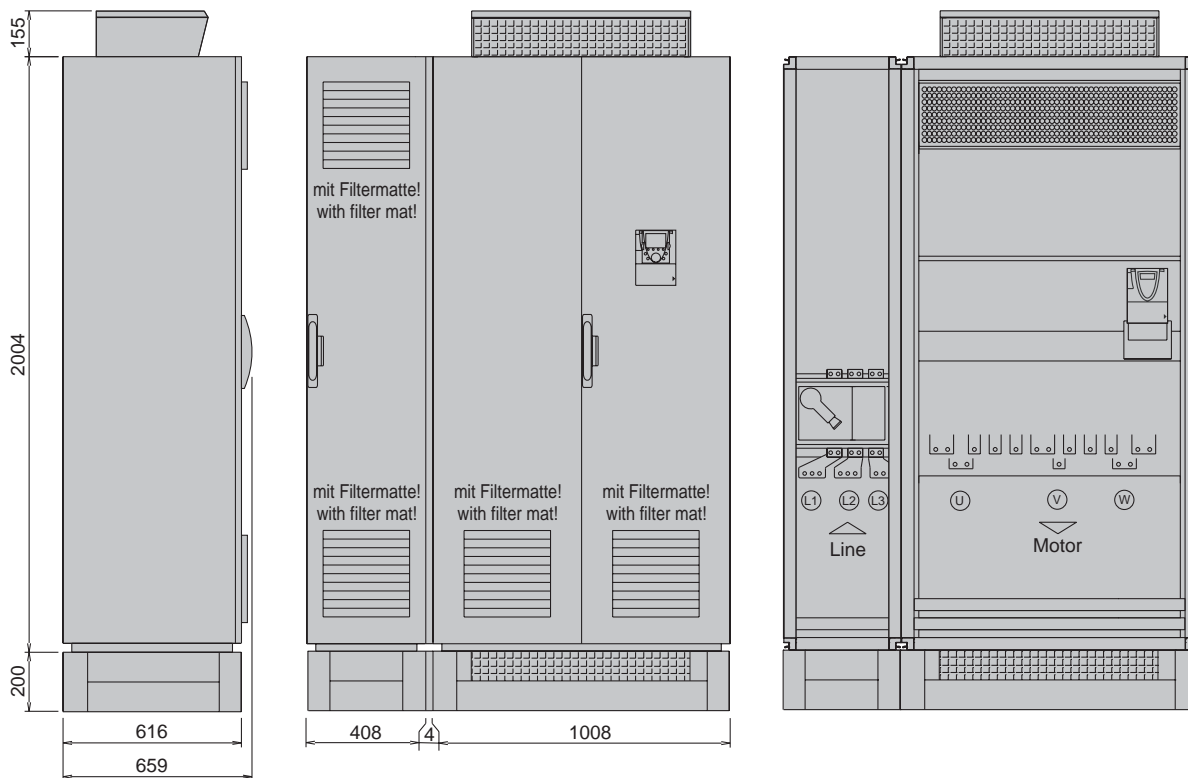
Dimensions: IP54CV Compact version

ATV71EXC5C31N4, C40N4



Dimensions: IP54SA with separated air flow

ATV71EXS5C31N4, C40N4



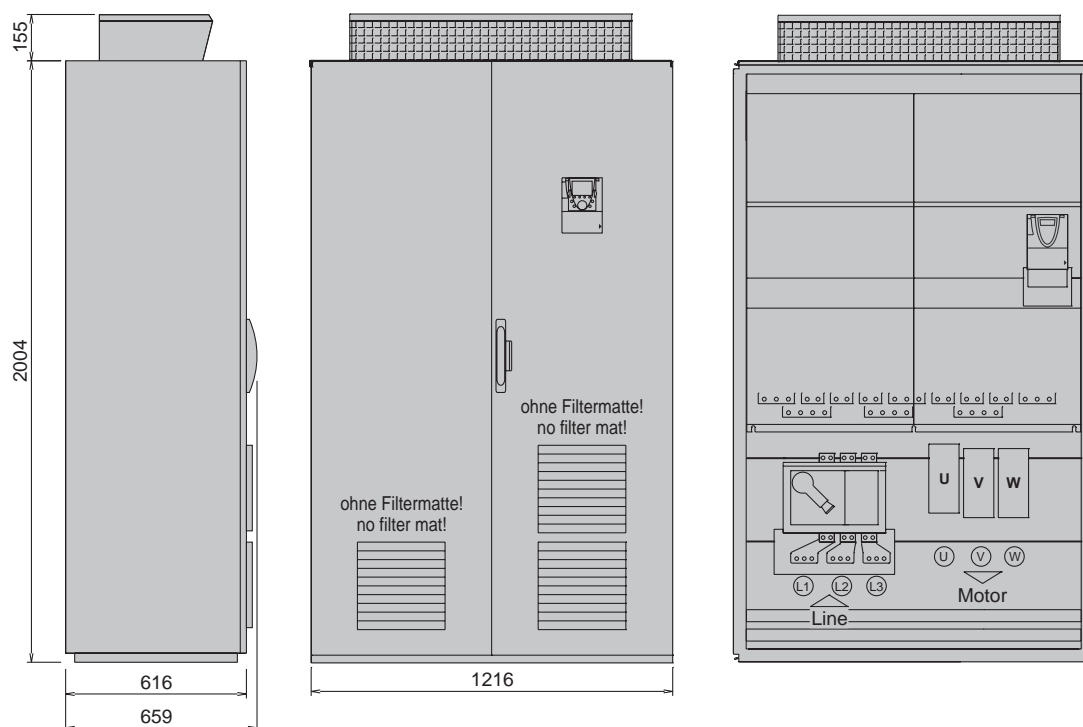
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type		ATV71EX●● C50N4
Built-in standard device		ATV71HC50N4
Nominal data		
Motor rating		
P _N [kW]	V _N = 400 V	500
Continuous output current		
I _N [A]	V _N = 400 V	941
Maximum current for 60 s per 10 minutes		
I _{MAX} [A]	V _N = 400 V	1411
Input		
Input current		
I _{IN} [A]	V _N = 400 V	834
Continuous apparent power		
S _N [kVA]	V _N = 400 V	577
Braking unit		
P _{CONT} /P _{MAX} [kW]		400/750
R _{MIN} /R _{MAX} [Ω]		0.7
Characteristics		
Efficiency [%]		≥ 97.5
Losses [W]		at I _N 12330
Weight net/gross [kg]		
ATV71EXC2●●●N4		750/805
ATV71EXC5●●●N4		780/835
ATV71EXS5●●●N4		835/900
Ambient conditions		
Volume of cooling air [m³/h]	EXC2 / EXC5 / EXS5	2400 / 2400 / 3000
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	69 / 79 / 73
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

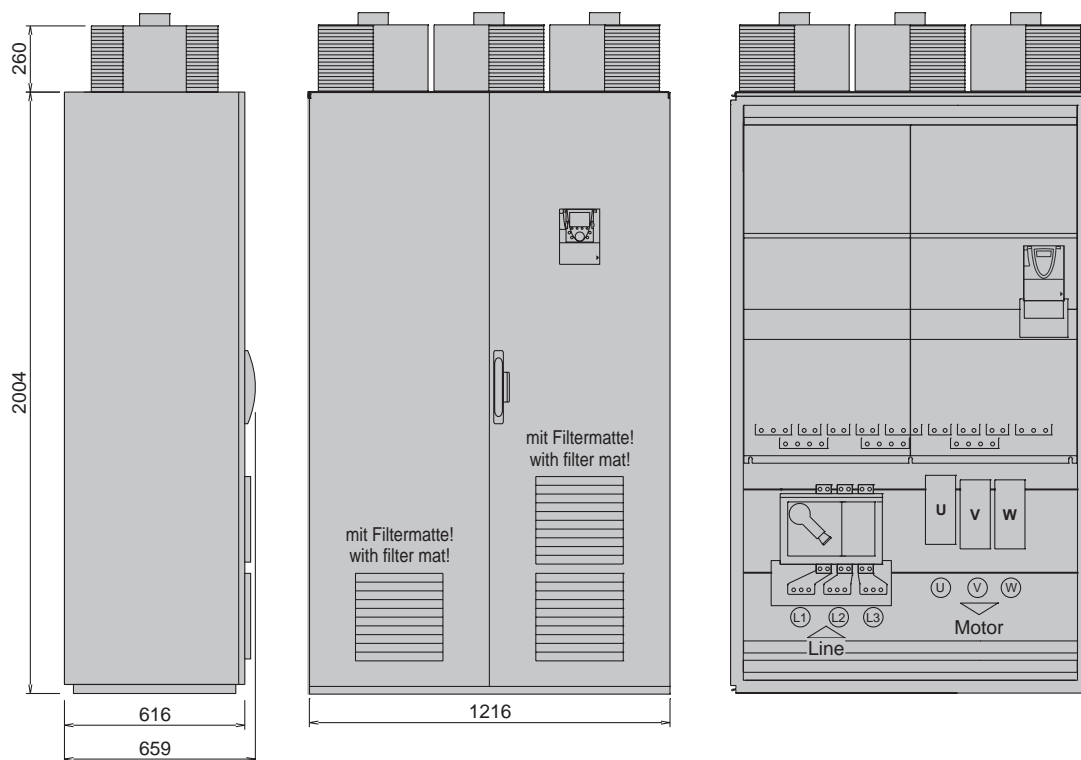
Dimensions: IP23CV Compact version

ATV71EXC2C50N4



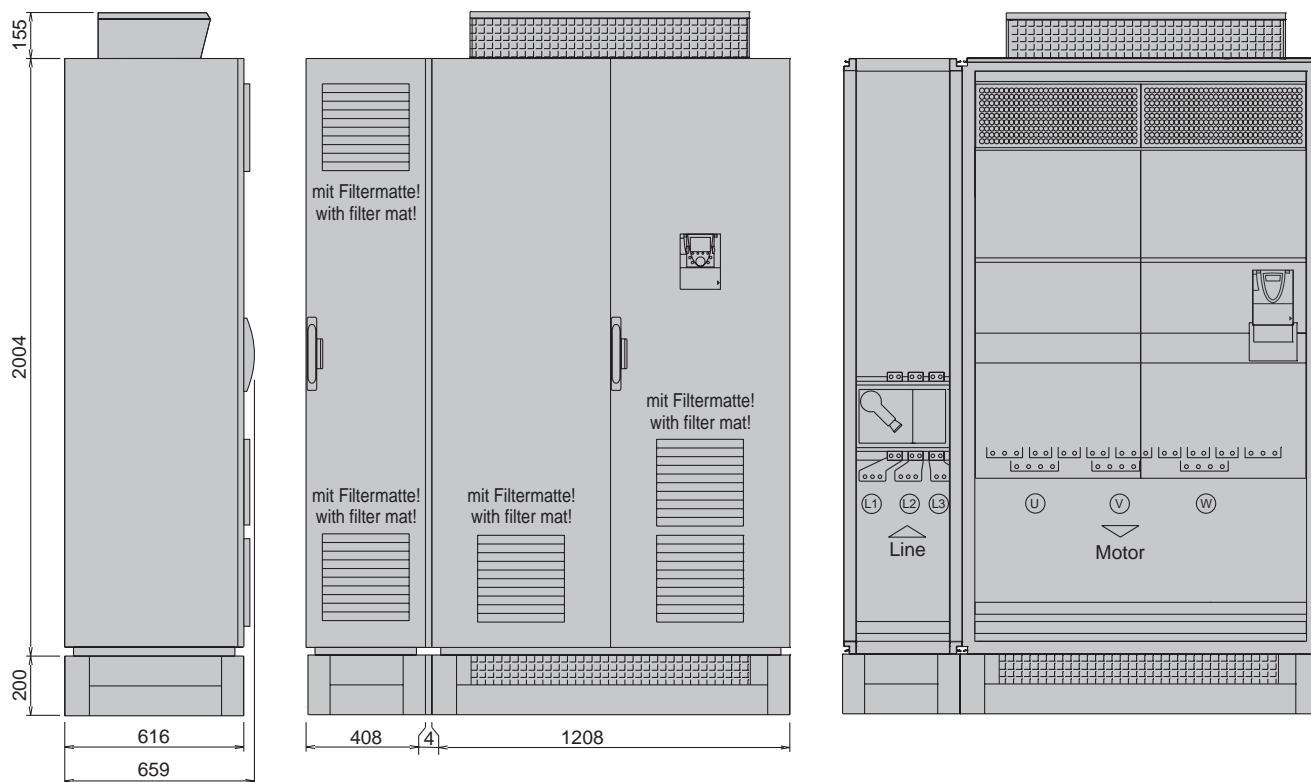
Dimensions: IP54CV Compact version

ATV71EXC5C50N4



Dimensions: IP54SA with separated air flow

ATV71EXS5C50N4

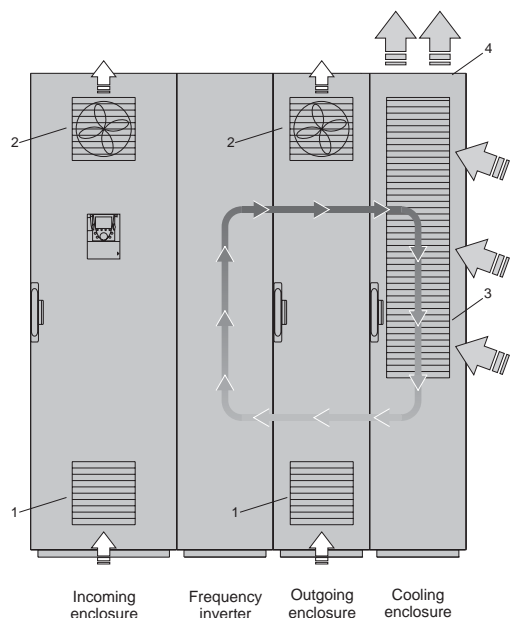


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Protection degree ATV71EXA●

Overview of available protection degrees

ATV71EXA2 - Enclosure design IP23 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by fans in the enclosure door.

1 Air inlet grid

2 Air outlet with fans

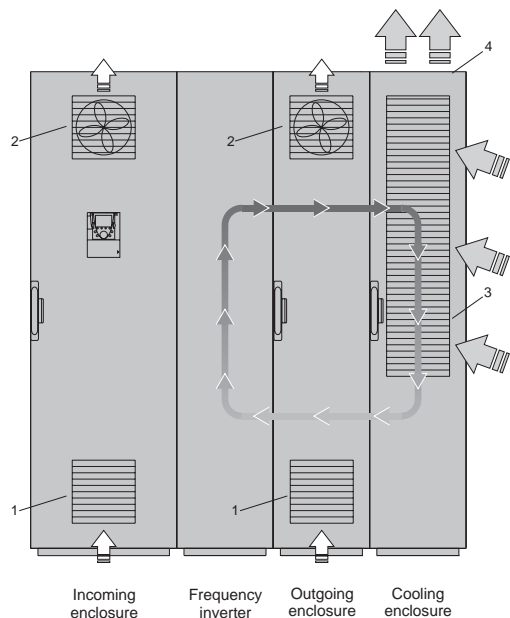
3 Air inlet grid with fans for power part

4 Air outlet grid for power part

Protection degree: IP23

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

ATV71EXA5 - Enclosure design IP54 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

1 Air inlet grid with filter mats

2 Air outlet with filter fans

3 Air inlet grid with fans for power part

4 Air outlet grid for power part

Protection degree: IP54

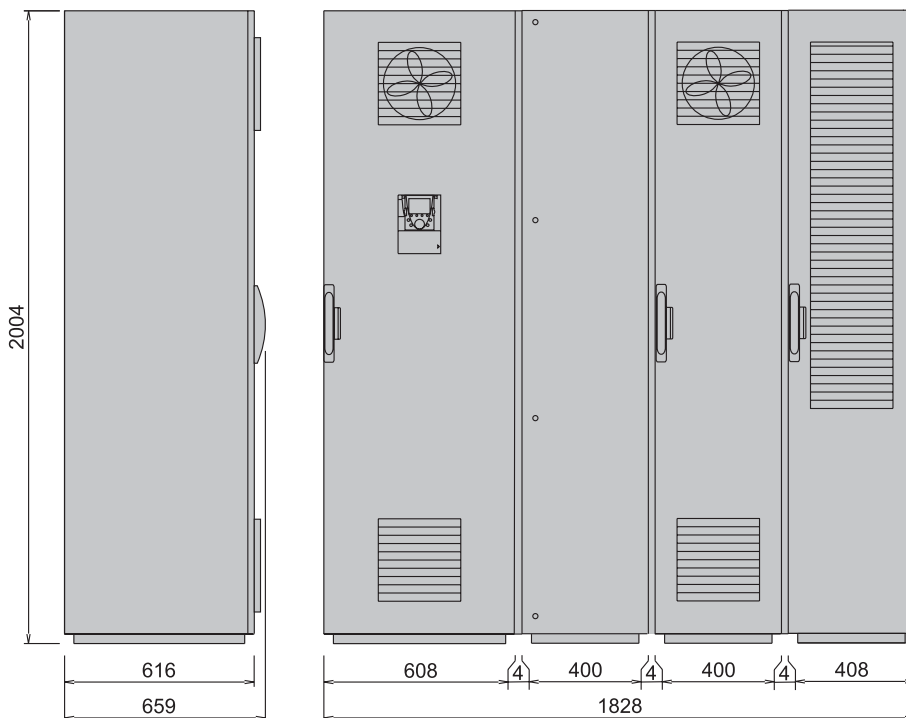
Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

Technical data ATV71EXA●			
Type		ATV71EXA● C50N4	C63N4
Internal inverter unit		ATV71EC50N4E1	ATV71EC63N4E1
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400$ V	500	630
Continuous output current			
I_N [A]	$V_N = 400$ V	920	1100
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400$ V	1380	1650
Input			
Input current			
I_{IN} [A]	$V_N = 400$ V	884	1094
Continuous apparent power			
S_N [kVA]	$V_N = 400$ V	612	758
Characteristics			
Efficiency [%]		> 98.0	> 98.0
Losses [kW]	at I_N	11.4	14.3
Weight net/gross [kg]		900/950	900/950
Ambient conditions			
Volume of cooling air [m³/h]		5500	5500
Sound pressure level [dB(A)]		77	77
Mains short circuit current [kA] *)		100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions:

ATV71EXA●C50N4, C63N4

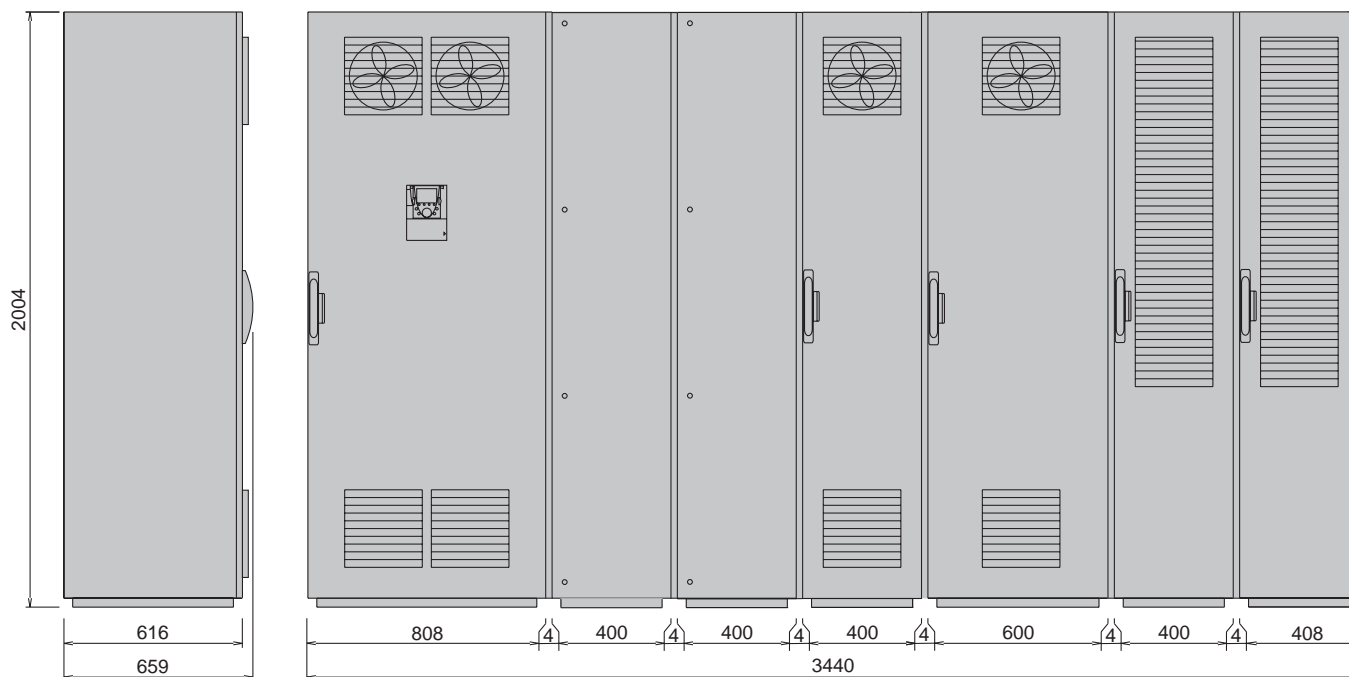


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type		ATV71EXA● C71N4	C90N4	M11N4	M13N4
Internal inverter unit		ATV71EC71N4E1	ATV71EC90N4E1	ATV71EM11N4E1	ATV71EM13N4E1
Nominal data					
Motor rating					
P_N [kW]	$V_N = 400$ V	710	900	1100	1300
Continuous output current					
I_N [A]	$V_N = 400$ V	1260	1580	1860	2200
Maximum current for 60 s per 10 minutes					
I_{MAX} [A]	$V_N = 400$ V	1890	2370	2790	3300
Input					
Input current					
I_{IN} [A]	$V_N = 400$ V	1212	1560	1872	2181
Continuous apparent power					
S_N [kVA]	$V_N = 400$ V	840	1081	1297	1511
Characteristics					
Efficiency [%]		> 98.0	> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	16.2	19.8	24.0	29.0
Weight net/gross [kg]		1850/1925	1850/1925	1850/1925	1850/1925
Ambient conditions					
Volume of cooling air [m ³ /h]		11000	11000	11000	11000
Sound pressure level [dB(A)]		79	79	79	79
Mains short circuit current [kA] *)		100	100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV61EXA●C90N4, M11N4, M13N4, M14N4

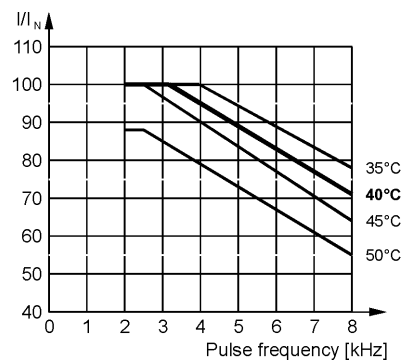


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

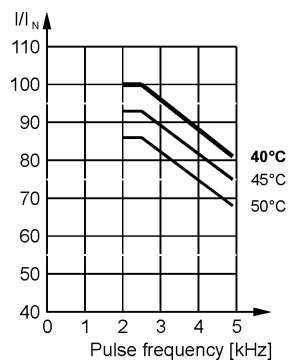
Power decrease

Depending on the chosen pulse frequency and the maximum ambient temperature a power increase is possible or a power reduction is necessary. This can be determined by means of the following diagrams.

ATV 71EX●●D90N4 ... EX●●C50N4



ATV 71EXA●C50N4 ... EXA●M13N4



Please observe the following guidelines to guarantee trouble-free operation of the drive:

- At higher pulse frequencies the allowed motor cable length is reduced (see chapter "Motor cable lengths").
- Select a motor that is at most one type bigger.



If the heat sink temperature is too high, the pulse frequency is automatically reduced to prevent an overload of the inverter.

Fuses and cable cross sections

The Altivar enclosure designs have input fuses built-in as standard. These fuses are for the case that the electronic protective mechanism of the inverter fails. So they are a secondary protection of the inverter to protect the power cables against overload and to protect the input rectifier against an internal short-circuit.

The below-mentioned diameters for 3-wire cables are recommended values for laying the cable in air at max. 40°C ambient temperature, based on the regulations ÖVN EN 1 and VDE 0100.

The lines in the enclosure are dimensioned according to the specification for single conductors XLPE/EPR copper 90°C.

The motor cables are dimensioned for the maximum continuous current. They apply to 0...100 Hz (up to 300 Hz the cable losses increase about 25 % because of the Skin-effect).



In case of other ambient conditions and different regulations the cable diameters must be adjusted.



If the mains fuses blow the inverter already has a primary defect. Therefore, exchanging the blown fuses and switching the inverter on again is not effective. Consequently, the use of circuit breakers is not advantageous and has additionally the disadvantage of a slower switch-off.



A low cost alternative to screened motor cables is the use of NYCY or NYCWY cables (power cables with concentric protective conductor).



The dimensioning of the pre-fuses, mains cable cross sections and mains cable length has to be done taking into account the available mains short circuit current to ensure a safe switch-off in case of a fault!

If required increase the power of the transformer to reach the necessary short circuit capability.

Cable cross sections at standard design									
		Mains supply		Recommended cable [mm ²]	Max. cable [mm ²] (per phase)	Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)				Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV71EX●● (6-pulse)	D90N4	3	250A	1x (3x 150)	2x 185 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C11N4	3	315A	1x (3x 185)	2x 185 (M12)	315 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 120)
	C13N4	3	400A	2x (3x 150)	2x 150 (M10)	400 A sf	2x 240 (M12)	2x 240 (M12)	1x (3x 150)
	C16N4	3	400A	2x (3x 150)	2x 150 (M10)	400 A sf	2x 240 (M12)	2x 240 (M12) or 4x 240 (M12) ¹⁾	3x (3x 50)
	C20N4	3	500 A	2x (3x 150)	2x 150 (M10)	500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 70)
	C25N4	3	630A	2x (3x 240)	2x 300 (M10) ²⁾	630 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C28N4	3	700A	3x (3x 185)	3x 185 (M12)	700 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 185)
	C31N4	3	800A	4x (3x 150)	4x 300 (M12)	800 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C40N4	3	1000A	4x (3x 185)	4x 300 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
	C50N4	3	1250A	6x (3x 185)	6x 300 (M12) ²⁾	2x 630 A sf	6x 240 (M12)	6x 240 (M12)	4x (3x 185)
ATV71EXA● (6-pulse)	C50N4	3	1250A	6x (3x 185) or 5x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C63N4	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C71N4	3	2000A	9x (3x 185) or 8x (3x 240)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	C90N4	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M11N4	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 700 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M13N4	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 800 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 150) or 10x (3x 185)
ATV71EXA● (12-pulse)	C50N4	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C63N4	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C71N4	6	1000A	2x [5x (3x 150)] or 2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	C90N4	6	1250A	2x [6x (3x 185)]	8x 240 (M12)	2x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M11N4	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 700 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M13N4	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 800 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 150) or 10x (3x 185)

1)at IP54 with separated air flow (ATV71EXS5●●●N4)

2)Connection only with special cable lugs for switching devices possible



Differing cable cross sections on request.

Cable cross sections at cable entry above									
		Mains supply		Recommended cable [mm ²]	Max. cable [mm ²] (per phase)	Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)				Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV71EX●● (6-pulse)	D90N4	3	250A	1x (3x 150)	2x 150 (M10)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C11N4	3	315A	1x (3x 185)	2x 240 (M12)	315 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 120)
	C13N4	3	400A	2x (3x 150)	2x 240 (M12)	400 A sf	2x 240 (M12)	2x 240 (M12)	1x (3x 150)
	C16N4	3	400A	2x (3x 150)	2x 240 (M12)	400 A sf	2x 240 (M12)	2x 240 (M12) or 4x 240 (M12) ¹⁾	3x (3x 50)
	C20N4	3	500 A	2x (3x 150)	4x 240 (M12)	500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 70)
	C25N4	3	630A	2x (3x 240)	4x 240 (M12)	630 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C28N4	3	700A	3x (3x 185)	4x 240 (M12)	700 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 185)
	C31N4	3	800A	4x (3x 150)	4x 240 (M12) or 4x 300 (M12) ²⁾	800 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C40N4	3	1000A	4x (3x 185)	4x 240 (M12) or 4x 300 (M12) ²⁾	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
	C50N4	3	1250A	6x (3x 185)	6x 240 (M12) or 6x 300 (M12) ^{1) 2)}	2x 630 A sf	6x 240 (M12)	6x 240 (M12)	4x (3x 185)
ATV71EXA● (6-pulse)	C50N4	3	1250A	6x (3x 185) or 5x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C63N4	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C71N4	3	2000A	9x (3x 185) or 8x (3x 240)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	C90N4	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M11N4	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 700 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M13N4	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 800 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 150) or 10x (3x 185)
ATV71EXA● (12-pulse)	C50N4	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C63N4	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C71N4	6	1000A	2x [5x (3x 150)] or 2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	C90N4	6	1250A	2x [6x (3x 185)]	8x 240 (M12)	2x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M11N4	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 700 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M13N4	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 800 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 150) or 10x (3x 185)

1)at IP54 with separated air flow (ATV71EXS5●●●N4)

2)Connection only with special cable lugs for switching devices possible



Differing cable cross sections on request.

Motor cable lengths

Because of the permitted mains disturbances, the allowed overvoltages at the motor, the occurring bearing currents and the permitted losses the distance between inverter and motor(s) is limited. The maximum distance heavily depends on the type of motor cable (screened/unscreened) as well as from the used options.

Overvoltages at the motor

Overvoltages at the motor terminals result from reflection in the motor cable. Basically the motors are stressed with measurable higher voltage peaks from a motor cable length of 50 m. Thereby the motor load is nearly independent from the used inverter !

Line supply voltage 400 V	Motor insulation for 1300 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs
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Line supply voltage 460 V	Motor insulation for 1600 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs
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In order to use standard motors in this voltage range, the Altivar frequency inverters have a function to inhibit short output voltage pulses. With this function the reflection conditional overvoltages are attenuated. The slew rate as well as the EMC load are not influenced by changing this parameter.

At even longer motor cables the use of a "dv/dt filter" is required. Combined with the cable capacitance the option motor choke affects like a filter and limits the voltage peaks at the motor as well as the slew rate of the output pulses.

When the specified motor cable lengths are observed the motor life time can be significantly extended.

Line supply voltage 400 V	max. 1000 V phase-to-phase peak voltage and dv/dt < 500 V/μs
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Line supply voltage 460 V	max. 1150 V phase-to-phase peak voltage and dv/dt < 500 V/μs
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Observing the specified length of motor cables is absolutely necessary to protect the motor !

EMC interferences

The mains rectifier as well as the IGBT inverter cause high-frequent interferences which drain off more and more stronger to the earth potential with increasing motor cable length. As a result the line-conducted interferences to the mains increase. The attenuation of the line reactors is not longer sufficient and the permitted interference limits are exceeded.



Observing the specified length of motor cables is also necessary for compliance with the EMC limits !

Bearing currents

Common mode bearing currents which even cannot be prevented by means of motors equipped with an insulated bearing are significantly reduced by use of the option motor choke.

Especially in case of big motors with middle up to high motor cable lengths the option motor choke is considerable to increase the availability of the motor.

Multiplication factors



The specified lengths of motor cables are recommended limits based on typical motor cables, laying in cable channels, default pulse frequency and maximal output frequency of 100 Hz.

In case of different conditions the recommended cable lengths must be converted by means of the following factors.

If several factors apply, please multiply them.

- The pulse frequency does not correspond to factory default:

at 4 kHz	multiply all values by 0.7
at 8 kHz	multiply all values by 0.4

- In case of output frequencies higher than 100 Hz:

up to 200 Hz	multiply all values by 0.8
up to 300 Hz	multiply all values by 0.5

- Instead of two parallel cables one thicker cable is used: multiply all values by 1.5

- In case of 6-pole motor cabling (e.g. for star/delta starting circuit): multiply all values by 0.75

- In case of parallel motors with their centre near the inverter values must be converted in compliance with the number of motors. When an adjusted motor choke is used for each motor, the following values in brackets apply.

at 2 motors	multiply all values by 0.40 (0.80)
at 3 motors	multiply all values by 0.25 (0.60)
at 4 motors	multiply all values by 0.15 (0.40)
at 5 motors	multiply all values by 0.10 (0.25)

- If the centre of the parallel motors is near the motors, following factors for conversion apply:

at 2 motors	multiply all values by 0.80
at 3 motors	multiply all values by 0.60
at 4 motors	multiply all values by 0.40
at 5 motors	multiply all values by 0.25

Recommended maximum lengths of motor cables in 2nd environment (industrial environment)

C3 (EN 55011 - class A group 2)

no option *)	50 m	screened cable
with motor choke	80 m	screened cable

C4 (EMC concept)

no option *)	100 m	screened cable
with motor choke	300 m	screened cable
no option *)	150 m	unscreened cable
with motor choke	300 m	unscreened cable

*) By means of a software function to inhibit short output voltage pulses the overvoltage at the motor terminals is limited to the double DC voltage. Before you can use this function you have to ensure that the motor is suitable!

Available options

To enlarge the field of applications, various options are available concerning control and operation, extensions referring to the electric arrangement and to increase the protection degree.

General enclosure options

Allocation table for options

Option	Brief description	Order number	Weight [kg]	Reference
Inputs/outputs				
Basic I/O extension card	Terminal extension for additional logic inputs and outputs	VW3 A3E 201	0.320	See product catalogue
Extended I/O extension card	Terminal extension for additional analog and logic inputs and outputs	VW3 A3E 202	0.300	See product catalogue
Control terminals X12	Control terminals for the basic inverter	VW3 AE 1201	0.700	Page 143
Control terminals X12, X13	Control terminals for the basic device and the I/O option cards VW3 A3E 201 and 202.	VW3 AE 1202	0.900	Page 143
Adapter for 115 V logic inputs	Enables the use of 115 V logic signals.	VW3 A3E 101	0.200	See product catalogue
Relay output OC	Relay for logic output (Open collector)	VW3 AE 2201	0.100	Page 144
"Controller inside" card	Programmable card for integration of control system functions.	VW3 A3E 501	0.300	See product catalogue
Additional electrical input isolation	Isolated amplifier with optoelectronic potential separation connected to the analog input of the inverter	VW3 AE 1901	0.100	Page 145
Additional electrical output isolation	Isolated Amplifier with optoelectronic potential separation connected to the analog output of the inverter	VW3 AE 1902	0.100	Page 146
Encoder feedback				
Encoder interface card 5 V / RS422	Extension card for encoder feedback. Supply voltage 5 V / RS422	VW3 A3E 401	0.200	See product catalogue
Encoder interface card 15 V / RS422	Extension card for encoder feedback. Supply voltage 15 V / RS422	VW3 A3E 402	0.200	
Encoder interface card 12 V OC	Extension card for encoder feedback. Supply voltage 12 V / open collector output	VW3 A3E 403	0.200	
Encoder interface card 15 V OC	Extension card for encoder feedback. Supply voltage 15 V / open collector output	VW3 A3E 404	0.200	
Encoder interface card 12 V (push-pull)	Extension card for encoder feedback. Supply voltage 12 V / push-pull	VW3 A3E 405	0.200	
Encoder interface card 15 V (push-pull)	Extension card for encoder feedback. Supply voltage 15 V / push-pull	VW3 A3E 406	0.200	
Encoder interface card 24 V (push-pull)	Extension card for encoder feedback. Supply voltage 24 V / push-pull	VW3 A3E 407	0.200	

Allocation table for options				
Option	Brief description	Order number	Weight [kg]	Reference
Fieldbuses (industry)				
Modbus TCP/IP communication card	Option card for control of the inverter via Modbus TCP/IP.	VW3 A3E 310	0.300	See product catalogue
Modbus TCP/IP Daisy Chain communication card	Option card for control of the inverter via Modbus TCP/IP Daisy Chain.	VW3 A3E 310d	0.300	
Ethernet/IP communication card	Option card for control of the inverter via Ethernet/IP.	VW3 A3E 316	0.300	
Fipio communication card	Option card for control of the inverter via Fipio.	VW3 A3E 311	0.300	
Substitution Fipio communication card	Option card for control of the inverter via Fipio. (ATV58, ATV58F compatibility)	VW3 A3E 301	0.300	
Modbus Plus communication card	Option card for control of the inverter via Modbus plus.	VW3 A3E 302	0.300	
DeviceNet communication card	Option card for control of the inverter via DeviceNet.	VW3 A3E 309	0.300	
Interbus communication card	Option card for control of the inverter via Interbus.	VW3 A3E 304	0.300	
CC-Link communication card	Option card for control of the inverter via CC-Link.	VW3 A3E 317	0.300	
Modbus/Uni-Telway communication card	Option card for control of the inverter via Modbus/Uni-Telway.	VW3 A3E 303	0.300	
Profibus DP communication card	Option card for control of the inverter via Profibus DP.	VW3 A3E 307	0.300	
Profibus DPv1 communication card	Option card for control of the inverter via Profibus DPv1.	VW3 A3E 307 S371	0.300	
Safety - monitoring of the motor				
Emergency stop button	This function prevents any unintended start-up of the motor and guarantees the safety of the machine and plant personnel.	VW3 AE 1501	0.100	Page 150
"Preventa type AC" fault relay		VW3 AE 1502	0.100	Page 150
"Preventa type ATE" fault relay		VW3 AE 1503	0.100	Page 150
PTC relay	PTC thermistor relay to monitor the PTC thermistors in the motor	VW3 AE 2001	0.100	Page 147
PTC relay with PTB (ATEX) certification	PTC thermistor relay with PTB certificate to monitor the PTC thermistors in the motor in EX-environments	VW3 AE 2002	0.100	Page 148
Pt100 relay for motor winding	Pt100 relay to monitor Pt100 sensors in the motor winding	VW3 AE 2003	0.300	Page 148
Pt100 relay for motor bearings	Pt100 relay to monitor Pt100 sensors in the motor bearings	VW3 AE 2004	0.300	Page 148
Pt100 relay for transformer	Pt100 relay to monitor Pt100 sensors in the transformer	VW3 AE 2005	0.300	Page 148
Further enclosure options				
Insulation monitoring	Monitors each phase to earth fault (only for IT networks)	VW3 AE 2601	5.000	Page 153
Design for IT networks	The frequency inverter will be prepared for the connection to non-grounded networks (IT networks).	VW3 AE 2701	–	Page 153
External 230V AC supply terminals	Provides the terminals and the protection for an external 230 V supply voltage.	VW3 AE 1301	0.100	Page 154
Additional 24 V DC power supply	24 V DC power supply with fuse protection.	VW3 AE 1401	2.200	Page 155
External 24 V DC supply terminals	Provides the terminals and the protection for an external 24 V buffer voltage.	VW3 AE 1402	0.100	Page 155
Enclosure lighting	Fluorescent lamp and a power socket 230V AC	VW3 AE 1601	1.500	Page 156
Key switch (Local / Remote)	Key switch in the enclosure door for switching between terminals/bus and local operation	VW3 AE 1801	0.200	Page 157
Motor heater	Includes a motor circuit breaker, a contactor and the terminals to connect a motor heating	VW3 AE 2101	0.200	Page 156
External motor fan	Includes a motor circuit breaker, a contactor and the terminals to connect an external motor fan	VW3 AE 2102	0.200	Page 157
Voltmeter 400 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2301	0.400	Page 157
Voltmeter 500 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2302	0.400	Page 157
Voltmeter 690 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2303	0.400	Page 157

Enclosure options depending on the power		
Option	Brief description	Reference
Braking unit	Limits the DC-voltage at generator operation	Page 159
Isolating handle for switch	Enables handling without opening the enclosure door	Page 160
Circuit breaker	Provides a safe switching-off at overload	Page 161
Door handle for circuit breaker	Enables handling without opening the enclosure door	Page 160
Undervoltage coil 230 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 162
Undervoltage coil 110 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 163
230 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 163
110 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 164
Line contactor	Used for the function "line contactor control" to disconnect the drive from the mains	Page 165
12-pulse supply	Contains the components for 12-pulse supply	Page 166
Line reactor	Is used for reduction of harmonics	Page 167
Control transformer	Control transformer 400 V / 230 V	Page 154
Ammeter	Measuring instrument built-in in the enclosure door, which indicates the line current.	Page 168
Enclosure heater	Heats the enclosure to avoid frost and condensation up to an ambient temperature of -10°C	Page 169
Motor choke	Reduces the slew rate on the output of the inverter to protect the motor	Page 170
Sinus filter	Permits nearly sinusoidal motor voltage	Page 171
Cable entry via the top	Allows connection of the line and the motor cables from above	Page 172
Enclosure plinth	200 mm plinth	Page 174
Plinth equipped with a fine mesh grille	Grill for the front side of the plinth of the enclosure	Page 176
Air conditioning	Cools the power losses of the control part to avoid filter mats in the enclosure door	Page 176

Allocation table for options depending on the power			
Description	ATV71	Order number	Weight [kg]
Braking unit	EX●●C20N4...C28N4	VW3 A7E 101	31.000
	EXC●C31N4...C50N4	VW3 AE 1003	190.000
	EXS5C31N4...C50N4	VW3 A7E 102	205.000
Isolating handle for switch	EX●●D90N4, C11N4	VW3 AE 0103	1.000
	EX●●C13N4...C28N4	VW3 AE 0104	2.000
	EX●●C31N4...C50N4	VW3 AE 0105	2.000
	EXA●C50N4...M13N4	VW3 AE 0105	2.000
Circuit breaker	EX●●D90N4, C11N4	VW3 AE 0106	1.400
	EX●●C13N4...C20N4	VW3 AE 0107	1.400
	EX●●C25N4...C31N4	VW3 AE 0109	1.400
	EX●●C40N4	VW3 AE 0111	–
	EX●●C50N4	VW3 AE 0112	–
	EXA●C50N4	VW3 AE 0112	–
	EXA●C63N4	VW3 AE 0113	–
	EXA●C71N4	VW3 AE 0174	–
	EXA●C90N4	VW3 AE 0166	–
	EXA●M11N4	VW3 AE 0167	–
	EXA●M13N4	VW3 AE 0168	–
Door handle for circuit breaker	EX●●D90N4, C11N4	VW3 AE 0114	1.000
	EX●●C13N4...C31N4	VW3 AE 0115	2.000
	EX●●C40N4, C50N4	VW3 AE 0116	2.000
	EXA●C50N4, C63N4	VW3 AE 0116	2.000
	EXA●C71N4...M13N4	–	–
Undervoltage coil 230 V	EX●●D90N4...C31N4	VW3 AE 0117	0.500
	EX●●C40N4, C50N4	VW3 AE 0118	0.500
	EXA●C50N4...M13N4	VW3 AE 0118	0.500
Undervoltage coil 110 V	EX●●D90N4...C31N4	VW3 AE 0119	0.500
	EX●●C40N4, C50N4	VW3 AE 0120	0.500
	EXA●C50N4...M13N4	VW3 AE 0120	0.500

Allocation table for options depending on the power

Description	ATV71	Order number	Weight [kg]
230 V motor for circuit breaker	EX●●D90N4, C11N4	VW3 AE 0121	0.950
	EX●●C13N4...C20N4	VW3 AE 0122	3.000
	EX●●C25N4...C31N4	VW3 AE 0123	3.000
	EX●●C40N4	VW3 AE 0124	7.000
	EX●●C50N4	VW3 AE 0125	7.000
	EXA●C50N4	VW3 AE 0125	7.000
	EXA●C63N4	VW3 AE 0126	7.000
	EXA●C71N4...M13N4	–	–
110 V motor for circuit breaker	EX●●D90N4, C11N4	VW3 AE 0127	0.950
	EX●●C13N4...C20N4	VW3 AE 0128	3.000
	EX●●C25N4...C31N4	VW3 AE 0129	3.000
	EX●●C40N4	VW3 AE 0130	7.000
	EX●●C50N4	VW3 AE 0131	7.000
	EXA●C50N4	VW3 AE 0131	7.000
	EXA●C63N4	VW3 AE 0132	7.000
	EXA●C71N4...M13N4	–	–
Line contactor	EX●●D90N4, C11N4	VW3 AE 0206	7.000
	EX●●C13N4	VW3 AE 0218	10.000
	EXC●C16N4	VW3 AE 0218	10.000
	EXS5C16N4	VW3 AE 0215	7.000
	EXC●C20N4	VW3 AE 0209	12.000
	EXS5C20N4...C28N4	VW3 AE 0216	10.000
	EXC●C25N4...C31N4	VW3 AE 0210	14.000
	EXS5C31N4	VW3 AE 0210	14.000
	EX●●C40N4	VW3 AE 0212	24.000
	EX●●C50N4	VW3 AE 0213	28.000
	EXA●C50N4, C63N4	VW3 AE 0227 ¹⁾	42.000
	EXA●C71N4...M13N4	VW3 AE 0224	84.000
	¹⁾ When this option is used together with a line reactor, the option VW3 AE 0225 (50.000 kg) must be ordered additionally!		
12-pulse supply	EXA●C50N4	VW3 AE 2415	–
	EXA●C63N4	VW3 AE 2416	–
	EXA●C71N4	VW3 AE 2417	–
	EXA●C90N4	VW3 AE 2418	–
	EXA●M11N4	VW3 AE 2419	–
	EXA●M13N4	VW3 AE 2420	–
Line reactor	EXA●C50N4, C63N4	VW3 AE 2501	132.000
	EXA●C71N4	VW3 AE 2502	202.000
	EXA●C90N4...M13N4	VW3 AE 2503	264.000
Control transformer, 230 V	EX●●D90N4...C28N4	VW3 AE 0302	8.000
	EX●●C31N4...C50N4	VW3 AE 0303	11.000

Allocation table for options depending on the power

Description	ATV71	Order number	Weight [kg]
Ammeter	EX●●D90N4... C13N4	VW3 AE 0406	0.200
	EX●●C16N4, C20N4	VW3 AE 0426	0.200
	EX●●C25N4...C31N4	VW3 AE 0409	0.200
	EX●●C40N4	VW3 AE 0427	0.200
	EX●●C50N4	VW3 AE 0411	0.200
	EXA●C50N4	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200
	EXA●C63N4, C71N4	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200
	EXA●C90N4	VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200
	EXA●M11N4	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200
	EXA●M13N4	VW3 AE 0416 (6p) VW3 AE 0424 (12p)	0.200
Enclosure heater	EX●●D90N4...C28N4	VW3 AE 0501	0.500
	EX●●C31N4...C50N4	VW3 AE 0502	1.000
	EXA●C50N4...C63N4	VW3 AE 0502	1.000
	EXA●C71N4...M13N4	VW3 AE 0503	1.500
Motor choke ²⁾	EXC●D90N4	VW3 AE 0603	17.000
	EXS5D90N4	VW3 AE 0615	37.000
	EXC●C11N4, C13N4	VW3 AE 0604	35.000
	EXS5C11N4, C13N4	VW3 AE 0617	55.000
	EXC●C16N4, C20N4	VW3 AE 0605	64.000
	EXS5C16N4	VW3 AE 0619	157.000
	EXS5C20N4	VW3 AE 0620	160.000
	EXC●C25N4, C28N4	VW3 AE 0606	102.000
	EXS5C25N4, C28N4	VW3 AE 0621	192.000
	EXC2C31N4	VW3 AE 0607	192.000
	EXC5C31N4	VW3 AE 0611	192.000
	EXS5C31N4	VW3 AE 0622	197.000
	EXC2C40N4	VW3 AE 0609	228.000
	EXC5C40N4	VW3 AE 0613	228.000
	EXS5C40N4	VW3 AE 0624	228.000
	EXC2C50N4	VW3 AE 0610	234.000
	EXC5C50N4	VW3 AE 0614	234.000
	EXS5C50N4	VW3 AE 0625	234.000
	EXA●C50N4, C63N4	VW3 AE 0635	132.000
	EXA●C71N4...M13N4	VW3 AE 0636	264.000
Sinus filter ³⁾	EXC2D90N4	VW3 AE 0641	318.000
	EXC5D90N4	VW3 AE 0653	348.000
	EXS5D90N4	VW3 AE 0665	318.000
	EXC2C11N4	VW3 AE 0642	318.000
	EXC5C11N4	VW3 AE 0654	325.000
	EXS2C11N4	VW3 AE 0666	325.000
	EXC2C13N4	VW3 AE 0644	365.000
	EXC5C13N4	VW3 AE 0656	365.000
	EXS5C13N4	VW3 AE 0668	365.000
	EXC2C16N4	VW3 AE 0645	373.000
	EXC5C16N4	VW3 AE 0657	373.000
	EXS5C16N4	VW3 AE 0669	373.000
	EXC2C20N4	VW3 AE 0647	384.000
	EXC5C20N4	VW3 AE 0659	394.000
	EXS5C20N4	VW3 AE 0671	394.000
	EXC2C25N4, C28N4	VW3 AE 0648	434.000
	EXC5C25N4, C28N4	VW3 AE 0660	434.000
	EXS5C25N4, C28N4	VW3 AE 0672	434.000

²⁾ The option motor choke cannot be combined with the option sinus filter or the option cable entry via the top!

Allocation table for options depending on the power

Description	ATV71	Order number	Weight [kg]
	EXC2C31N4	VW3 AE 0649	445.000
	EXC5C31N4	VW3 AE 0661	445.000
	EXS5C31N4	VW3 AE 0673	445.000
	EXC2C40N4	VW3 AE 0651	870.000
	EXC5C40N4	VW3 AE 0663	900.000
	EXS5C40N4	VW3 AE 0675	900.000
	EXC2C50N4	VW3 AE 0652	900.000
	EXC5C50N4	VW3 AE 0664	930.000
	EXS5C50N4	VW3 AE 0676	930.000

³⁾ The option sinus filter cannot be combined with the option motor choke or the option cable entry via the top!

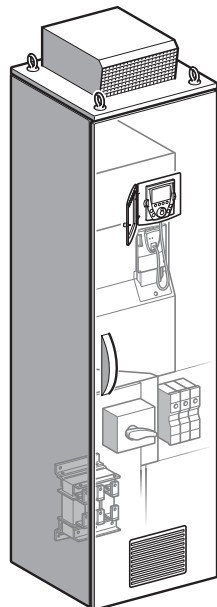
Cable entry via the top ⁴⁾	Without motor choke	EXC●D90N4, C11N4	VW3 AE 0705	108.000
		EXS5D90N4, C11N4	VW3 AE 0715	123.000
		EXC●C13N4	VW3 AE 0706	108.000
		EXS5C13N4	VW3 AE 0716	123.000
		EXC●C16N4	VW3 AE 0707	108.000
		EXS5C16N4	VW3 AE 0717	123.000
		EXC●C20N4...C28N4	VW3 AE 0708	126.000
		EXS5C20N4...C28N4	VW3 AE 0718	141.000
		EXC●C31N4	VW3 AE 0709	216.000
		EXS5C31N4	VW3 AE 0719	123.000
		EXC●C40N4	VW3 AE 0710	252.000
		EXS5C40N4	VW3 AE 0720	141.000
		EXC●C50N4	VW3 AE 0711	252.000
		EXS5C50N4	VW3 AE 0721	141.000
		EXA●C50N4...C63N4	VW3 AE 0740	126.000
		EXA●C71N4...M13N4	VW3 AE 0741	150.000
	With motor choke	EXC●D90N4, C11N4	VW3 AE 0705	108.000
		EXS5D90N4, C11N4	VW3 AE 0715	123.000
		EXC●C13N4	VW3 AE 0706	108.000
		EXS5C13N4	VW3 AE 0716	123.000
		EXC●C16N4	VW3 AE 0707	108.000
		EXS5C16N4	VW3 AE 0722	123.000
		EXC●C20N4...C28N4	VW3 AE 0708	126.000
		EXS5C20N4...C28N4	VW3 AE 0723	141.000
		EXC●C31N4	VW3 AE 0712	108.000
		EXS5C31N4	VW3 AE 0724	–
		EXC●C40N4	VW3 AE 0713	126.000
		EXS5C40N4	VW3 AE 0725	–
		EXC●C50N4	VW3 AE 0714	126.000
		EXS5C50N4	VW3 AE 0726	–
		EXA●C50N4...C63N4	VW3 AE 0740	126.000
		EXA●C71N4...M13N4	VW3 AE 0741	150.000

⁴⁾ The option cable entry via the top cannot be combined with the option sinus filter!

Allocation table for options depending on the power				
Description		ATV71	Order number	Weight [kg]
Enclosure plinth 200 mm	Without motor choke	EXC●D90N4...C16N4	VW3 AE 0801	11.000
		EXC●C20N4...C28N4	VW3 AE 0802	13.000
		EXC●C31N4, C40N4	VW3 AE 0803	15.000
		EXC●C50N4	VW3 AE 0804	17.000
		EXA●C50N4...C63N4	VW3 AE 0820 ⁵⁾	38.000
		EXA●C71N4...M13N4	VW3 AE 0822	69.000
	With motor choke	EXC●D90N4...C16N4	VW3 AE 0801	11.000
		EXC●C20N4...C28N4	VW3 AE 0802	13.000
		EXC●C31N4, C40N4	VW3 AE 0805	24.000
		EXC●C50N4	VW3 AE 0806	26.000
		EXA●C50N4...C63N4	VW3 AE 0820 ⁵⁾	38.000
		EXA●C71N4...M13N4	VW3 AE 0822	69.000
	with line reactor	EXA●C50N4...C63N4	VW3 AE 0820 ⁵⁾	38.000
		EXA●C71N4...M13N4	VW3 AE 0824	78.000
⁵⁾ When using a line reactor and line contactor the option VW3 AE 0821 (40.000 kg) has to be used instead of the option VW3 AE 0820.				
Additional enclosure plinth for cable entry via the top	Without motor choke	EXC●D90N4...C28N4	VW3 AE 0807	9.000
		EXC●C31N4...C50N4	VW3 AE 0808	18.000
		EXA●C50N4...C63N4	VW3 AE 0825	9.000
		EXA●C71N4...M13N4	VW3 AE 0826	11.000
	With motor choke	EXC●D90N4...C28N4	VW3 AE 0807	9.000
		EXC●C31N4...C50N4	VW3 AE 0809	9.000
		EXA●C50N4...C63N4	VW3 AE 0825	9.000
		EXA●C71N4...M13N4	VW3 AE 0826	11.000
Additional enclosure plinth		EXC●C20N4...C28N4	— ⁶⁾	—
For braking unit		EXC●C31N4...C50N4	VW3 AE 0810	9.000
⁶⁾ Therefore is no extra enclosure plinth necessary				
Additional enclosure plinth for sinus filter		EXC●D90N4...C31N4	VW3 AE 0816	11.000
		EXC●C40N4, C50N4	VW3 AE 0817	13.000
Plinth equipped with a fine mesh grille		EXS5D90N4...C16N4	VW3 AE 0812	2.000
		EXS5C20N4...C28N4	VW3 AE 0813	3.000
		EXS5C31N4, C40N4	VW3 AE 0814	4.000
		EXS5C50N4	VW3 AE 0815	5.000
Air conditioning	Without motor choke	EXS5D90N4	VW3 AE 0901	29.500
		EXS5C11N4	VW3 AE 0902	29.500
		EXS5C13N4	VW3 AE 0903	29.500
		EXS5C16N4	VW3 AE 0904	56.000
		EXS5C20N4...C28N4	VW3 AE 0905	71.000
		EXS5C31N4	VW3 AE 0906	71.000
		EXS5C40N4	VW3 AE 0907	71.000
		EXS5C50N4	VW3 AE 0908	86.000
	With motor choke	EXS5D90N4	VW3 AE 0909	56.000
		EXS5C11N4	VW3 AE 0911	56.000
		EXS5C13N4	VW3 AE 0912	56.000
		EXS5C16N4	VW3 AE 0914	71.000
		EXS5C20N4...C28N4	VW3 AE 0915	71.000
		EXS5C31N4	VW3 AE 0916	71.000
		EXS5C40N4	VW3 AE 0917	86.000
		EXS5C50N4	VW3 AE 0918	86.000

Inverters in standard enclosures for 500 V networks

The basic equipment contains:



- Frequency inverter ATV71 with integrated EMC filter
- Mains connection on main switch
- Main switch (without door handle)
- Superfast semiconductor fuses for inverter protection
- Line reactor
For ATV71EXA●●●●N the line reactor is available as option.
- LCD operating panel (mounted into the enclosure door)
- Terminals/bars for motor connection
- Control transformer for 400 V and 230 V to supply the cooling system as well as optional components.
- Protection degree IP23:
air inlet through the enclosure door, air outlet through the enclosure roof.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid in the enclosure door.
- Protection degree IP54:
air inlet through the enclosure door, air outlet through fan on the top.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid with filter in the enclosure door.
- Protection degree IP54 with separated air flow:
air flow through the plinth of the enclosure and mounted air guidance hood. Cooling of the control part by means of filter fans in the enclosure door.
- Inflow coolant temperature 0...40°C
(up to 50°C with derating)
- Enclosure Sarel S6000, color RAL 7032
- Multilingual operating instructions
- Documentation-CD-ROM with parameterization instructions, fieldbus instructions, operating and parameterizing software,...
- Enclosure layout plans consisting of circuit diagram, terminal connection table, list of materials and design drawing

Description

Altivar 71 Plus

ATV71EX●●●●●N

Line supply voltage 500 V

Technical data	
Input	
Voltage	500 (525) V $\pm 10\%$ for TT, TN-C, TN-S or IT networks *)
Frequency	50 / 60 Hz $\pm 5\%$ *)
Overvoltage class	Class III according to EN 50178
*) Technical data and remarks for line supply voltages are given in chapter "Mains conditions", page 21.	
Output	
Control method	Vector-oriented flux control with/without encoder, V/f characteristic, ENA system
Voltage	3 AC 0...100% line supply voltage, dynamic voltage stabilization
Overload	50 % for 60 seconds per 10 minutes, 65 % for 2 seconds
Pulse frequency	2.5 kHz, adjustable from 2...4.9 kHz
Frequency / Base frequency	0.1...500 Hz / 25...500 Hz, adjustable
Short circuit protection	All-pole protected against short circuit and earth fault by means of overcurrent switch-off
Design	Floor-standing enclosure
Cooling	forced
Frequency resolution, digital	0.01 Hz / 50 Hz, frequency stability: $\pm 0.01\%$ / 50 Hz
Speed accuracy	V/f Mode: slip frequency VC without feedback 0.3 x slip frequency VC with feedback 0.01 % of maximum frequency
Mechanical strength	
Mechanical vibration	According to IEC/EN 60068-2-6 1.5 mm at 3...10 Hz, 0.6 g at 10...200 Hz (3M3 according to IEC/EN 60721-3-3)
Shock	According to IEC/EN 60068-2-27 4 g for 11 ms (3M2 according to IEC/EN 60721-3-3)
Ambient conditions	
Operating temperature	0...+40°C (-10...+40°C with enclosure heating) 3K3 according to IEC/EN 60721-3-3 up to +50°C with derating
Storage / Transport temperature	-25...+70°C
Protection degree	alternatively: ATV71EXC2●●●N ... IP23 ATV71EXC5●●●N ... IP54 with air intake through filter mats ATV71EXS5●●●N ... IP54 with separated air flow ATV71EXA2●●●N ... IP23 with internal cooling circuit ATV71EXA5●●●N ... IP54 with internal cooling circuit
Environmental class / Humidity	Class 3K3 in accordance with IEC/EN 60721-3-3 / no condensation, max. 95 % relative humidity
Altitude	Up to 1000 m, beyond power decrease of 1 % per 100 m up to 3000 m
Allowed pollution	Pollution degree: for IP23 design: pollution degree 2 according to EN 61800-5-1 for IP54 design: pollution degree 3 according to EN 61800-5-1 Chemical / mechanical classification: 3C2 and 3S2 according to EN 60721-3-3
Protection class	Class 1 according to EN 50178
Standards	
Basic standard	The devices are designed, built and tested on the basis of EN 50178.
EMC immunity	According to EN 61800-3, 1st and 2nd environment (IEC 1000-4-2; IEC 1000-4-3; IEC 1000-4-4; IEC 1000-4-5; IEC 1000-4-6)
EMC emission	In accordance with product standard EN 61800-3, 2nd environment, category C3, at IT networks category C4
Insulation	Galvanic insulation in accordance with EN 50178 PELV (Protective Extra Low Voltage)
Standards	CE



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Protection degree ATV71EXC● and ATV71EXS5

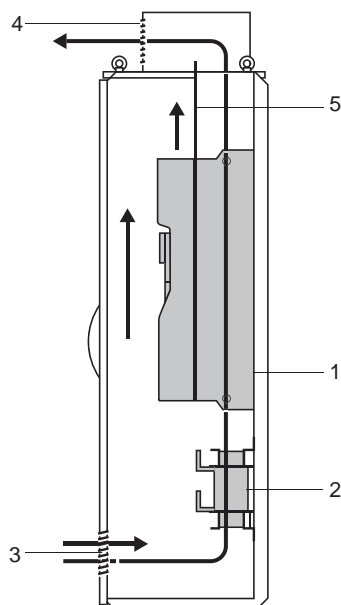
In order to adapt the utmost robust Altivar product line with enclosure design optimal to the individual requests of the system, these enclosure units are available in three different designs. Each solution contains a clearly specified and tested cooling system which provides highest operating safety.

The standard design of the ATV71 enclosure units complies with protection degree IP23. If a higher protection degree is desired or required, there are two IP54 solutions available.

- IP54 with filter mats
- IP54 with separated air flow

Overview of standardised protection degrees

ATV71EXC2 - Standard enclosure design IP23



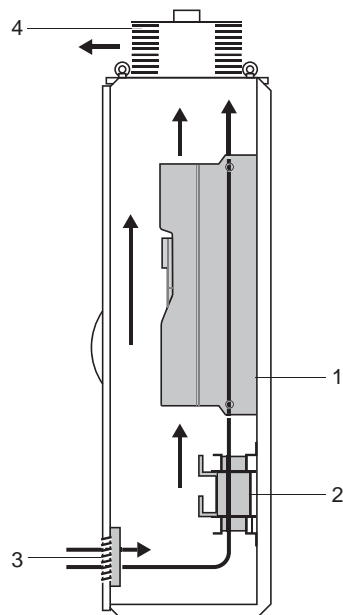
In this case the input of the cooling air takes place by the enclosure door and the output through the top of the enclosure. The air flow must not be constrained by means of fixtures or filter mats.

- 1 Frequency inverter ATV71
- 2 Line reactor
- 3 Air inlet grid (without filter mat) for control part and power part
- 4 Metal cover with splash water protection
- 5 Guided air flow to avoid internal air short-cuts

Protection degree: IP23

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV71EXC5 - Enclosure design IP54



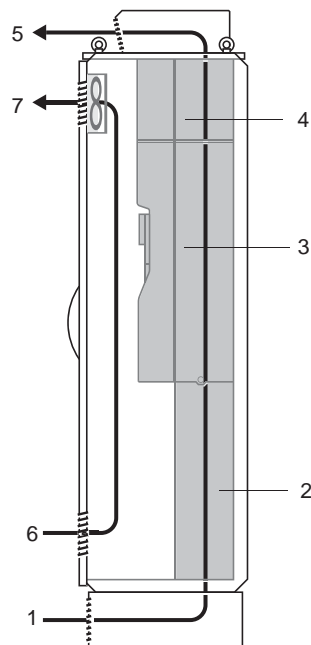
At protection degree IP54 with filter mats the input of the cooling air takes place through the filter mats in the enclosure door and the output through the fan at the top of the enclosure.

- 1 Frequency inverter ATV71
- 2 Line reactor
- 3 Air inlet grid (with filter mat)
- 4 Fan (with filter mat)

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV71EXS5 - Enclosure design IP54 with separated air flow



In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door or by an optional air condition.

- 1 Cooling air for power part (via enclosure plinth)
- 2 Air guidance channel
- 3 Frequency inverter ATV71
- 4 DC choke
(at ATV71EXS5●●●N and ATV71EXS5●●●Y instead of the DC choke a line reactor is delivered in a separate supply field)
- 5 Air outlet through metal grid with splash water protection
- 6 Air inlet (with filter mat) for control part
- 7 Air outlet (with filter fan) for control part

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

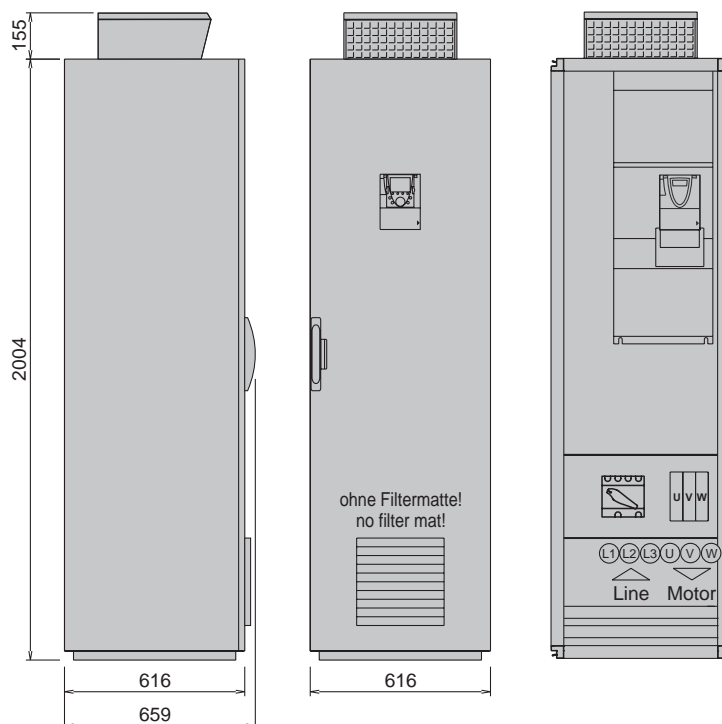
Technical data ATV71EXC● and ATV71EXS5

Type	ATV71EX●● D90N	C11N	C13N
Built-in standard device	ATV71HC11Y	ATV71HC13Y	ATV71HC16Y
Nominal data			
Motor rating			
P_N [kW]	$V_N = 500 \text{ V}$ 90	110	132
Continuous output current			
I_N [A]	$V_N = 500 \text{ V}$ 136	165	200
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 500 \text{ V}$ 204	248	300
Input			
Input current			
I_{IN} [A]	$V_N = 500 \text{ V}$ 128	153	182
Continuous apparent power			
S_N [kVA]	$V_N = 500 \text{ V}$ 111	133	158
Braking unit			
P_{CONT}/P_{MAX} [kW]	90/135	110/165	132/198
R_{MIN}/R_{MAX} [Ω]	4	4	4
Characteristics			
Efficiency [%]	97.0	97.2	97.2
Losses [W]	at I_N 2700	3210	3820
Weight net/gross [kg]			
ATV71EXC2●●●N	325/365	375/415	375/415
ATV71EXC5●●●N	320/360	370/410	370/410
ATV71EXS5●●●N	385/435	435/485	435/485
Ambient conditions			
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5 600 / 600 / 600	600 / 600 / 600	600 / 600 / 600
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5 64 / 64 / 64	64 / 64 / 64	64 / 64 / 64
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5 100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

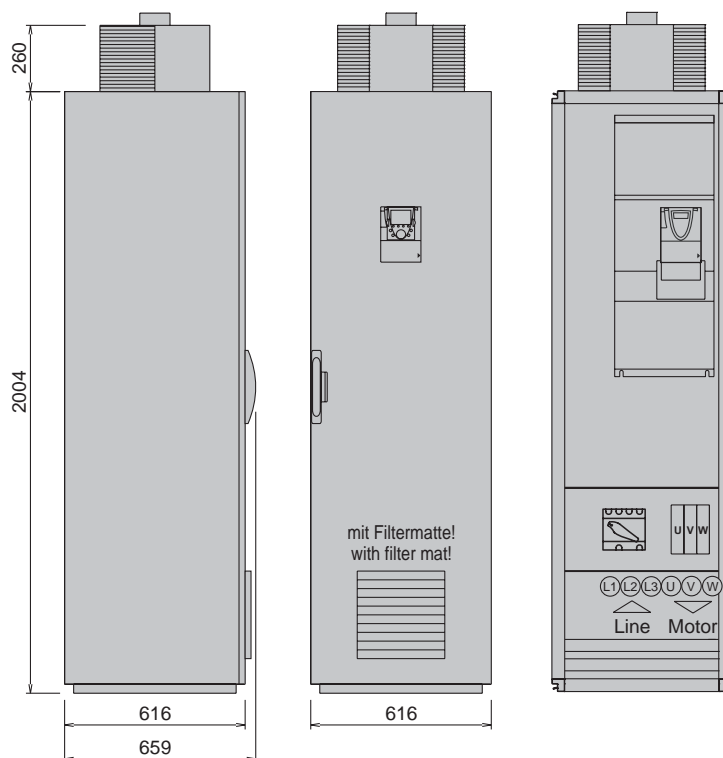
Dimensions: IP23CV Compact version

ATV71EXC2D90N ... C13N



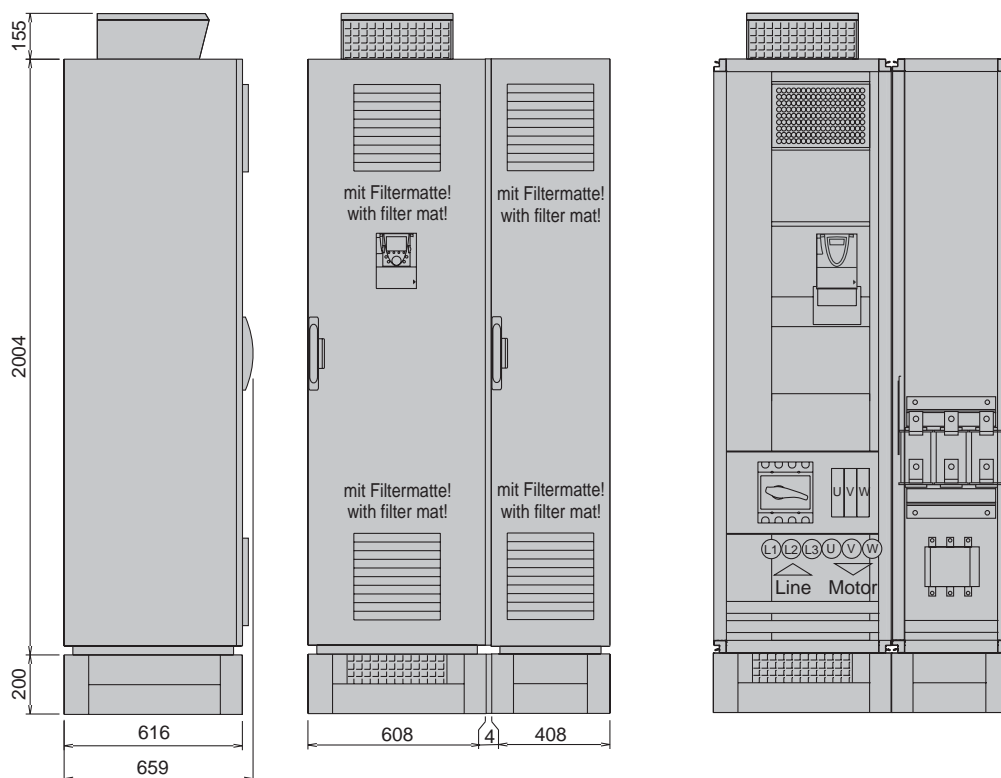
Dimensions: IP54CV Compact version

ATV71EXC2D90N ... C13N



Dimensions: IP54SA with separated air flow

ATV71EXC2D90N ... C13N



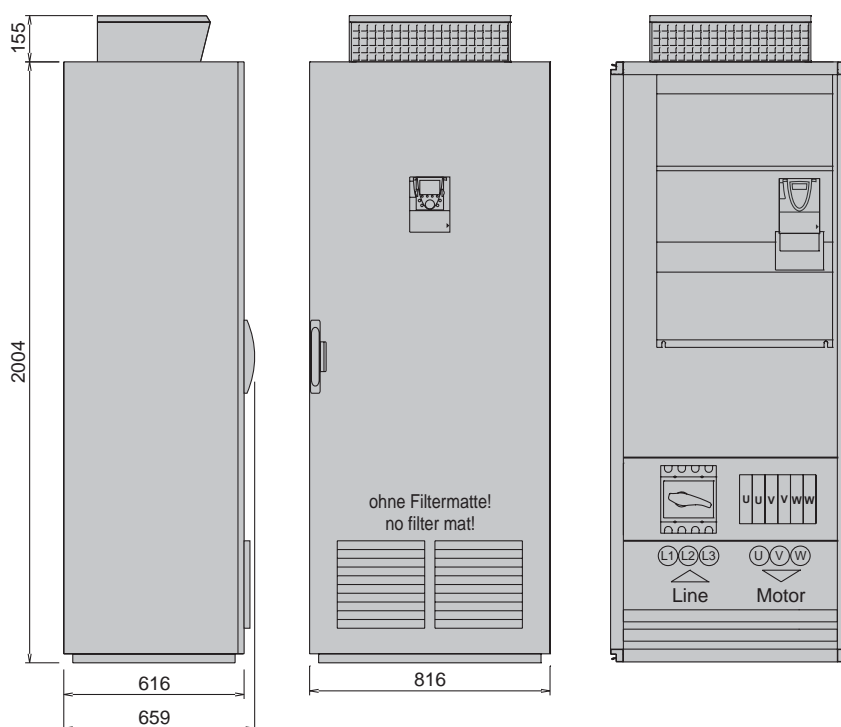
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV71EX●●	C16N	C20N	C25N
Built-in standard device	ATV71HC20Y	ATV71HC25Y	ATV71HC31Y	
Nominal data				
Motor rating				
P_N [kW]	$V_N = 500$ V	160	200	250
Continuous output current				
I_N [A]	$V_N = 500$ V	240	312	390
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 500$ V	360	468	585
Input				
Input current				
I_{IN} [A]	$V_N = 500$ V	227	277	342
Continuous apparent power				
S_N [kV]	$V_N = 500$ V	197	240	296
Braking unit				
P_{CONT}/P_{MAX} [kW]		160/240	200/300	250/375
R_{MIN}/R_{MAX} [Ω]		2	2	2
Characteristics				
Efficiency [%]		97.2	97.2	97.2
Losses [W]	at I_N	4560	5820	7180
Weight net/gross [kg]				
ATV71EXC2●●●N		455/500	505/550	505/550
ATV71EXC5●●●N		455/500	505/550	505/550
ATV71EXS5●●●N		515/570	565/620	565/620
Volume of cooling air [m³/h]				
EXC2 / EXC5 / EXS5		1200 / 1200 / 1200	1200 / 1200 / 1200	1200 / 1200 / 1200
Sound pressure level [dB(A)]				
EXC2 / EXC5 / EXS5		66 / 68 / 72	66 / 68 / 72	66 / 68 / 72
Mains short circuit current [kA] *)				
EXC2 / EXC5 / EXS5		100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

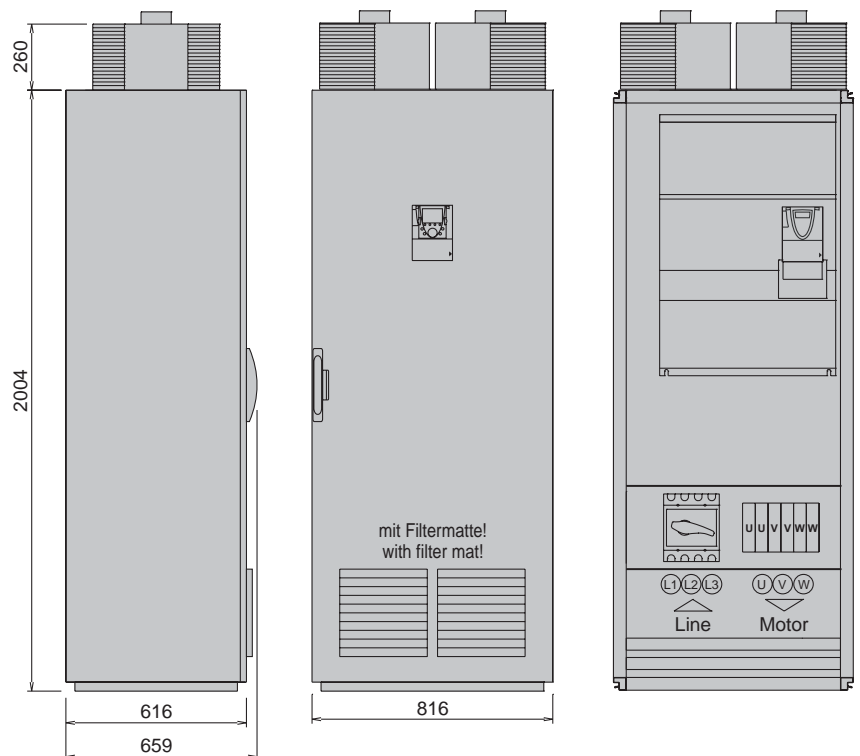
Dimensions: IP23CV Compact version

ATV71EXC2C16N ... C25N



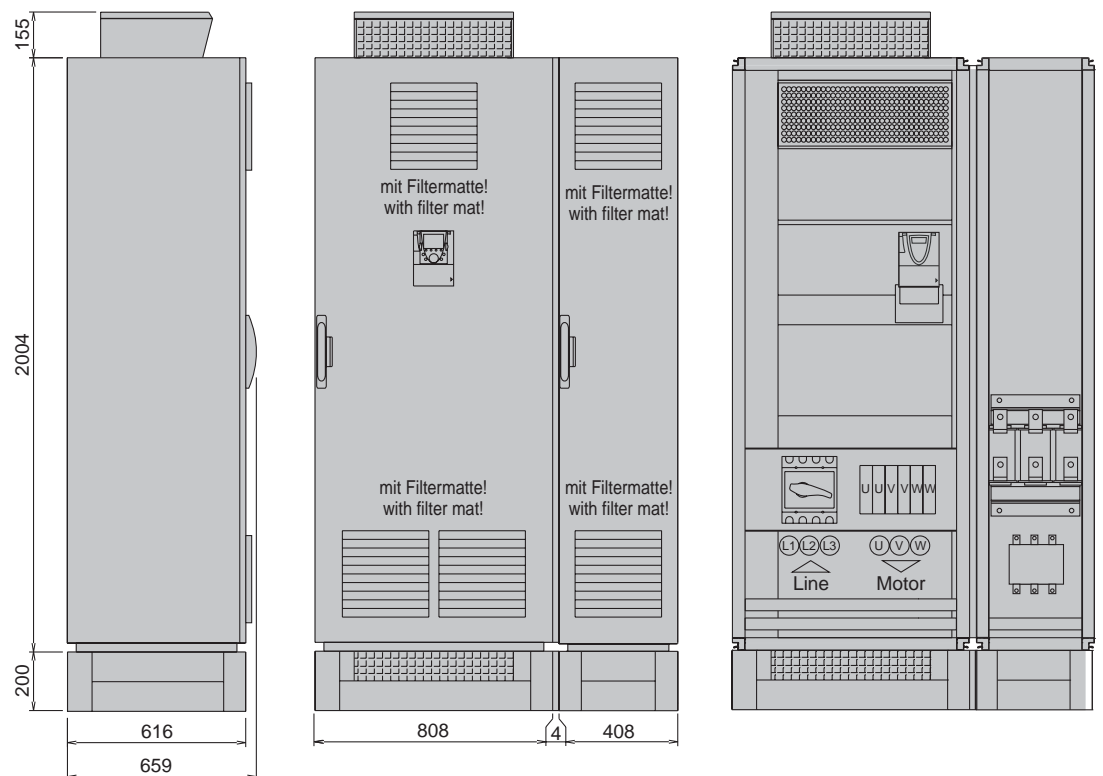
Dimensions: IP54CV Compact version

ATV71EXC2C16N ... C25N



Dimensions: IP54SA with separated air flow

ATV71EXC2C16N ... C25N



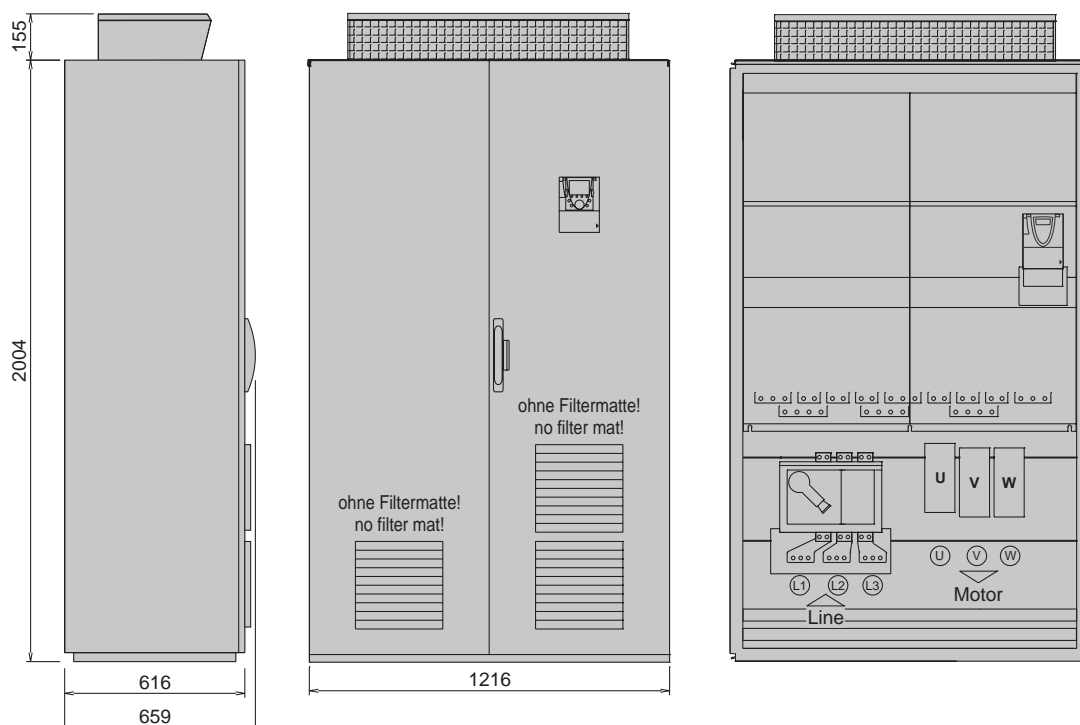
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV71EX●●	C31N	C40N	C50N
Built-in standard device	ATV71HC40Y	ATV71HC50Y	ATV71HC63Y	
Nominal data				
Motor rating				
P_N [kW]	$V_N = 500\text{ V}$	315	400	500
Continuous output current				
I_N [A]	$V_N = 500\text{ V}$	462	590	740
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 500\text{ V}$	693	885	1110
Input				
Input current				
I_{IN} [A]	$V_N = 500\text{ V}$	439	544	673
Continuous apparent power				
S_N [kV]	$V_N = 500\text{ V}$	380	471	583
Braking unit				
P_{CONT}/P_{MAX} [kW]		315/473	400/600	500/750
R_{MIN}/R_{MAX} [Ω]		1	1	1
Characteristics				
Efficiency [%]		97.3	97.3	97.3
Losses [W]	at I_N	8730	11030	13700
Weight net/gross [kg]				
ATV71EXC2●●●N		770/825	860/915	860/915
ATV71EXC5●●●N		800/855	890/945	890/945
ATV71EXS5●●●N		845/910	935/1000	935/1000
Ambient conditions				
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	2400 / 2400 / 2400	2400 / 2400 / 2400	2400 / 2400 / 2400
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	69 / 79 / 73	69 / 79 / 73	69 / 79 / 73
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

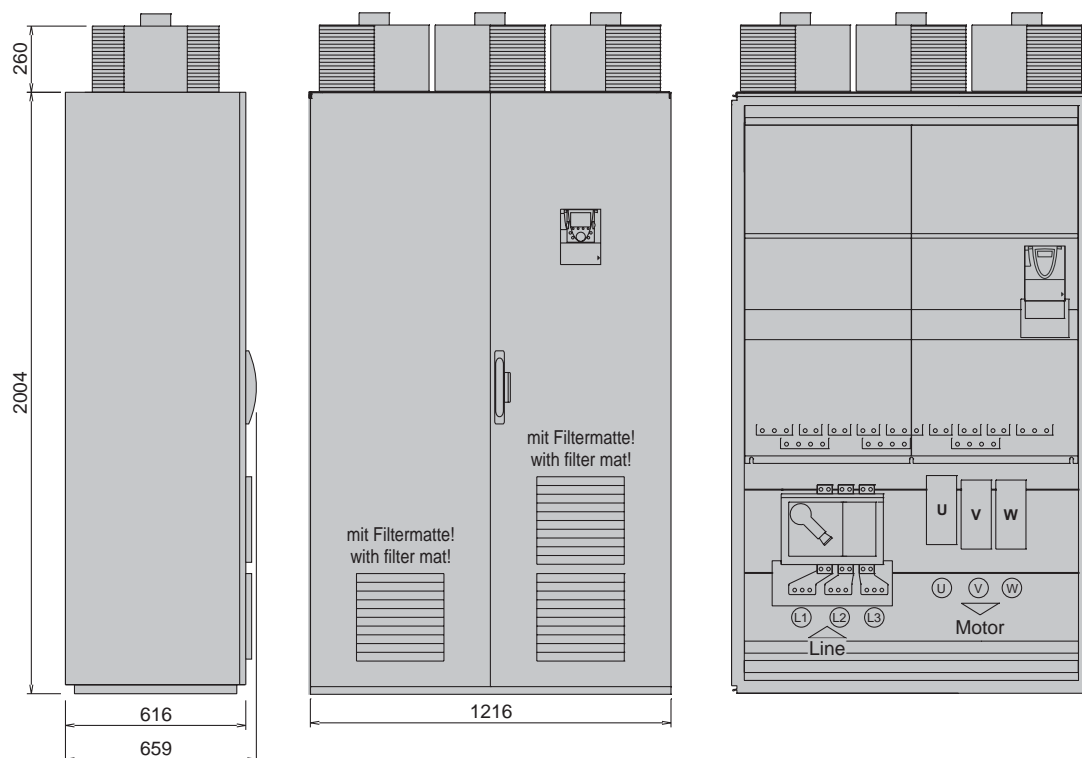
Dimensions: IP23CV Compact version

ATV71EXC2C31N ... C50N



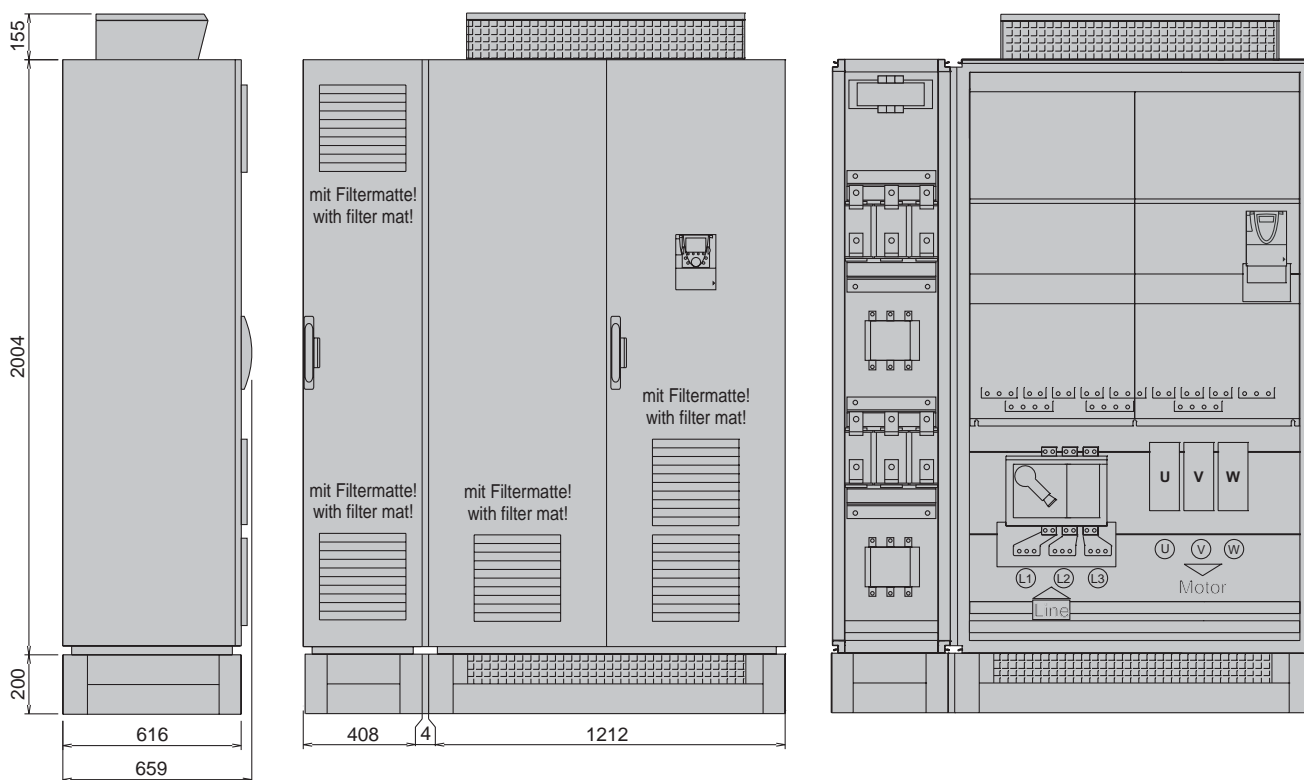
Dimensions: IP54CV Compact version

ATV71EXC2C31N ... C50N



Dimensions: IP54SA with separated air flow

ATV71EXC2C31N ... C50N

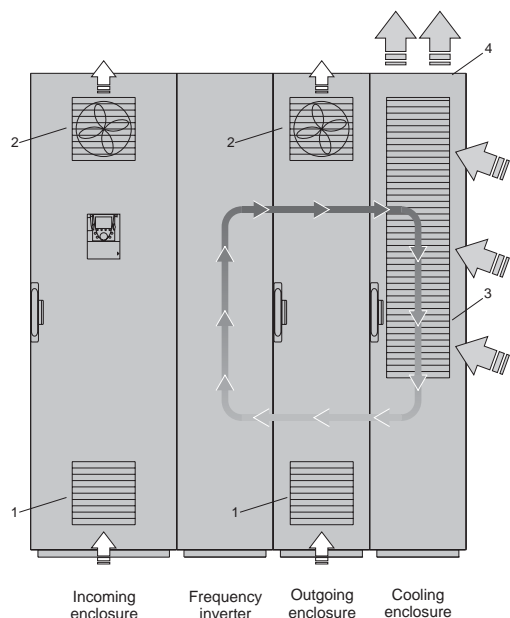


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Protection degree ATV71EXA●

Overview of available protection degrees

ATV71EXA2 - Enclosure design IP23 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by fans in the enclosure door.

1 Air inlet grid

2 Air outlet with fans

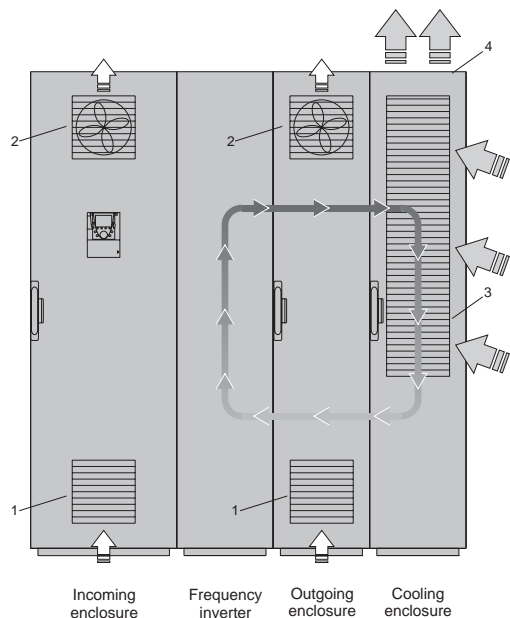
3 Air inlet grid with fans for power part

4 Air outlet grid for power part

Protection degree: IP23

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

ATV71EXA5 - Enclosure design IP54 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

1 Air inlet grid with filter mats

2 Air outlet with filter fans

3 Air inlet grid with fans for power part

4 Air outlet grid for power part

Protection degree: IP54

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

Technical data ATV71EXA●				
Type		ATV71EXA● C50N	C63N	C80N
Internal inverter unit		ATV71EC63YE1	ATV71EC80YE1	ATV71EM10YE1
Nominal data				
Motor rating				
P_N [kW]	$V_N = 500$ V	500	630	800
Continuous output current				
I_N [A]	$V_N = 500$ V	740	920	1100
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 500$ V	1110	1380	1650
Input				
Input current				
I_{IN} [A]	$V_N = 500$ V	698	889	1083
Continuous apparent power				
S_N [kVA]	$V_N = 500$ V	604	770	938
Characteristics				
Efficiency [%]		> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	10.7	13.2	16.1
Weight net/gross [kg]		900/950	900/950	900/950
Ambient conditions				
Volume of cooling air [m³/h]		5500	5500	5500
Sound pressure level [dB(A)]		77	77	77
Mains short circuit current [kA] *)		100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV71EXA●C50N, C63N, C80N

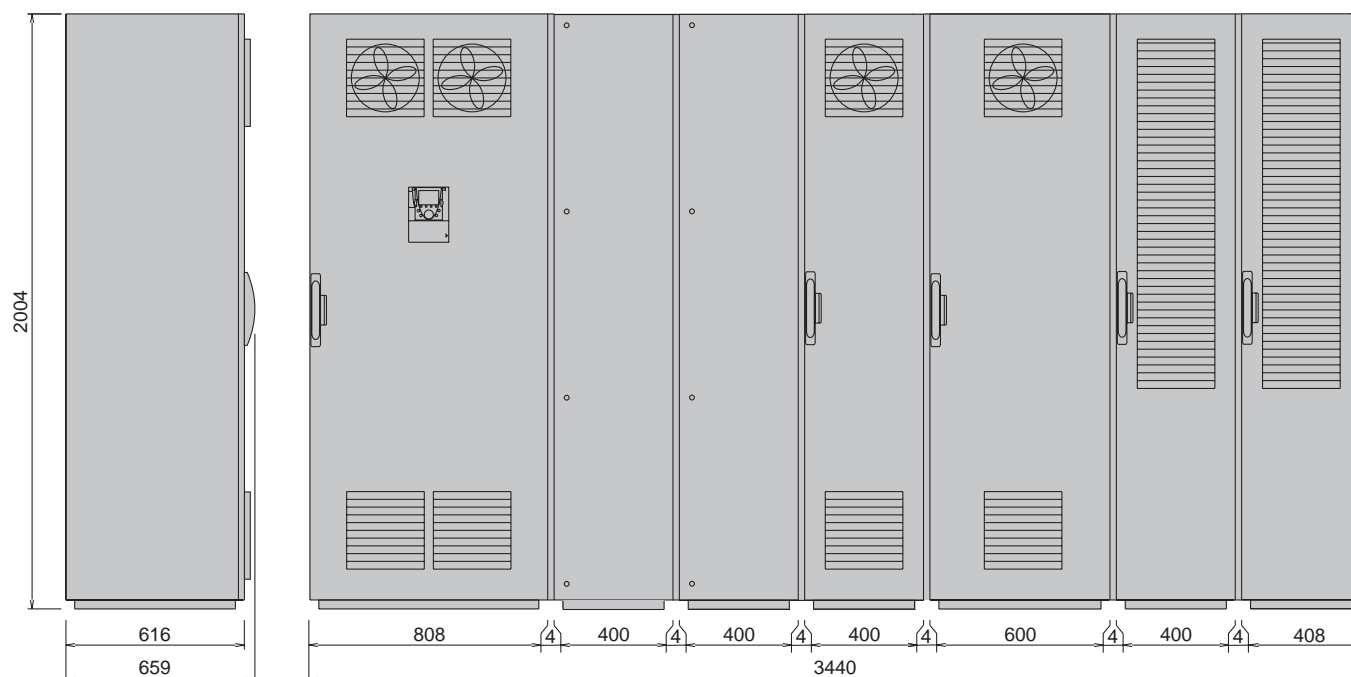


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type		ATV71EXA● C90N	M11N	M13N	M15N
Internal inverter unit		ATV71EM12YE1	ATV71EM15YE1	ATV71EM18YE1	ATV71EM20YE1
Nominal data					
Motor rating					
P_N [kW]	$V_N = 500$ V	900	1100	1300	1500
Continuous output current					
I_N [A]	$V_N = 500$ V	1260	1580	1860	2020
Maximum current for 60 s per 10 minutes					
I_{MAX} [A]	$V_N = 500$ V	1890	2370	2790	3030
Input					
Input current					
I_{IN} [A]	$V_N = 500$ V	1238	1523	1771	2000
Continuous apparent power					
S_N [kVA]	$V_N = 500$ V	1072	1319	1534	1732
Characteristics					
Efficiency [%]		> 98.0	> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	20.1	24.7	29.2	32.0
Weight net/gross [kg]		1850/1925	1850/1925	1850/1925	1850/1925
Ambient conditions					
Volume of cooling air [m ³ /h]		11000	11000	11000	11000
Sound pressure level [dB(A)]		79	79	79	79
Mains short circuit current [kA] *)		100	100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV61EXA●C90N4, M11N4, M13N4, M14N4

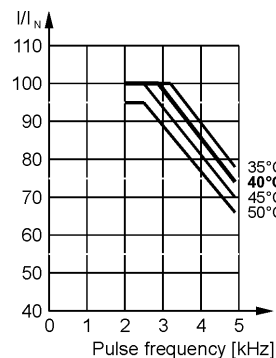


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

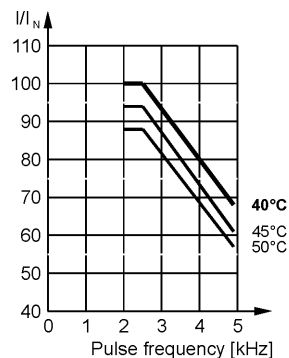
Power decrease

Depending on the chosen pulse frequency and the maximum ambient temperature a power increase is possible or a power reduction is necessary. This can be determined by means of the following diagrams.

ATV 71EX●●D90N ... EX●●C50N



ATV 71EXA●C50N ... EXA●M15N



Please observe the following guidelines to guarantee trouble-free operation of the drive:

- At higher pulse frequencies the allowed motor cable length is reduced (see chapter "Motor cable lengths").
- Select a motor that is at most one type bigger.



If the heat sink temperature is too high, the pulse frequency is automatically reduced to prevent an overload of the inverter.

Fuses and cable cross sections

The Altivar enclosure designs have input fuses built-in as standard. These fuses are for the case that the electronic protective mechanism of the inverter fails. So they are a secondary protection of the inverter to protect the power cables against overload and to protect the input rectifier against an internal short-circuit.

The below-mentioned diameters for 3-wire cables are recommended values for laying the cable in air at max. 40°C ambient temperature, based on the regulations ÖVN EN 1 and VDE 0100.

The lines in the enclosure are dimensioned according to the specification for single conductors XLPE/EPR copper 90°C.

The motor cables are dimensioned for the maximum continuous current. They apply to 0...100 Hz (up to 300 Hz the cable losses increase about 25 % because of the Skin-effect).



In case of other ambient conditions and different regulations the cable diameters must be adjusted.



If the mains fuses blow the inverter already has a primary defect. Therefore, exchanging the blown fuses and switching the inverter on again is not effective. Consequently, the use of circuit breakers is not advantageous and has additionally the disadvantage of a slower switch-off.



A low cost alternative to screened motor cables is the use of NYCY or NYCWY cables (power cables with concentric protective conductor).



The dimensioning of the pre-fuses, mains cable cross sections and mains cable length has to be done taking into account the available mains short circuit current to ensure a safe switch-off in case of a fault!

If required increase the power of the transformer to reach the necessary short circuit capability.

Cable cross sections at standard design									
		Mains supply					Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)	Internal fuse (per phase)	Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV71EX●● (6-pulse)	D90N	3	200A	1x (3x 95)	2x 120 (M8)	200 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 70)
	C11N	3	200A	1x (3x 95)	2x 120 (M8)	200 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 70)
	C13N	3	250A	1x (3x 150)	2x 185 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 95)
	C16N	3	315A	2x (3x 95)	2x 150 (M10)	315 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 120)
	C20N	3	400A	2x (3x 150)	2x 150 (M12)	400 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 185)
	C25N	3	500A	2x (3x 150)	3x 185 (M12)	500 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C31N	3	630A	3x (3x 150)	4x 300 (M12)	2x 315 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C40N	3	800A	4x (3x 150)	4x 300 (M12)	2x 400 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 120)
	C50N	3	1000A	4x (3x 185)	4x 300 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
ATV71EXA● (6-pulse)	C50N	3	1000A	5x (3x 150) or 4x (3x 185)	10x 240 (M12)	2x 500 A sf	16x 240 (M12)	16x 240 (M12)	3x (3x 185)
	C63N	3	1250A	6x (3x 185) or 5x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C80N	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C90N	3	2000A	9x (3x 185) or 8x (3x 240)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M11N	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M13N	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M15N	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 700 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 8x (3x 240)
ATV71EXA● (12-pulse)	C50N	6	500A	2x [3x (3x 120)] or 2x [2x (3x 185)]	4x 240 (M12)	500 A sf	16x 240 (M12)	16x 240 (M12)	3x (3x 185)
	C63N	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C80N	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C90N	6	1000A	2x [5x (3x 150)] or 2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M11N	6	1250A	2x [6x (3x 185)] or 2x [5x (3x 240)]	8x 240 (M12)	2x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M13N	6	1250A	2x [6x (3x 185)] or 2x [5x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M15N	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 700 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 8x (3x 240)

1) at IP54 with separated air flow (ATV71EXS5●●●N)



Differing cable cross sections on request.

Cable cross sections at cable entry above									
		Mains supply					Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)	Internal fuse (per phase)	Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV71EX●● (6-pulse)	D90N	3	200A	1x (3x 95)	2x 150(M10)	200 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 70)
	C11N	3	200A	1x (3x 95)	2x 150 (M10)	200 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 70)
	C13N	3	250A	1x (3x 150)	2x 240 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C16N	3	315A	2x (3x 95)	4x 240 (M12)	315 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 120)
	C20N	3	400A	2x (3x 150)	4x 240 (M12)	400 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 185)
	C25N	3	500A	2x (3x 150)	4x 240 (M12)	500 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C31N	3	630A	3x (3x 150)	4x 240 (M12)	2x 315 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C40N	3	800A	4x (3x 150)	4x 240 (M12)	2x 400 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 120)
	C50N	3	1000A	4x (3x 185)	4x 240 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
ATV71EXA● (6-pulse)	C50N	3	1000A	5x (3x 150) or 4x (3x 185)	10x 240 (M12)	2x 500 A sf	16x 240 (M12)	16x 240 (M12)	3x (3x 185)
	C63N	3	1250A	6x (3x 185) or 5x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C80N	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C90N	3	2000A	9x (3x 185) or 8x (3x 240)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M11N	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M13N	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M15N	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 700 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 8x (3x 240)
ATV71EXA● (12-pulse)	C50N	6	500A	2x [3x (3x 120)] or 2x [2x (3x 185)]	4x 240 (M12)	500 A sf	16x 240 (M12)	16x 240 (M12)	3x (3x 185)
	C63N	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C80N	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C90N	6	1000A	2x [5x (3x 150)] or 2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M11N	6	1250A	2x [6x (3x 185)] or 2x [5x (3x 240)]	8x 240 (M12)	2x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M13N	6	1250A	2x [6x (3x 185)] or 2x [5x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M15N	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 700 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 8x (3x 240)



Differing cable cross sections on request.

Motor cable lengths

Because of the permitted mains disturbances, the allowed overvoltages at the motor, the occurring bearing currents and the permitted losses the distance between inverter and motor(s) is limited. The maximum distance heavily depends on the type of motor cable (screened/unscreened) as well as from the used options.

Overvoltages at the motor

Overvoltages at the motor terminals result from reflection in the motor cable. Basically the motors are stressed with measurable higher voltage peaks from a motor cable length of 50 m. Thereby the motor load is nearly independent from the used inverter !

Line supply voltage 500 V Motor insulation for 1600 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs

In order to use standard motors in this voltage range, the Altivar frequency inverters have a function to inhibit short output voltage pulses. With this function the reflection conditional overvoltages are attenuated. The slew rate as well as the EMC load are not influenced by changing this parameter.

At even longer motor cables the use of a "dv/dt filter" is required. Combined with the cable capacitance the option motor choke affects like a filter and limits the voltage peaks at the motor as well as the slew rate of the output pulses.

When the specified motor cable lengths are observed the motor life time can be significantly extended.

Line supply voltage 500 V max. 1300 V phase-to-phase peak voltage and dv/dt < 750 V/μs



Observing the specified length of motor cables is absolutely necessary to protect the motor !

EMC interferences

The mains rectifier as well as the IGBT inverter cause high-frequent interferences which drain off more and more stronger to the earth potential with increasing motor cable length. As a result the line-conducted interferences to the mains increase. The attenuation of the line reactors is not longer sufficient and the permitted interference limits are exceeded.



Observing the specified length of motor cables is also necessary for compliance with the EMC limits !

Bearing currents

Common mode bearing currents which even cannot be prevented by means of motors equipped with an insulated bearing are significantly reduced by use of the option motor choke.

Especially in case of big motors with middle up to high motor cable lengths the option motor choke is considerable to increase the availability of the motor.

Multiplication factors



The specified lengths of motor cables are recommended limits based on typical motor cables, laying in cable channels, default pulse frequency and maximal output frequency of 100 Hz.

In case of different conditions the recommended cable lengths must be converted by means of the following factors.

If several factors apply, please multiply them.

- The pulse frequency does not correspond to factory default:

at 4 kHz multiply all values by 0.7

- In case of output frequencies higher than 100 Hz:

up to 200 Hz multiply all values by 0.8

up to 300 Hz multiply all values by 0.5

- Instead of two parallel cables one thicker cable is used: multiply all values by 1.5

- In case of 6-pole motor cabling (e.g. for star/delta starting circuit): multiply all values by 0.75

- In case of parallel motors with their centre near the inverter values must be converted in compliance with the number of motors. When an adjusted motor choke is used for each motor, the following values in brackets apply.

at 2 motors multiply all values by 0.40 (0.80)

at 3 motors multiply all values by 0.25 (0.60)

at 4 motors multiply all values by 0.15 (0.40)

at 5 motors multiply all values by 0.10 (0.25)

- If the centre of the parallel motors is near the motors, following factors for conversion apply:

at 2 motors multiply all values by 0.80

at 3 motors multiply all values by 0.60

at 4 motors multiply all values by 0.40

at 5 motors multiply all values by 0.25

Recommended maximum lengths of motor cables in 2nd environment (industrial environment)

C3 (EN 55011 - class A group 2)

no option	15 m	screened cable
with motor choke	50 m	screened cable

C4 (EMC concept)

with motor choke	150 m	screened cable
no option	30 m	unscreened cable
with motor choke	250 m	unscreened cable

Available options

To enlarge the field of applications, various options are available concerning control and operation, extensions referring to the electric arrangement and to increase the protection degree.

General enclosure options

Allocation table for options

Option	Brief description	Order number	Weight [kg]	Reference
Inputs/outputs				
Basic I/O extension card	Terminal extension for additional logic inputs and outputs	VW3 A3E 201	0.320	See product catalogue
Extended I/O extension card	Terminal extension for additional analog and logic inputs and outputs	VW3 A3E 202	0.300	See product catalogue
Control terminals X12	Control terminals for the basic inverter	VW3 AE 1201	0.700	Page 143
Control terminals X12, X13	Control terminals for the basic device and the I/O option cards VW3 A3E 201 and 202.	VW3 AE 1202	0.900	Page 143
Adapter for 115 V logic inputs	Enables the use of 115 V logic signals.	VW3 A3E 101	0.200	See product catalogue
Relay output OC	Relay for logic output (Open collector)	VW3 AE 2201	0.100	Page 144
"Controller inside" card	Programmable card for integration of control system functions.	VW3 A3E 501	0.300	See product catalogue
Additional electrical input isolation	Isolated amplifier with optoelectronic potential separation connected to the analog input of the inverter	VW3 AE 1901	0.100	Page 145
Additional electrical output isolation	Isolated Amplifier with optoelectronic potential separation connected to the analog output of the inverter	VW3 AE 1902	0.100	Page 146
Encoder feedback				
Encoder interface card 5 V / RS422	Extension card for encoder feedback. Supply voltage 5 V / RS422	VW3 A3E 401	0.200	See product catalogue
Encoder interface card 15 V / RS422	Extension card for encoder feedback. Supply voltage 15 V / RS422	VW3 A3E 402	0.200	
Encoder interface card 12 V OC	Extension card for encoder feedback. Supply voltage 12 V / open collector output	VW3 A3E 403	0.200	
Encoder interface card 15 V OC	Extension card for encoder feedback. Supply voltage 15 V / open collector output	VW3 A3E 404	0.200	
Encoder interface card 12 V (push-pull)	Extension card for encoder feedback. Supply voltage 12 V / push-pull	VW3 A3E 405	0.200	
Encoder interface card 15 V (push-pull)	Extension card for encoder feedback. Supply voltage 15 V / push-pull	VW3 A3E 406	0.200	
Encoder interface card 24 V (push-pull)	Extension card for encoder feedback. Supply voltage 24 V / push-pull	VW3 A3E 407	0.200	

Allocation table for options				
Option	Brief description	Order number	Weight [kg]	Reference
Fieldbuses (industry)				
Modbus TCP/IP communication card	Option card for control of the inverter via Modbus TCP/IP.	VW3 A3E 310	0.300	See product catalogue
Modbus TCP/IP Daisy Chain communication card	Option card for control of the inverter via Modbus TCP/IP Daisy Chain.	VW3 A3E 310d	0.300	
Ethernet/IP communication card	Option card for control of the inverter via Ethernet/IP.	VW3 A3E 316	0.300	
Fipio communication card	Option card for control of the inverter via Fipio.	VW3 A3E 311	0.300	
Substitution Fipio communication card	Option card for control of the inverter via Fipio. (ATV58, ATV58F compatibility)	VW3 A3E 301	0.300	
Modbus Plus communication card	Option card for control of the inverter via Modbus plus.	VW3 A3E 302	0.300	
DeviceNet communication card	Option card for control of the inverter via DeviceNet.	VW3 A3E 309	0.300	
Interbus communication card	Option card for control of the inverter via Interbus.	VW3 A3E 304	0.300	
CC-Link communication card	Option card for control of the inverter via CC-Link.	VW3 A3E 317	0.300	
Modbus/Uni-Telway communication card	Option card for control of the inverter via Modbus/Uni-Telway.	VW3 A3E 303	0.300	
Profibus DP communication card	Option card for control of the inverter via Profibus DP.	VW3 A3E 307	0.300	
Profibus DPv1 communication card	Option card for control of the inverter via Profibus DPv1.	VW3 A3E 307 S371	0.300	
Safety - monitoring of the motor				
Emergency stop button	This function prevents any unintended start-up of the motor and guarantees the safety of the machine and plant personnel.	VW3 AE 1501	0.100	Page 150
"Preventa type AC" fault relay		VW3 AE 1502	0.100	Page 150
"Preventa type ATE" fault relay		VW3 AE 1503	0.100	Page 150
PTC relay	PTC thermistor relay to monitor the PTC thermistors in the motor	VW3 AE 2001	0.100	Page 147
PTC relay with PTB (ATEX) certification	PTC thermistor relay with PTB certificate to monitor the PTC thermistors in the motor in EX-environments	VW3 AE 2002	0.100	Page 148
Pt100 relay for motor winding	Pt100 relay to monitor Pt100 sensors in the motor winding	VW3 AE 2003	0.300	Page 148
Pt100 relay for motor bearings	Pt100 relay to monitor Pt100 sensors in the motor bearings	VW3 AE 2004	0.300	Page 148
Pt100 relay for transformer	Pt100 relay to monitor Pt100 sensors in the transformer	VW3 AE 2005	0.300	Page 148
Further enclosure options				
Insulation monitoring	Monitors each phase to earth fault (only for IT networks)	VW3 AE 2601	5.000	Page 153
Design for IT networks	The frequency inverter will be prepared for the connection to non-grounded networks (IT networks).	VW3 AE 2701	–	Page 153
External 230V AC supply terminals	Provides the terminals and the protection for an external 230 V supply voltage.	VW3 AE 1301	0.100	Page 154
Additional 24 V DC power supply	24 V DC power supply with fuse protection.	VW3 AE 1401	2.200	Page 155
External 24 V DC supply terminals	Provides the terminals and the protection for an external 24 V buffer voltage.	VW3 AE 1402	0.100	Page 155
Enclosure lighting	Fluorescent lamp and a power socket 230V AC	VW3 AE 1601	1.500	Page 156
Key switch (Local / Remote)	Key switch in the enclosure door for switching between terminals/bus and local operation	VW3 AE 1801	0.200	Page 157
Motor heater	Includes a motor circuit breaker, a contactor and the terminals to connect a motor heating	VW3 AE 2101	0.200	Page 156
External motor fan	Includes a motor circuit breaker, a contactor and the terminals to connect an external motor fan	VW3 AE 2102	0.200	Page 157
Voltmeter 400 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2301	0.400	Page 157
Voltmeter 500 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2302	0.400	Page 157
Voltmeter 690 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2303	0.400	Page 157

Enclosure options depending on the power		
Option	Brief description	Reference
Braking unit	Limits the DC-voltage at generator operation	Page 159
Isolating handle for switch	Enables handling without opening the enclosure door	Page 160
Circuit breaker	Provides a safe switching-off at overload	Page 161
Door handle for circuit breaker	Enables handling without opening the enclosure door	Page 162
Undervoltage coil 230 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 162
Undervoltage coil 110 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 163
230 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 163
110 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 164
Line contactor	Used for the function "line contactor control" to disconnect the drive from the mains	Page 165
12-pulse supply	Contains the components for 12-pulse supply	Page 166
Line reactor	Is used for reduction of harmonics	Page 167
Ammeter	Measuring instrument built-in in the enclosure door, which indicates the line current.	Page 168
Enclosure heater	Heats the enclosure to avoid frost and condensation up to an ambient temperature of -10°C	Page 169
Motor choke	Reduces the slew rate on the output of the inverter to protect the motor	Page 170
Cable entry via the top	Allows connection of the line and the motor cables from above	Page 172
Enclosure plinth	200 mm plinth	Page 174
Plinth equipped with a fine mesh grille	Grill for the front side of the plinth of the enclosure	Page 176
Air conditioning	Cools the power losses of the control part to avoid filter mats in the enclosure door	Page 176

Allocation table for options depending on the power			
Description	ATV71	Order number	Weight [kg]
Braking unit	EXC●C16N...C25N	VW3 AE 1004	190.000
	EXS5C16N...C25N	VW3 A7E 103	205.000
	EXC●C31N...C50N	VW3 AE 1005	190.000
	EXS5C31N...C50N	VW3 A7E 104	205.000
Isolating handle for switch	EX●●D90N...C13N	VW3 AE 0103	1.000
	EX●●C16N...C25N	VW3 AE 0104	2.000
	EX●●C31N...C50N	VW3 AE 0105	2.000
	EXA●C50N...M15N	VW3 AE 0105	2.000
Circuit breaker	EX●●D90N	VW3 AE 0141	–
	EX●●C11N	VW3 AE 0142	–
	EX●●C13N	VW3 AE 0144	–
	EX●●C16N, C20N	VW3 AE 0146	1.400
	EX●●C25N	VW3 AE 0147	1.400
	EX●●C31N, C40N	VW3 AE 0150	–
	EX●●C50N	VW3 AE 0151	–
	EXA●C50N	VW3 AE 0151	–
	EXA●C63N	VW3 AE 0169	–
	EXA●C80N	VW3 AE 0170	–
	EXA●C90N	VW3 AE 0175	–
	EXA●M11N	VW3 AE 0171	–
	EXA●M13N	VW3 AE 0172	–
	EXA●M15N	VW3 AE 0173	–
Door handle for circuit breaker	EX●●D90N...C13N	VW3 AE 0114	1.000
	EX●●C16N...C25N	VW3 AE 0115	2.000
	EX●●C31N...C50N	VW3 AE 0116	2.000
	EXA●C50N...C80N	VW3 AE 0116	2.000
	EXA●C90N...M15N	–	–
Undervoltage coil 230 V	EX●●D90N...C25N	VW3 AE 0117	0.500
	EX●●C31N...C50N	VW3 AE 0118	0.500
	EXA●C50N...M15N	VW3 AE 0118	0.500

Allocation table for options depending on the power

Description	ATV71	Order number	Weight [kg]
Undervoltage coil 110 V	EX●●D90N...C25N	VW3 AE 0119	0.500
	EX●●C31N...C50N	VW3 AE 0120	0.500
	EXA●C50N...M15N	VW3 AE 0120	0.500
230 V motor for circuit breaker	EX●●D90N	VW3 AE 0154	1.000
	EX●●C11N, C13N	VW3 AE 0155	1.000
	EX●●C16N, C20N	VW3 AE 0156	3.000
	EX●●C25N	VW3 AE 0157	3.000
	EX●●C31N, C40N	VW3 AE 0158	7.000
	EX●●C50N	VW3 AE 0159	7.000
	EXA●C50N	VW3 AE 0159	7.000
	EXA●C63N	VW3 AE 0176	7.000
	EXA●C80N	VW3 AE 0177	7.000
	EXA●C90N...M15N	–	–
110 V motor for circuit breaker	EX●●D90N	VW3 AE 0160	1.000
	EX●●C11N, C13N	VW3 AE 0161	1.000
	EX●●C16N, C20N	VW3 AE 0162	3.000
	EX●●C25N	VW3 AE 0163	3.000
	EX●●C31N, C40N	VW3 AE 0164	7.000
	EX●●C50N	VW3 AE 0165	7.000
	EXA●C50N	VW3 AE 0165	7.000
	EXA●C63N	VW3 AE 0179	7.000
	EXA●C80N	VW3 AE 0180	7.000
	EXA●C90N...M15N	–	–
Line contactor	EX●●D90N	VW3 AE 0205	4.000
	EX●●C11N	VW3 AE 0206	7.000
	EX●●C13N, C16N	VW3 AE 0218	10.000
	EX●●C20N	VW3 AE 0209	12.000
	EX●●C25N	VW3 AE 0210	14.000
	EX●●C31N	VW3 AE 0221	20.000
	EX●●C40N	VW3 AE 0212	24.000
	EX●●C50N	VW3 AE 0213	28.000
	EXA●C50N...C80N	VW3 AE 0227 ¹⁾	42.000
	EXA●C90N...M15N	VW3 AE 0226	84.000
¹⁾ When this option is used together with a line reactor, the option VW3 AE 0225 (50.000 kg) must be ordered additionally!			
12-pulse supply	EXA●C50N	VW3 AE 2414	–
	EXA●C63N	VW3 AE 2415	–
	EXA●C80N	VW3 AE 2416	–
	EXA●C90N	VW3 AE 2417	–
	EXA●M11N	VW3 AE 2418	–
	EXA●M13N	VW3 AE 2419	–
	EXA●M15N	VW3 AE 2420	–
Line reactor	EXA●C50N	VW3 AE 2504	154.000
	EXA●C63N	VW3 AE 2505	121.000
	EXA●C80N	VW3 AE 2506	136.000
	EXA●C90N	VW3 AE 2507	308.000
	EXA●M11N, M13N	VW3 AE 2508	242.000
	EXA●M15N	VW3 AE 2509	273.000

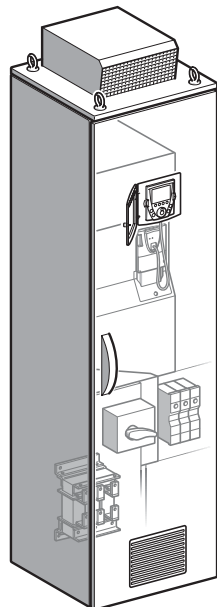
Allocation table for options depending on the power

Description		ATV71	Order number	Weight [kg]
Ammeter		EX●●D90N	VW3 AE 0404	0.200
		EX●●C11N...C16N	VW3 AE 0406	0.200
		EX●●C20N, C25N	VW3 AE 0426	0.200
		EX●●C31N...C40N	VW3 AE 0409	0.200
		EX●●C50N	VW3 AE 0427	0.200
		EXA●C50N	VW3 AE 0427 (6p) VW3 AE 0428 (12p)	0.200
		EXA●C63N	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200
		EXA●C80N, C90N	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200
		EXA●M11N	VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200
		EXA●M13N	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200
		EXA●M15N	VW3 AE 0416 (6p) VW3 AE 0424 (12p)	0.200
	Enclosure heater		EX●●D90N...C25N	VW3 AE 0501
		EX●●C31N...C50N	VW3 AE 0502	1.000
		EXA●C50N...C80N	VW3 AE 0502	1.000
		EXA●C90N...M15N	VW3 AE 0503	1.500
Motor choke		EX●●D90N, C11N	VW3 AE 0603	17.000
		EX●●C13N, C16N	VW3 AE 0604	35.000
		EX●●C20N, C25N	VW3 AE 0605	64.000
		EXC2C31N, C40N	VW3 AE 0626	192.000
		EXC5C31N, C40N	VW3 AE 0628	192.000
		EXS5C31N, C40N	VW3 AE 0630	197.000
		EXC2C50N	VW3 AE 0627	234.000
		EXC5C50N	VW3 AE 0629	234.000
		EXS5C50N	VW3 AE 0631	234.000
		EXA●C50N...C80N	VW3 AE 0635	132.000
		EXA●C90N...M15N	VW3 AE 0636	264.000
Cable entry via the top	Without motor choke	EXC●D90N...C13N	VW3 AE 0728	108.000
		EXS5D90N...C13N	VW3 AE 0732	–
		EXC●C16N...C25N	VW3 AE 0729	126.000
		EXS5C16N...C25N	VW3 AE 0733	–
		EXC●C31N...C50N	VW3 AE 0730	252.000
		EXS5C31N...C50N	VW3 AE 0734	252.000
		EXA●C50N...C80N	VW3 AE 0740	126.000
		EXA●C90N...M15N	VW3 AE 0741	150.000
	with motor choke	EXC●D90N...C13N	VW3 AE 0728	108.000
		EXS5D90N...C13N	VW3 AE 0735	108.000
		EXC●C16N...C25N	VW3 AE 0729	126.000
		EXS5C16N...C25N	VW3 AE 0736	126.000
		EXC●C31N...C50N	VW3 AE 0731	126.000
		EXS5C31N...C50N	VW3 AE 0737	252.000
		EXA●C50N...C80N	VW3 AE 0740	126.000
		EXA●C90N...M15N	VW3 AE 0741	150.000

Allocation table for options depending on the power				
Description		ATV71	Order number	Weight [kg]
Enclosure plinth 200 mm	No option	EXC●D90N...C13N	VW3 AE 0801	11.000
		EXC●C16N...C25N	VW3 AE 0802	13.000
		EXC●C31N...C50N	VW3 AE 0804	17.000
		EXA●C50N...C80N	VW3 AE 0820 ²⁾	38.000
		EXA●C90N...M15N	VW3 AE 0822	69.000
	With motor choke	EXC●D90N...C13N	VW3 AE 0801	11.000
		EXC●C16N...C25N	VW3 AE 0802	13.000
		EXC●C31N...C50N	VW3 AE 0806	26.000
		EXA●C50N...C80N	VW3 AE 0820 ²⁾	38.000
		EXA●C90N...M15N	VW3 AE 0822	69.000
	with line reactor	EXA●C50N...C80N	VW3 AE 0820 ²⁾	38.000
		EXA●C90N...M15N	VW3 AE 0824	78.000
	²⁾ When using a line reactor and a line contactor the option VW3 AE 0821 (40.000 kg) has to be used instead of the option VW3 AE 0820.			
Additional enclosure plinth for cable entry via the top	Without motor choke	EXC●D90N...C25N	VW3 AE 0807	9.000
		EXC●C31N...C50N	VW3 AE 0808	18.000
		EXA●C50N...C80N	VW3 AE 0825	9.000
		EXA●C90N...M15N	VW3 AE 0826	11.000
	With motor choke	EXC●D90N...C25N	VW3 AE 0807	9.000
		EXC●C31N...C50N	VW3 AE 0809	9.000
		EXA●C50N...C80N	VW3 AE 0825	9.000
		EXA●C90N...M15N	VW3 AE 0826	11.000
Additional enclosure plinth for braking unit		EXC●C16N...C50N	VW3 AE 0810	9.000
Plinth equipped with a fine mesh grille		EXS5D90N...C13N	VW3 AE 0812	2.000
		EXS5C16N...C25N	VW3 AE 0813	3.000
		EXS5C31N...C50N	VW3 AE 0815	5.000
Air conditioning	Without motor choke	EXS5D90N...C13N	VW3 AE 0919	56.000
		EXS5C16N...C25N	VW3 AE 0920	71.000
		EXS5C31N...C50N	VW3 AE 0921	86.000
	With motor choke	EXS5D90N...C13N	VW3 AE 0922	71.000
		EXS5C16N...C25N	VW3 AE 0923	71.000
		EXS5C31N...C50N	VW3 AE 0924	86.000

Inverters in standard enclosures for 690 V networks

The basic equipment contains:



- Frequency inverter ATV71 with integrated EMC filter
- Mains connection on main switch
- Main switch (without door handle)
- Superfast semiconductor fuses for inverter protection
- Line reactor
For ATV71EXA●●●Y the line reactor is available as option.
- LCD operating panel (mounted into the enclosure door)
- Terminals/bars for motor connection
- Control transformer for 400 V and 230 V to supply the cooling system as well as optional components.
- Protection degree IP23:
air inlet through the enclosure door, air outlet through the enclosure roof.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid in the enclosure door.
- Protection degree IP54:
air inlet through the enclosure door, air outlet through fan on the top.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid with filter in the enclosure door.
- Protection degree IP54 with separated air flow:
air flow through the plinth of the enclosure and mounted air guidance hood. Cooling of the control part by means of filter fans in the enclosure door.
- Inflow coolant temperature 0...40°C
(up to 50°C with derating)
- Enclosure Sarel S6000, color RAL 7032
- Multilingual operating instructions
- Documentation-CD-ROM with parameterization instructions, fieldbus instructions, operating and parameterizing software,...
- Enclosure layout plans consisting of circuit diagram, terminal connection table, list of materials and design drawing

Description

Altivar 71 Plus

ATV71EX●●●●●Y

Mains voltage 690 V

Technical data	
Input	
Voltage	690 V $\pm 10\%$ for TT, TN-C, TN-S or IT networks *)
Frequency	50 / 60 Hz $\pm 5\%$ *)
Overvoltage class	Class III according to EN 50178
*) Technical data and remarks for line supply voltages are given in chapter "Mains conditions", page 21.	
Output	
Control method	Vector-oriented flux control with/without encoder, V/f characteristic, ENA system
Voltage	3 AC 0...100% line supply voltage, dynamic voltage stabilization
Overload	50 % for 60 seconds per 10 minutes, 65 % for 2 seconds
Pulse frequency	2.5 kHz, adjustable from 2...4.9 kHz
Frequency / Base frequency	0.1...500 Hz / 25...500 Hz, adjustable
Short circuit protection	All-pole protected against short circuit and earth fault by means of overcurrent switch-off
Design	Floor-standing enclosure
Cooling	forced
Frequency resolution, digital	0.01 Hz / 50 Hz, frequency stability: $\pm 0.01\%$ / 50 Hz
Speed accuracy	V/f Mode: slip frequency VC without feedback 0.3 x slip frequency VC with feedback 0.01 % of maximum frequency
Mechanical strength	
Mechanical vibration	According to IEC/EN 60068-2-6 1.5 mm at 3...10 Hz, 0.6 g at 10...200 Hz (3M3 according to IEC/EN 60721-3-3)
Shock	According to IEC/EN 60068-2-27 4 g for 11 ms (3M2 according to IEC/EN 60721-3-3)
Ambient conditions	
Operating temperature	0...+40°C (-10...+40°C with enclosure heating) 3K3 according to IEC/EN 60721-3-3 up to +50°C with derating
Storage / Transport temperature	-25...+70°C
Protection degree	alternatively: ATV71EXC2●●●Y ... IP23 ATV71EXC5●●●Y ... IP54 with air intake through filter mats ATV71EXS5●●●Y ... IP54 with separated air flow ATV71EXA2●●●Y ... IP23 with internal cooling circuit ATV71EXA5●●●Y ... IP54 with internal cooling circuit
Environmental class / Humidity	Class 3K3 in accordance with IEC/EN 60721-3-3 / no condensation, max. 95 % relative humidity
Altitude	Up to 1000 m, beyond power decrease of 1 % per 100 m up to 3000 m
Allowed pollution	Pollution degree: for IP23 design: pollution degree 2 according to EN 61800-5-1 for IP54 design: pollution degree 3 according to EN 61800-5-1 Chemical / mechanical classification: 3C2 and 3S2 according to EN 60721-3-3
Protection class	Class 1 according to EN 50178
Standards	
Basic standard	The devices are designed, built and tested on the basis of EN 50178.
EMC immunity	According to EN 61800-3, 1st and 2nd environment (IEC 1000-4-2; IEC 1000-4-3; IEC 1000-4-4; IEC 1000-4-5; IEC 1000-4-6)
EMC emission	In accordance with product standard EN 61800-3, 2nd environment, category C3
Insulation	Galvanic insulation in accordance with EN 50178 PELV (Protective Extra Low Voltage)
Standards	CE



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Protection degree ATV71EXC● and ATV71EXS5

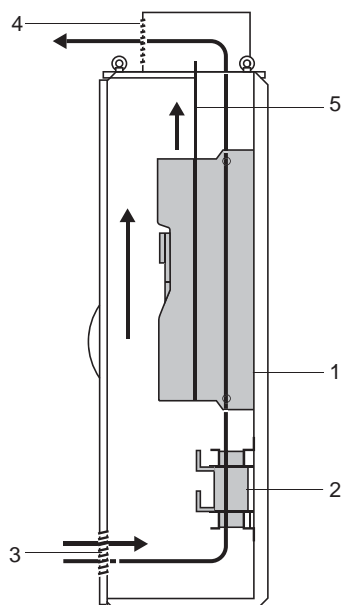
In order to adapt the utmost robust Altivar product line with enclosure design optimal to the individual requests of the system, these enclosure units are available in three different designs. Each solution contains a clearly specified and tested cooling system which provides highest operating safety.

The standard design of the ATV71 enclosure units complies with protection degree IP23. If a higher protection degree is desired or required, there are two IP54 solutions available.

- IP54 with filter mats
- IP54 with separated air flow

Overview of standardised protection degrees

ATV71EXC2 - Standard enclosure design IP23



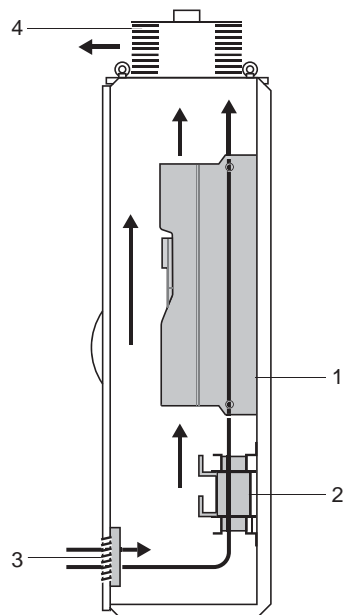
In this case the input of the cooling air takes place by the enclosure door and the output through the top of the enclosure. The air flow must not be constrained by means of fixtures or filter mats.

- 1 Frequency inverter ATV71
- 2 Line reactor
- 3 Air inlet grid (without filter mat) for control part and power part
- 4 Metal cover with splash water protection
- 5 Guided air flow to avoid internal air short-cuts

Protection degree: IP23

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV71EXC5 - Enclosure design IP54



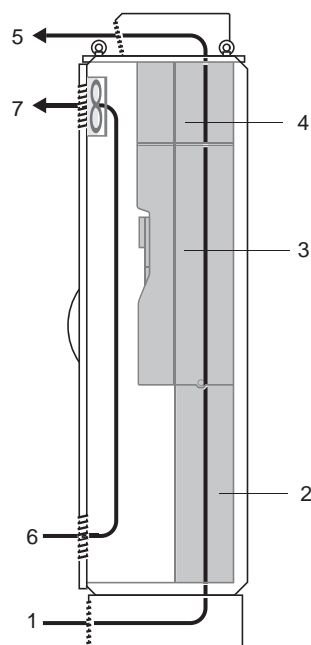
At protection degree IP54 with filter mats the input of the cooling air takes place through the filter mats in the enclosure door and the output through the fan at the top of the enclosure.

- 1 Frequency inverter ATV71
- 2 Line reactor
- 3 Air inlet grid (with filter mat)
- 4 Fan (with filter mat)

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV71EXS5 - Enclosure design IP54 with separated air flow



In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door or by an optional air condition.

- 1 Cooling air for power part (via enclosure plinth)
- 2 Air guidance channel
- 3 Frequency inverter ATV71
- 4 DC choke
(at ATV71EXS5●●●N and ATV71EXS5●●●Y instead of the DC choke a line reactor is delivered in a separate supply field)
- 5 Air outlet through metal grid with splash water protection
- 6 Air inlet (with filter mat) for control part
- 7 Air outlet (with filter fan) for control part

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

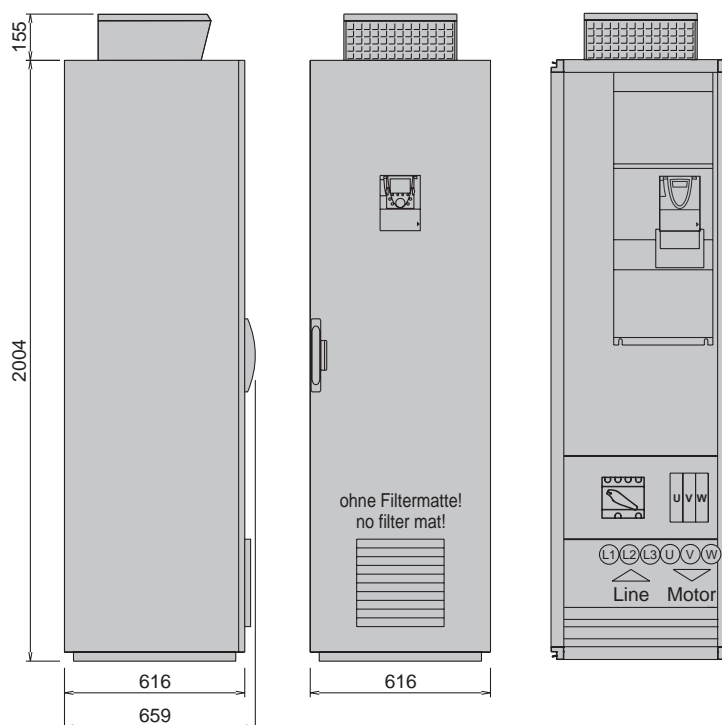
Technical data ATV71EXC● and ATV71EXS5

Type		ATV71EX●● C11Y	C13Y	C16Y
Built-in standard device		ATV71HC11Y	ATV71HC13Y	ATV71HC16Y
Nominal data				
Motor rating				
P_N [kW]	$V_N = 690\text{ V}$	110	132	160
Continuous output current				
I_N [A]	$V_N = 690\text{ V}$	125	150	180
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 690\text{ V}$	188	225	270
Input				
Input current				
I_{IN} [A]	$V_N = 690\text{ V}$	117	137	163
Continuous apparent power				
S_N [kVA]	$V_N = 690\text{ V}$	140	164	195
Braking unit				
P_{CONT}/P_{MAX} [kW]		110/165	132/198	160/240
R_{MIN}/R_{MAX} [Ω]		4	4	4
Characteristics				
Efficiency [%]		97.5	97.6	97.6
Losses [W]	at I_N	2740	3250	3880
Weight net/gross [kg]				
ATV71EXC2●●●Y		325/365	375/415	375/415
ATV71EXC5●●●Y		320/360	370/410	370/410
ATV71EXS5●●●Y		385/435	435/485	435/485
Ambient conditions				
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	600 / 600 / 600	600 / 600 / 600	600 / 600 / 600
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	64 / 65 / 64	64 / 65 / 64	64 / 65 / 64
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

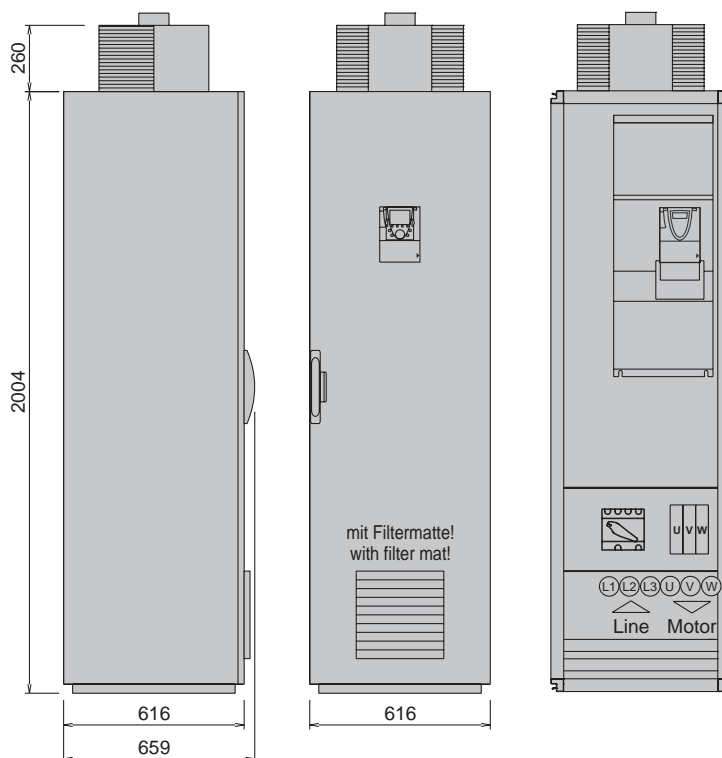
Dimensions: IP23CV Compact version

ATV71EXC2C11Y ... C16Y



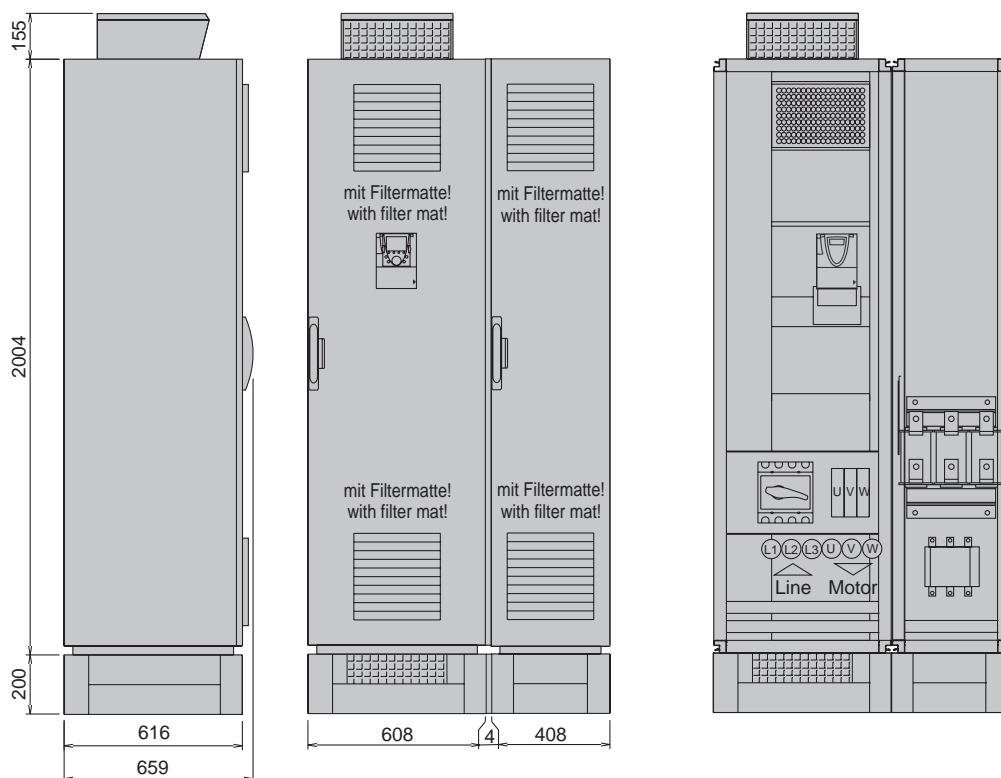
Dimensions: IP54CV Compact version

ATV71EXC2C11Y ... C16Y



Dimensions: IP54SA with separated air flow

ATV71EXC2C11Y ... C16Y



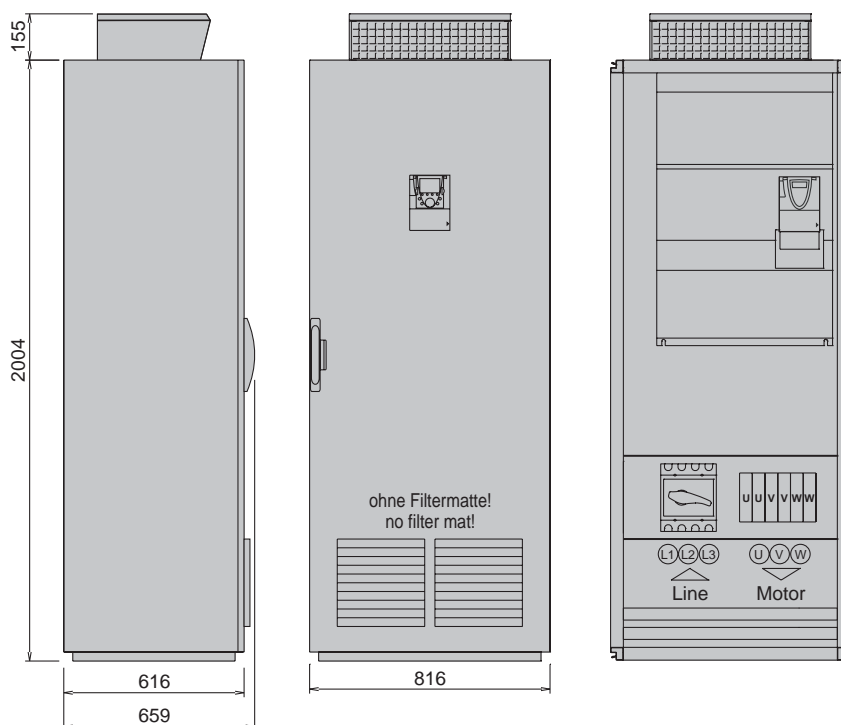
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV71EX●●	C20Y	C25Y	C31Y
Built-in standard device	ATV71HC20Y	ATV71HC25Y	ATV71HC31Y	
Nominal data				
Motor rating				
P_N [kW]	$V_N = 690\text{ V}$	200	250	315
Continuous output current				
I_N [A]	$V_N = 690\text{ V}$	220	290	355
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 690\text{ V}$	330	435	533
Input				
Input current				
I_{IN} [A]	$V_N = 690\text{ V}$	212	256	317
Continuous apparent power				
S_N [kV]	$V_N = 690\text{ V}$	253	306	379
Braking unit				
P_{CONT}/P_{MAX} [kW]		200/300	250/375	315/473
R_{MIN}/R_{MAX} [Ω]		2	2	2
Characteristics				
Efficiency [%]		97.7	97.7	97.7
Losses [W]	at I_N	4640	5950	7310
Weight net/gross [kg]				
ATV71EXC2●●●Y		455/500	505/550	505/550
ATV71EXC5●●●Y		455/500	505/550	505/550
ATV71EXS5●●●Y		515/570	565/620	565/620
Ambient conditions				
Volume of cooling air [m³/h]	EXC2 / EXC5 / EXS5	1200 / 1200 / 1200	1200 / 1200 / 1200	1200 / 1200 / 1200
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	66 / 68 / 72	66 / 68 / 72	66 / 68 / 72
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

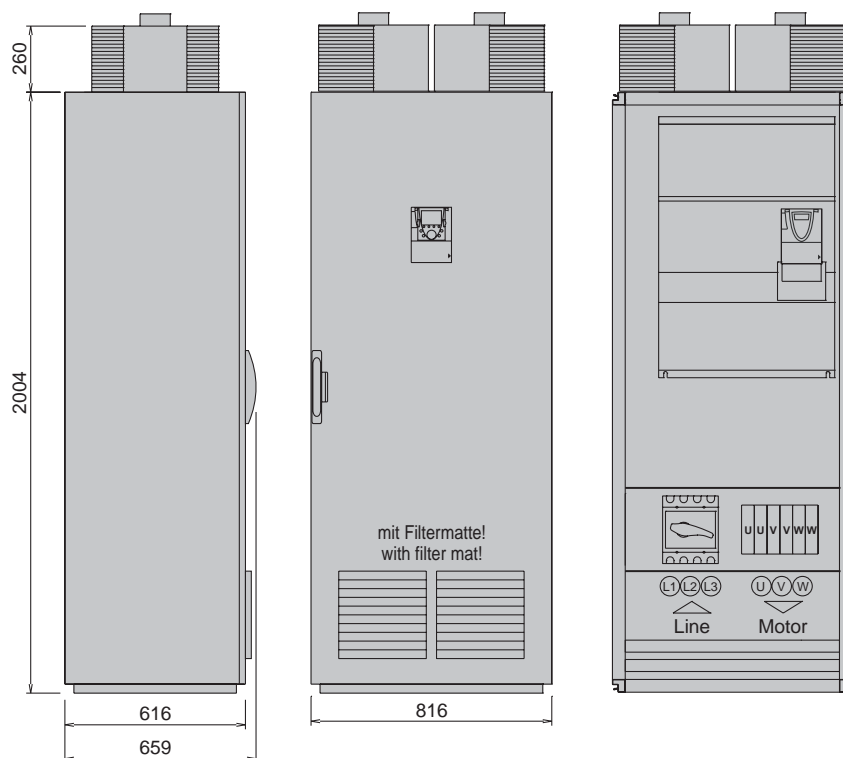
Dimensions: IP23CV Compact version

ATV71EXC2C20Y ... C31Y



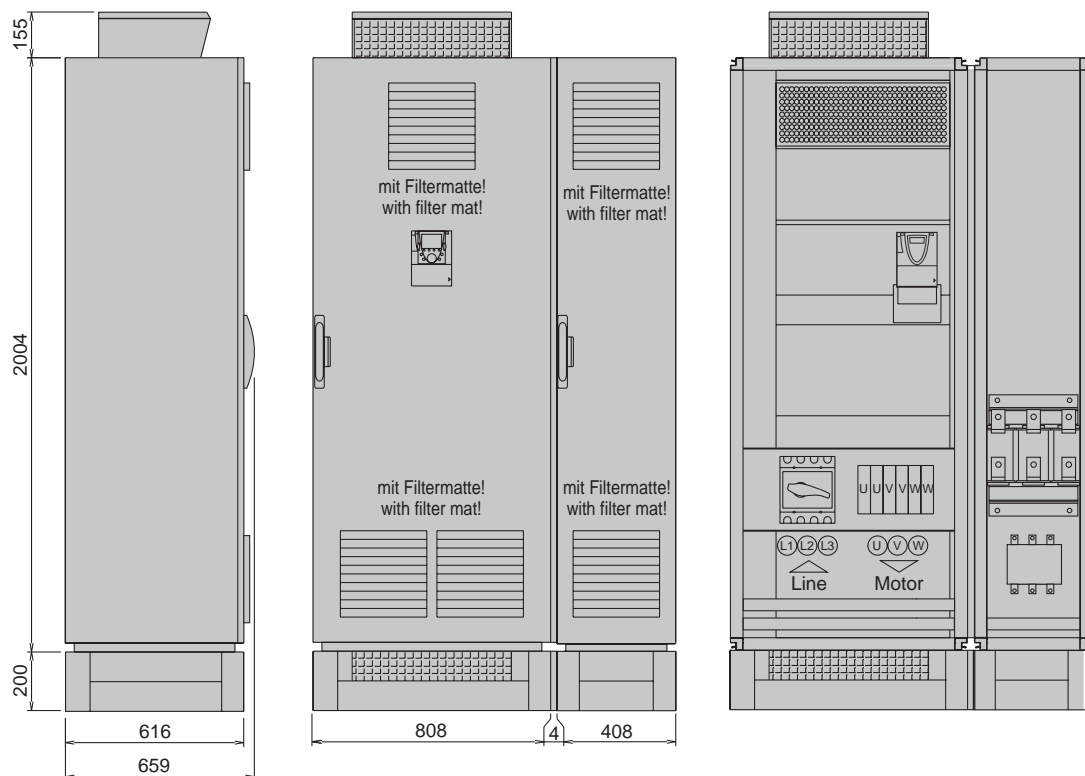
Dimensions: IP54CV Compact version

ATV71EXC2C20Y ... C31Y



Dimensions: IP54SA with separated air flow

ATV71EXC2C20Y ... C31Y



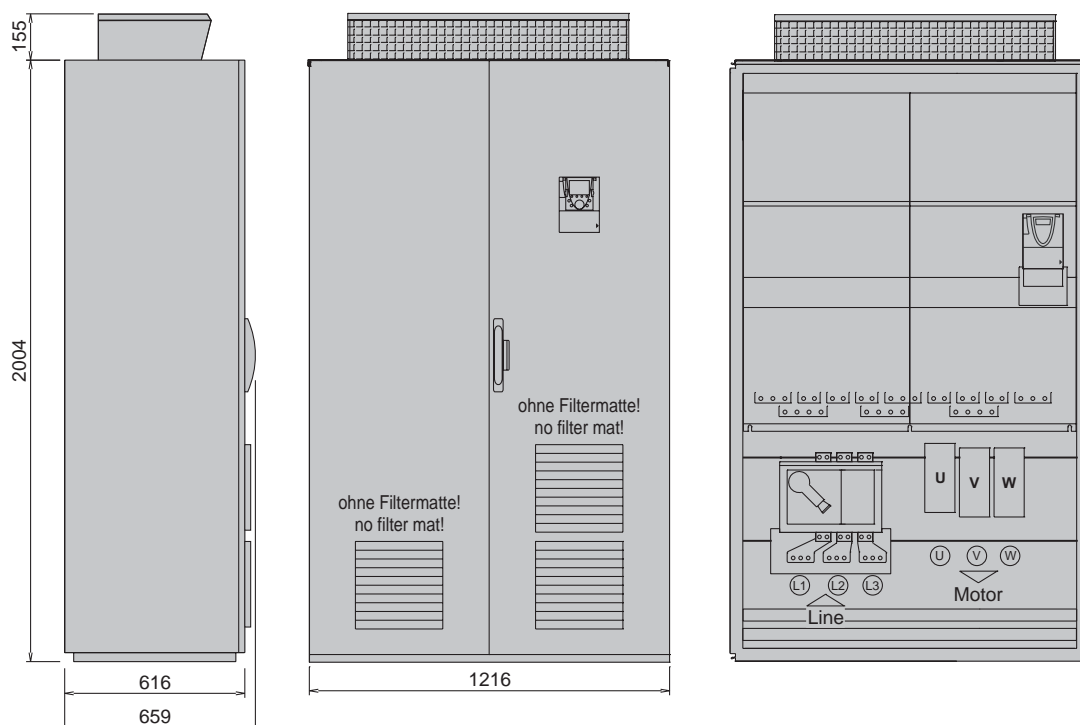
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV71EX●●	C40Y	C50Y	C63Y
Built-in standard device	ATV71HC40Y	ATV71HC50Y	ATV71HC63Y	
Nominal data				
Motor rating				
P_N [kW]	$V_N = 690\text{ V}$	400	500	630
Continuous output current				
I_N [A]	$V_N = 690\text{ V}$	420	543	675
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 690\text{ V}$	630	815	1013
Input				
Input current				
I_{IN} [A]	$V_N = 690\text{ V}$	409	498	616
Continuous apparent power				
S_N [kV]	$V_N = 690\text{ V}$	489	595	736
Braking unit				
P_{CONT}/P_{MAX} [kW]		400/600	500/750	630/945
R_{MIN}/R_{MAX} [Ω]		1	1	1
Characteristics				
Efficiency [%]		97.8	97.8	97.8
Losses [W]	at I_N	8900	11230	13960
Weight net/gross [kg]				
ATV71EXC2●●●Y		770/825	860/915	860/915
ATV71EXC5●●●Y		800/855	890/945	890/945
ATV71EXS5●●●Y		845/910	935/1000	935/1000
Ambient conditions				
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	2400 / 2400 / 2400	2400 / 2400 / 2400	2400 / 2400 / 2400
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	69 / 79 / 73	69 / 79 / 73	69 / 79 / 73
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

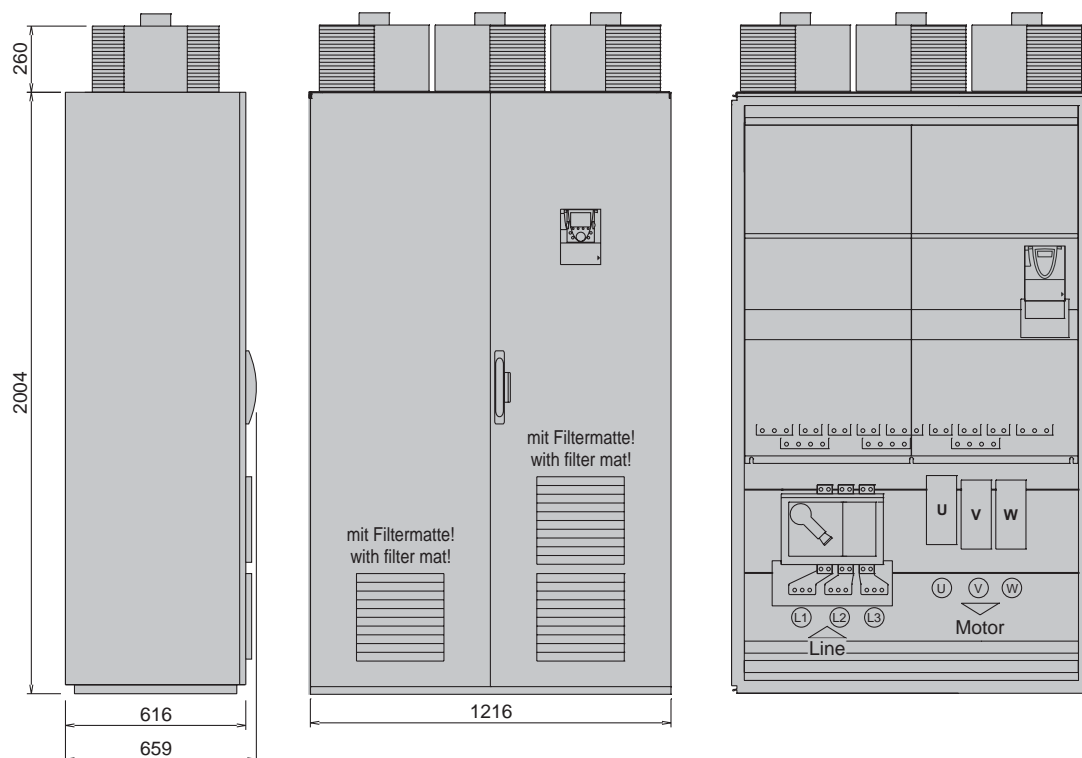
Dimensions: IP23CV Compact version

ATV71EXC2C40Y ... C63Y



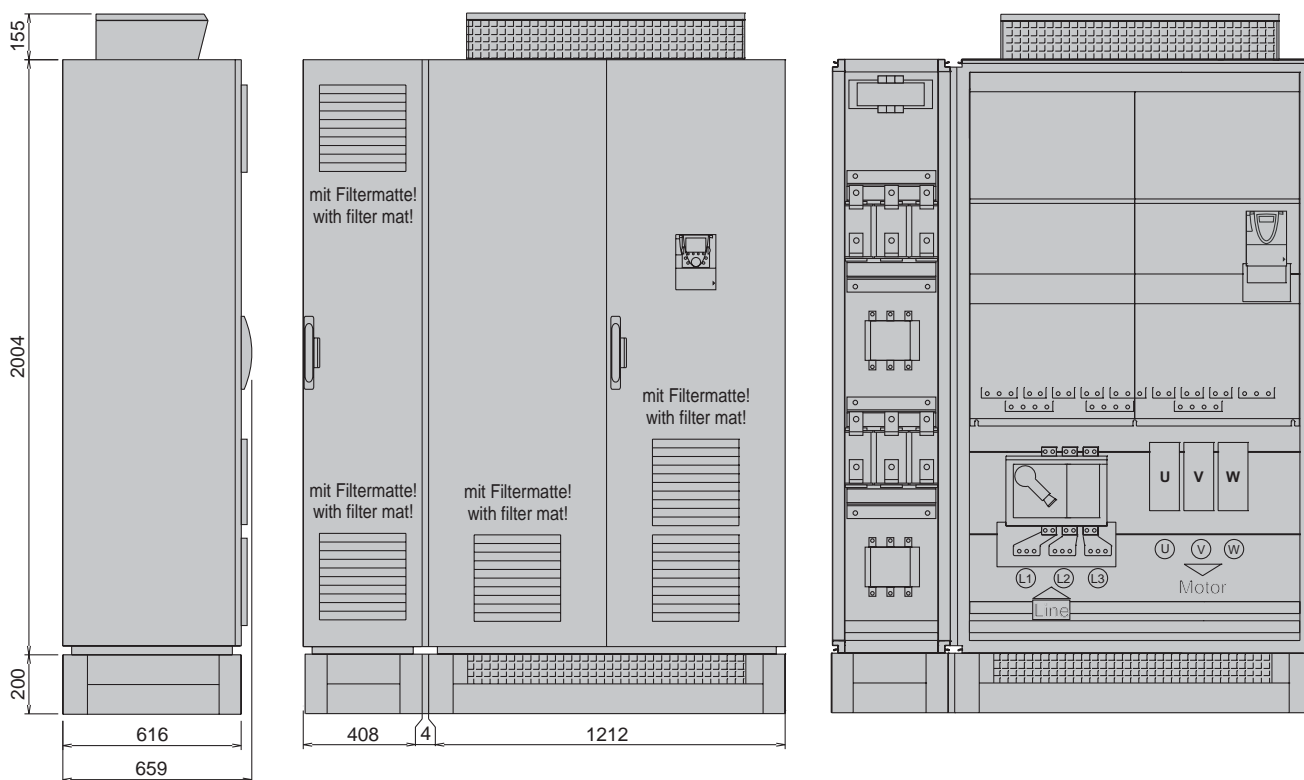
Dimensions: IP54CV Compact version

ATV71EXC2C40Y ... C63Y



Dimensions: IP54SA with separated air flow

ATV71EXC2C40Y ... C63Y

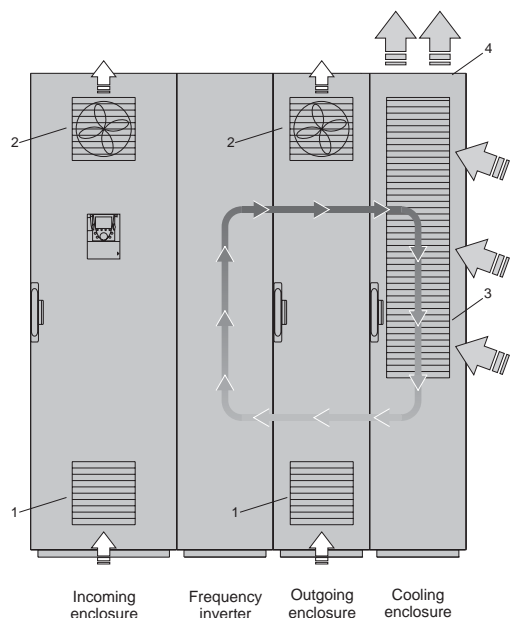


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Protection degree ATV71EXA●

Overview of available protection degrees

ATV71EXA2 - Enclosure design IP23 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by fans in the enclosure door.

1 Air inlet grid

2 Air outlet with fans

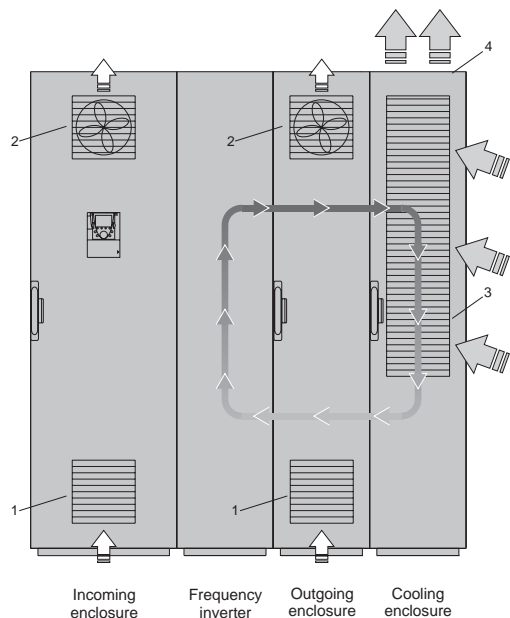
3 Air inlet grid with fans for power part

4 Air outlet grid for power part

Protection degree: IP23

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

ATV71EXA5 - Enclosure design IP54 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

1 Air inlet grid with filter mats

2 Air outlet with filter fans

3 Air inlet grid with fans for power part

4 Air outlet grid for power part

Protection degree: IP54

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

Technical data ATV71EXA●				
Type		ATV71EXA● C63Y	C80Y	M10Y
Internal inverter unit		ATV71EC63YE1	ATV71EC80YE1	ATV71EM10YE1
Nominal data				
Motor rating				
P_N [kW]	$V_N = 690\text{ V}$	630	800	1000
Continuous output current				
I_N [A]	$V_N = 690\text{ V}$	675	840	1010
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 690\text{ V}$	1012	1260	1515
Input				
Input current				
I_{IN} [A]	$V_N = 690\text{ V}$	654	844	1023
Continuous apparent power				
S_N [kVA]	$V_N = 690\text{ V}$	782	1009	1223
Characteristics				
Efficiency [%]		> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	12.7	15.8	19.2
Weight net/gross [kg]		900/950	900/950	900/950
Ambient conditions				
Volume of cooling air [m³/h]		5500	5500	5500
Sound pressure level [dB(A)]		77	77	77
Mains short circuit current [kA] *)		100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions:

ATV71EXA●C63Y, C80Y, M10Y

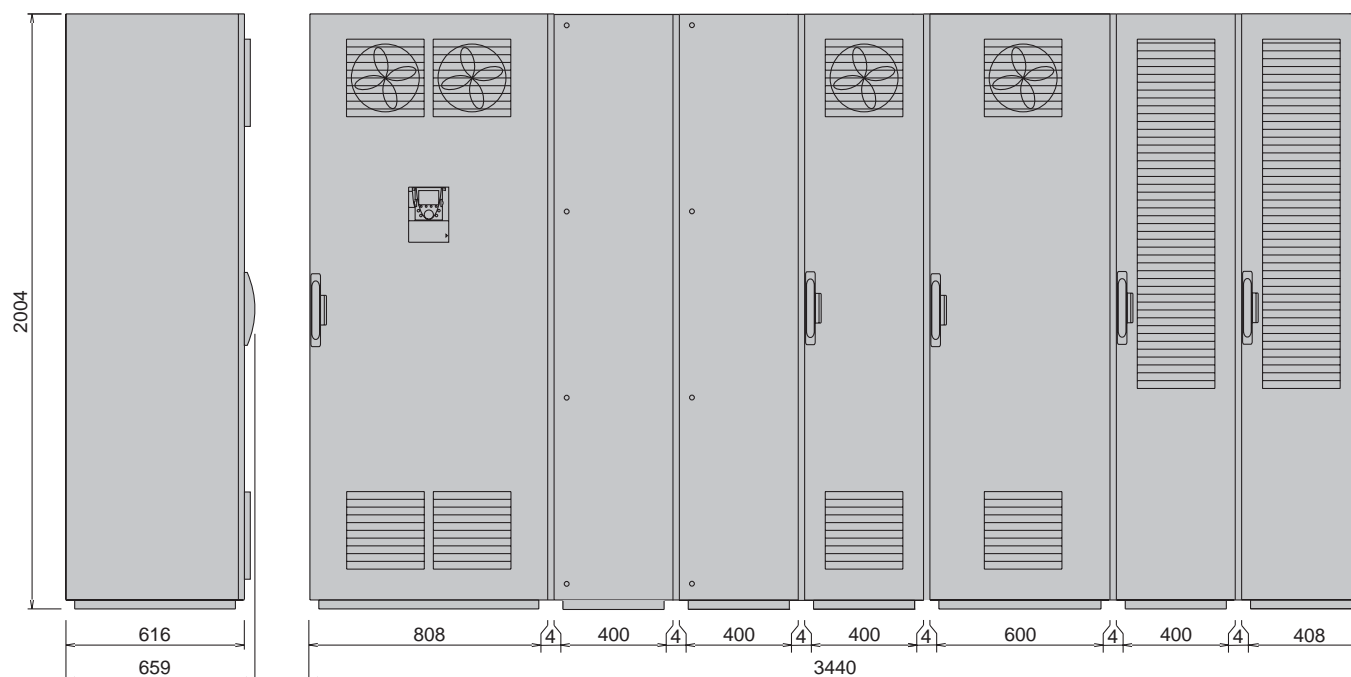


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV71EXA●	M12Y	M15Y	M18Y	M20Y
Internal inverter unit	ATV71EM12YE1	ATV71EM15YE1	ATV71EM18YE1	ATV71EM20YE1	
Nominal data					
Motor rating					
P_N [kW]	$V_N = 690$ V	1200	1500	1800	2000
Continuous output current					
I_N [A]	$V_N = 690$ V	1260	1580	1860	2020
Maximum current for 60 s per 10 minutes					
I_{MAX} [A]	$V_N = 690$ V	1890	2370	2790	3030
Input					
Input current					
I_{IN} [A]	$V_N = 690$ V	1209	1514	1793	1972
Continuous apparent power					
S_N [kVA]	$V_N = 690$ V	1445	1809	2143	2357
Characteristics					
Efficiency [%]		> 98.0	> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	23.8	29.5	35.0	38.2
Weight net/gross [kg]		1850/1925	1850/1925	1850/1925	1850/1925
Ambient conditions					
Volume of cooling air [m³/h]		11000	11000	11000	11000
Sound pressure level [dB(A)]		79	79	79	79
Mains short circuit current [kA] *)		100	100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV71EXA●M12Y, M15Y, M18Y, M20Y

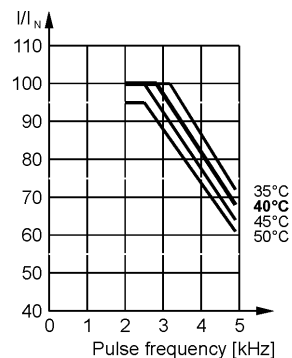


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

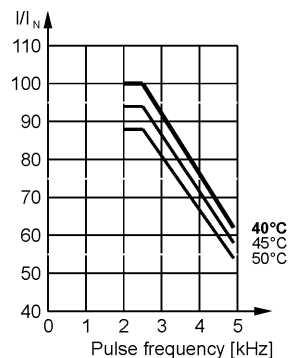
Power decrease

Depending on the chosen pulse frequency and the maximum ambient temperature a power increase is possible or a power reduction is necessary. This can be determined by means of the following diagrams.

ATV 71EX●●C11Y ... EX●●C63Y



ATV 71EXA●C63Y ... EXA●M20Y



Please observe the following guidelines to guarantee trouble-free operation of the drive:

- At higher pulse frequencies the allowed motor cable length is reduced (see chapter "Motor cable lengths").
- Select a motor that is at most one type bigger.



If the heat sink temperature is too high, the pulse frequency is automatically reduced to prevent an overload of the inverter.

Fuses and cable cross sections

The Altivar enclosure designs have input fuses built-in as standard. These fuses are for the case that the electronic protective mechanism of the inverter fails. So they are a secondary protection of the inverter to protect the power cables against overload and to protect the input rectifier against an internal short-circuit.

The below-mentioned diameters for 3-wire cables are recommended values for laying the cable in air at max. 40°C ambient temperature, based on the regulations ÖVN EN 1 and VDE 0100.

The lines in the enclosure are dimensioned according to the specification for single conductors XLPE/EPR copper 90°C.

The motor cables are dimensioned for the maximum continuous current. They apply to 0...100 Hz (up to 300 Hz the cable losses increase about 25 % because of the Skin-effect).



In case of other ambient conditions and different regulations the cable diameters must be adjusted.



If the mains fuses blow the inverter already has a primary defect. Therefore, exchanging the blown fuses and switching the inverter on again is not effective. Consequently, the use of circuit breakers is not advantageous and has additionally the disadvantage of a slower switch-off.



A low cost alternative to screened motor cables is the use of NYCY or NYCWY cables (power cables with concentric protective conductor).



The dimensioning of the pre-fuses, mains cable cross sections and mains cable length has to be done taking into account the available mains short circuit current to ensure a safe switch-off in case of a fault!

If required increase the power of the transformer to reach the necessary short circuit capability.

Cable cross sections at standard design									
		Mains supply				Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)		Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV71EX●● (6-pulse)	C11Y	3	200A	1x (3x 95)	2x 120 (M8)	200 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 70)
	C13Y	3	200A	1x (3x 95)	2x 120 (M8)	200 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 70)
	C16Y	3	250A	1x (3x 150)	2x 185 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 95)
	C20Y	3	315A	2x (3x 95)	3x 185 (M12)	315 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 120)
	C25Y	3	400A	2x (3x 150)	3x 185 (M12)	400 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 70)
	C31Y	3	500A	2x (3x 150)	3x 185 (M12)	500 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 95)
	C40Y	3	630A	3x (3x 150)	4x 300 (M12)	2x 315 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C50Y	3	800A	4x (3x 150)	4x 300 (M12)	2x 400 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 185)
	C63Y	3	1000A	4x (3x 185)	4x 300 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
ATV71EXA● (6-pulse)	C63Y	3	1000A	5x (3x 150) or 4x (3x 185)	10x 240 (M12)	2x 500 A sf	16x 240 (M12)	16x 240 (M12)	3x (3x 150)
	C80Y	3	1250A	6x (3x 185) or 5x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 150)
	M10Y	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 150)
	M12Y	3	2000A	9x (3x 185) or 8x (3x 240)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M15Y	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M18Y	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M20Y	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 700 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 8x (3x 240)
ATV71EXA● (12-pulse)	C63Y	6	500A	2x [3x (3x 120)] or 2x [2x (3x 185)]	4x 240 (M12)	500 A sf	16x 240 (M12)	16x 240 (M12)	3x (3x 150)
	C80Y	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 150)
	M10Y	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 150)
	M12Y	6	1000A	2x [5x (3x 150)] or 2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M15Y	6	1250A	2x [6x (3x 185)] or 2x [5x (3x 240)]	8x 240 (M12)	2x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M18Y	6	1250A	2x [6x (3x 185)] or 2x [5x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M20Y	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 700 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 8x (3x 240)

1) at IP54 with separated air flow (ATV71EXS5●●●Y)



Differing cable cross sections on request.

Cable cross sections at cable entry above									
		Mains supply				Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)		Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV71EX●●	C11Y	3	200A	1x (3x 95)	2x 150(M10)	200 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 70)
	C13Y	3	200A	1x (3x 95)	2x 150 (M10)	200 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 70)
	C16Y	3	250A	1x (3x 150)	2x 240 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C20Y	3	315A	2x (3x 95)	4x 240 (M12)	315 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 120)
	C25Y	3	400A	2x (3x 150)	4x 240 (M12)	400 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 70)
	C31Y	3	500A	2x (3x 150)	4x 240 (M12)	500 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 95)
	C40Y	3	630A	3x (3x 150)	4x 240 (M12)	2x 315 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C50Y	3	800A	4x (3x 150)	4x 240 (M12)	2x 400 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 185)
	C63Y	3	1000A	4x (3x 185)	4x 240 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
ATV71EXA●	C63Y	3	1000A	5x (3x 150) or 4x (3x 185)	10x 240 (M12)	2x 500 A sf	16x 240 (M12)	16x 240 (M12)	3x (3x 150)
	C80Y	3	1250A	6x (3x 185) or 5x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 150)
	M10Y	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 150)
	M12Y	3	2000A	9x (3x 185) or 8x (3x 240)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M15Y	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M18Y	3	2500A	13x (3x 150) or 11x (3x 185)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M20Y	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 700 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 8x (3x 240)
ATV71EXA● (12-pulse)	C63Y	6	500A	2x [3x (3x 120)] or 2x [2x (3x 185)]	4x 240 (M12)	500 A sf	16x 240 (M12)	16x 240 (M12)	3x (3x 150)
	C80Y	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 150)
	M10Y	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 150)
	M12Y	6	1000A	2x [5x (3x 150)] or 2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M15Y	6	1250A	2x [6x (3x 185)] or 2x [5x (3x 240)]	8x 240 (M12)	2x 550 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M18Y	6	1250A	2x [6x (3x 185)] or 2x [5x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 240)
	M20Y	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 700 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 8x (3x 240)



Differing cable cross sections on request.

Motor cable lengths

Because of the permitted mains disturbances, the allowed overvoltages at the motor, the occurring bearing currents and the permitted losses the distance between inverter and motor(s) is limited. The maximum distance heavily depends on the type of motor cable (screened/unscreened) as well as from the used options.

Overvoltages at the motor

Overvoltages at the motor terminals result from reflection in the motor cable. Basically the motors are stressed with measurable higher voltage peaks from a motor cable length of 50 m. Thereby the motor load is nearly independent from the used inverter !

Line supply voltage 690 V Motor insulation for 2000 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs

In order to use standard motors in this voltage range, the Altivar frequency inverters have a function to inhibit short output voltage pulses. With this function the reflection conditional overvoltages are attenuated. The slew rate as well as the EMC load are not influenced by changing this parameter.

At even longer motor cables the use of a "dv/dt filter" is required. Combined with the cable capacitance the option motor choke affects like a filter and limits the voltage peaks at the motor as well as the slew rate of the output pulses.

When the specified motor cable lengths are observed the motor life time can be significantly extended.

Line supply voltage 690 V max. 1800 V phase-to-phase peak voltage and dv/dt < 1000 V/μs



Observing the specified length of motor cables is absolutely necessary to protect the motor !

EMC interferences

The mains rectifier as well as the IGBT inverter cause high-frequent interferences which drain off more and more stronger to the earth potential with increasing motor cable length. As a result the line-conducted interferences to the mains increase. The attenuation of the line reactors is not longer sufficient and the permitted interference limits are exceeded.



Observing the specified length of motor cables is also necessary for compliance with the EMC limits !

Bearing currents

Common mode bearing currents which even cannot be prevented by means of motors equipped with an insulated bearing are significantly reduced by use of the option motor choke.

Especially in case of big motors with middle up to high motor cable lengths the option motor choke is considerable to increase the availability of the motor.

Multiplication factors



The specified lengths of motor cables are recommended limits based on typical motor cables, laying in cable channels, default pulse frequency and maximal output frequency of 100 Hz.

In case of different conditions the recommended cable lengths must be converted by means of the following factors.

If several factors apply, please multiply them.

- The pulse frequency does not correspond to factory default:
 - at 4 kHz multiply all values by 0.7

- In case of output frequencies higher than 100 Hz:
 - up to 200 Hz multiply all values by 0.8
 - up to 300 Hz multiply all values by 0.5

- Instead of two parallel cables one thicker cable is used: multiply all values by 1.5

- In case of 6-pole motor cabling (e.g. for star/delta starting circuit): multiply all values by 0.75

- In case of parallel motors with their centre near the inverter values must be converted in compliance with the number of motors. When an adjusted motor choke is used for each motor, the following values in brackets apply.
 - at 2 motors multiply all values by 0.40 (0.80)
 - at 3 motors multiply all values by 0.25 (0.60)
 - at 4 motors multiply all values by 0.15 (0.40)
 - at 5 motors multiply all values by 0.10 (0.25)

- If the centre of the parallel motors is near the motors, following factors for conversion apply:
 - at 2 motors multiply all values by 0.80
 - at 3 motors multiply all values by 0.60
 - at 4 motors multiply all values by 0.40
 - at 5 motors multiply all values by 0.25

Recommended maximum lengths of motor cables in 2nd environment (industrial environment)

C3 (EN 55011 - class A group 2)

no option	15 m	screened cable
with motor choke	50 m	screened cable

C4 (EMC concept)

with motor choke	150 m	screened cable
no option	30 m	unscreened cable
with motor choke	250 m	unscreened cable

Available options

To enlarge the field of applications, various options are available concerning control and operation, extensions referring to the electric arrangement and to increase the protection degree.

General enclosure options

Allocation table for options

Option	Brief description	Order number	Weight [kg]	Reference
Inputs/outputs				
Basic I/O extension card	Terminal extension for additional logic inputs and outputs	VW3 A3E 201	0.320	See product catalogue
Extended I/O extension card	Terminal extension for additional analog and logic inputs and outputs	VW3 A3E 202	0.300	See product catalogue
Control terminals X12	Control terminals for the basic inverter	VW3 AE 1201	0.700	Page 143
Control terminals X12, X13	Control terminals for the basic device and the I/O option cards VW3 A3E 201 and 202.	VW3 AE 1202	0.900	Page 143
Adapter for 115 V logic inputs	Enables the use of 115 V logic signals.	VW3 A3E 101	0.200	See product catalogue
Relay output OC	Relay for logic output (Open collector)	VW3 AE 2201	0.100	Page 144
"Controller inside" card	Programmable card for integration of control system functions.	VW3 A3E 501	0.300	See product catalogue
Additional electrical input isolation	Isolated amplifier with optoelectronic potential separation connected to the analog input of the inverter	VW3 AE 1901	0.100	Page 145
Additional electrical output isolation	Isolated Amplifier with optoelectronic potential separation connected to the analog output of the inverter	VW3 AE 1902	0.100	Page 146
Encoder feedback				
Encoder interface card 5 V / RS422	Extension card for encoder feedback. Supply voltage 5 V / RS422	VW3 A3E 401	0.200	See product catalogue
Encoder interface card 15 V / RS422	Extension card for encoder feedback. Supply voltage 15 V / RS422	VW3 A3E 402	0.200	
Encoder interface card 12 V OC	Extension card for encoder feedback. Supply voltage 12 V / open collector output	VW3 A3E 403	0.200	
Encoder interface card 15 V OC	Extension card for encoder feedback. Supply voltage 15 V / open collector output	VW3 A3E 404	0.200	
Encoder interface card 12 V (push-pull)	Extension card for encoder feedback. Supply voltage 12 V / push-pull	VW3 A3E 405	0.200	
Encoder interface card 15 V (push-pull)	Extension card for encoder feedback. Supply voltage 15 V / push-pull	VW3 A3E 406	0.200	
Encoder interface card 24 V (push-pull)	Extension card for encoder feedback. Supply voltage 24 V / push-pull	VW3 A3E 407	0.200	

Allocation table for options				
Option	Brief description	Order number	Weight [kg]	Reference
Fieldbuses (industry)				
Modbus TCP/IP communication card	Option card for control of the inverter via Modbus TCP/IP.	VW3 A3E 310	0.300	See product catalogue
Modbus TCP/IP Daisy Chain communication card	Option card for control of the inverter via Modbus TCP/IP Daisy Chain.	VW3 A3E 310d	0.300	
Ethernet/IP communication card	Option card for control of the inverter via Ethernet/IP.	VW3 A3E 316	0.300	
Fipio communication card	Option card for control of the inverter via Fipio.	VW3 A3E 311	0.300	
Substitution Fipio communication card	Option card for control of the inverter via Fipio. (ATV58, ATV58F compatibility)	VW3 A3E 301	0.300	
Modbus Plus communication card	Option card for control of the inverter via Modbus plus.	VW3 A3E 302	0.300	
DeviceNet communication card	Option card for control of the inverter via DeviceNet.	VW3 A3E 309	0.300	
Interbus communication card	Option card for control of the inverter via Interbus.	VW3 A3E 304	0.300	
CC-Link communication card	Option card for control of the inverter via CC-Link.	VW3 A3E 317	0.300	
Modbus/Uni-Telway communication card	Option card for control of the inverter via Modbus/Uni-Telway.	VW3 A3E 303	0.300	
Profibus DP communication card	Option card for control of the inverter via Profibus DP.	VW3 A3E 307	0.300	
Profibus DPv1 communication card	Option card for control of the inverter via Profibus DPv1.	VW3 A3E 307 S371	0.300	
Safety - monitoring of the motor				
Emergency stop button	This function prevents any unintended start-up of the motor and guarantees the safety of the machine and plant personnel.	VW3 AE 1501	0.100	Page 150
"Preventa type AC" fault relay		VW3 AE 1502	0.100	Page 150
"Preventa type ATE" fault relay		VW3 AE 1503	0.100	Page 150
PTC relay	PTC thermistor relay to monitor the PTC thermistors in the motor	VW3 AE 2001	0.100	Page 147
PTC relay with PTB (ATEX) certification	PTC thermistor relay with PTB certificate to monitor the PTC thermistors in the motor in EX-environments	VW3 AE 2002	0.100	Page 148
Pt100 relay for motor winding	Pt100 relay to monitor Pt100 sensors in the motor winding	VW3 AE 2003	0.300	Page 148
Pt100 relay for motor bearings	Pt100 relay to monitor Pt100 sensors in the motor bearings	VW3 AE 2004	0.300	Page 148
Pt100 relay for transformer	Pt100 relay to monitor Pt100 sensors in the transformer	VW3 AE 2005	0.300	Page 148
Further enclosure options				
Insulation monitoring	Monitors each phase to earth fault (only for IT networks)	VW3 AE 2601	5.000	Page 153
Design for IT networks	The frequency inverter will be prepared for the connection to non-grounded networks (IT networks).	VW3 AE 2701	–	Page 153
External 230V AC supply terminals	Provides the terminals and the protection for an external 230 V supply voltage.	VW3 AE 1301	0.100	Page 154
Additional 24 V DC power supply	24 V DC power supply with fuse protection.	VW3 AE 1401	2.200	Page 155
External 24 V DC supply terminals	Provides the terminals and the protection for an external 24 V buffer voltage.	VW3 AE 1402	0.100	Page 155
Enclosure lighting	Fluorescent lamp and a power socket 230V AC	VW3 AE 1601	1.500	Page 156
Key switch (Local / Remote)	Key switch in the enclosure door for switching between terminals/bus and local operation	VW3 AE 1801	0.200	Page 157
Motor heater	Includes a motor circuit breaker, a contactor and the terminals to connect a motor heating	VW3 AE 2101	0.200	Page 156
External motor fan	Includes a motor circuit breaker, a contactor and the terminals to connect an external motor fan	VW3 AE 2102	0.200	Page 157
Voltmeter 400 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2301	0.400	Page 157
Voltmeter 500 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2302	0.400	Page 157
Voltmeter 690 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2303	0.400	Page 157

Enclosure options depending on the power		
Option	Brief description	Reference
Braking unit	Limits the DC-voltage at generator operation	Page 159
Isolating handle for switch	Enables handling without opening the enclosure door	Page 160
Circuit breaker	Provides a safe switching-off at overload	Page 161
Door handle for circuit breaker	Enables handling without opening the enclosure door	Page 162
Undervoltage coil 230 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 162
Undervoltage coil 110 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 163
230 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 163
110 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 164
Line contactor	Used for the function "line contactor control" to disconnect the drive from the mains	Page 165
12-pulse supply	Contains the components for 12-pulse supply	Page 166
Line reactor	Is used for reduction of harmonics	Page 167
Ammeter	Measuring instrument built-in in the enclosure door, which indicates the line current.	Page 168
Enclosure heater	Heats the enclosure to avoid frost and condensation up to an ambient temperature of -10°C	Page 169
Motor choke	Reduces the slew rate on the output of the inverter to protect the motor	Page 170
Cable entry via the top	Allows connection of the line and the motor cables from above	Page 172
Enclosure plinth	200 mm plinth	Page 174
Plinth equipped with a fine mesh grille	Grill for the front side of the plinth of the enclosure	Page 176
Air conditioning	Cools the power losses of the control part to avoid filter mats in the enclosure door	Page 176

Allocation table for options depending on the power			
Description	ATV71	Order number	Weight [kg]
Braking unit	EXC●C20Y...C31Y	VW3 AE 1004	190.000
	EXS5C20Y...C31Y	VW3 A7E 103	205.000
	EXC●C40Y...C63Y	VW3 AE 1005	190.000
	EXS5C40Y...C63Y	VW3 A7E 104	205.000
Isolating handle for switch	EX●●C11Y...C16Y	VW3 AE 0103	1.000
	EX●●C20Y...C31Y	VW3 AE 0104	2.000
	EX●●C40Y...C63Y	VW3 AE 0105	2.000
	EXA●C63Y...M20Y	VW3 AE 0105	2.000
Circuit breaker	EXC●C11Y, C13Y	VW3 AE 0143	4.000
	EXC●C16Y	VW3 AE 0145	4.000
	EXC●C20Y	VW3 AE 0146	1.400
	EXC●C25Y...C31Y	VW3 AE 0147	1.400
	EXC●C40Y...C63Y	VW3 AE 0150	–
	EXA●C63Y	VW3 AE 0151	–
	EXA●C80Y	VW3 AE 0169	–
	EXA●M10Y	VW3 AE 0170	–
	EXA●M12Y	VW3 AE 0175	–
	EXA●M15Y	VW3 AE 0171	–
	EXA●M18Y	VW3 AE 0172	–
	EXA●M20Y	VW3 AE 0173	–
Door handle for circuit breaker	EX●●C11Y...C31Y	VW3 AE 0115	2.000
	EX●●C40Y...C63Y	VW3 AE 0116	2.000
	EXA●C63Y...M10Y	VW3 AE 0116	2.000
	EXA●M12Y...M20Y	–	–
Undervoltage coil 230 V	EX●●C11Y...C31Y	VW3 AE 0117	0.500
	EX●●C40Y...C63Y	VW3 AE 0118	0.500
	EXA●C63Y...M20Y	VW3 AE 0118	0.500
Undervoltage coil 110 V	EX●●C11Y...C63Y	VW3 AE 0119	0.500
	EX●●C40Y...C63Y	VW3 AE 0120	0.500
	EXA●C63Y...M20Y	VW3 AE 0120	0.500

Allocation table for options depending on the power

Description	ATV71	Order number	Weight [kg]
230 V motor for circuit breaker	EX●●C11Y...C20Y	VW3 AE 0156	3.000
	EX●●C25Y...C31Y	VW3 AE 0157	3.000
	EX●●C40Y...C63Y	VW3 AE 0158	7.000
	EXA●C63Y	VW3 AE 0159	7.000
	EXA●C80Y	VW3 AE 0176	7.000
	EXA●M10Y	VW3 AE 0177	7.000
	EXA●M12Y...M20Y	–	–
110 V motor for circuit breaker	EX●●C11Y...C20Y	VW3 AE 0162	3.000
	EX●●C25Y...C31Y	VW3 AE 0163	3.000
	EX●●C40Y...C63Y	VW3 AE 0164	7.000
	EXA●C63Y	VW3 AE 0165	7.000
	EXA●C80Y	VW3 AE 0179	7.000
	EXA●M10Y	VW3 AE 0180	7.000
	EXA●M12Y...M20Y	–	–
Line contactor	EX●●C11Y...C16Y	VW3 AE 0218	10.000
	EX●●C20Y	VW3 AE 0208	11.000
	EX●●C25Y	VW3 AE 0209	12.000
	EX●●C31Y	VW3 AE 0210	14.000
	EX●●C40Y	VW3 AE 0219	22.000
	EX●●C50Y	VW3 AE 0212	24.000
	EX●●C63Y	VW3 AE 0213	28.000
	EXA●C63Y...M10Y	VW3 AE 0227 ¹⁾	42.000
	EXA●M12Y...M20Y	VW3 AE 0226	84.000
¹⁾ When this option is used together with a line reactor, the option VW3 AE 0225 (50.000 kg) must be ordered additionally!			
12-pulse supply	EXA●C63Y	VW3 AE 2414	–
	EXA●C80Y	VW3 AE 2415	–
	EXA●M10Y	VW3 AE 2416	–
	EXA●M12Y	VW3 AE 2417	–
	EXA●M15Y	VW3 AE 2418	–
	EXA●M18Y	VW3 AE 2419	–
	EXA●M20Y	VW3 AE 2420	–
Line reactor	EXA●C63Y	VW3 AE 2504	154.000
	EXA●C80Y	VW3 AE 2505	121.000
	EXA●M10Y	VW3 AE 2506	136.000
	EXA●M12Y	VW3 AE 2507	308.000
	EXA●M15Y, M18Y	VW3 AE 2508	242.000
	EXA●M20Y	VW3 AE 2509	273.000
Ammeter	EX●●C11Y	VW3 AE 0404	0.200
	EX●●C13Y...C25Y	VW3 AE 0406	0.200
	EX●●C31Y, C40Y	VW3 AE 0426	0.200
	EX●●C50Y, C63Y	VW3 AE 0409	0.200
	EXA●C63Y	VW3 AE 0409 (6p) VW3 AE 0428 (12p)	0.200
	EXA●C80Y	VW3 AE 0427 (6p) VW3 AE 0421 (12p)	0.200
	EXA●M10Y	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200
	EXA●M12Y	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200
	EXA●M15Y	VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200
	EXA●M18Y, M20Y	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200

Allocation table for options depending on the power				
Description	ATV71		Order number	Weight [kg]
Enclosure heater	EX●●C11Y...C31Y		VW3 AE 0501	0.500
	EX●●C40Y...C63Y		VW3 AE 0502	1.000
	EXA●C63Y...M10Y		VW3 AE 0502	1.000
	EXA●M12Y...M20Y		VW3 AE 0503	1.500
Motor choke	EX●●C11Y, C13Y		VW3 AE 0603	17.000
	EX●●C16Y, C20Y		VW3 AE 0604	35.000
	EX●●C25Y, C31Y		VW3 AE 0605	64.000
	EXC2C40Y, C50Y		VW3 AE 0626	192.000
	EXC5C40Y, C50Y		VW3 AE 0628	192.000
	EXS5C40Y, C50Y		VW3 AE 0630	197.000
	EXC2C63Y		VW3 AE 0627	234.000
	EXC5C63Y		VW3 AE 0629	234.000
	EXS5C63Y		VW3 AE 0631	234.000
	EXA●C63Y...M10Y		VW3 AE 0635	132.000
	EXA●M12Y...M20Y		VW3 AE 0636	264.000
Cable entry via the top	Without motor choke	EXC●C11Y...C16Y	VW3 AE 0728	108.000
		EXS5C11Y...C16Y	VW3 AE 0732	–
		EXC●C20Y...C31Y	VW3 AE 0729	126.000
		EXS5C20Y...C31Y	VW3 AE 0733	–
		EXC●C40Y...C63Y	VW3 AE 0730	252.000
		EXS5C40Y...C63Y	VW3 AE 0734	252.000
		EXA●C63Y...M10Y	VW3 AE 0740	126.000
		EXA●M12Y...M20Y	VW3 AE 0741	150.000
	With motor choke	EXC●C11Y...C16Y	VW3 AE 0728	108.000
		EXS5C11Y...C16Y	VW3 AE 0735	108.000
		EXC●C20Y...C31Y	VW3 AE 0729	126.000
		EXS5C20Y...C31Y	VW3 AE 0736	126.000
		EXC●C40Y...C63Y	VW3 AE 0731	126.000
		EXS5C40Y...C63Y	VW3 AE 0737	252.000
		EXA●C63Y...M10Y	VW3 AE 0740	126.000
		EXA●M12Y...M20Y	VW3 AE 0741	150.000
Enclosure plinth 200 mm	No option	EXC●C11Y...C16Y	VW3 AE 0801	11.000
		EXC●C20Y...C31Y	VW3 AE 0802	13.000
		EXC●C40Y...C63Y	VW3 AE 0804	17.000
		EXA●C63Y...M10Y	VW3 AE 0820 ²⁾	38.000
		EXA●M12Y...M20Y	VW3 AE 0822	69.000
	With motor choke	EXC●C11Y...C16Y	VW3 AE 0801	11.000
		EXC●C20Y...C31Y	VW3 AE 0802	13.000
		EXC●C40Y...C63Y	VW3 AE 0806	26.000
		EXA●C63N...M10N	VW3 AE 0820 ²⁾	38.000
		EXA●M12Y...M20Y	VW3 AE 0822	69.000
	with line reactor	EXA●C63Y...M10Y	VW3 AE 0820 ²⁾	38.000
		EXA●M12Y...M20Y	VW3 AE 0824	78.000

²⁾ When using a line reactor and line contactor the option VW3 AE 0821 (40.000 kg) has to be used instead of the option VW3 AE 0820.

Allocation table for options depending on the power

Description	ATV71	Order number	Weight [kg]
Additional enclosure plinth for cable entry via the top	Without motor choke	EXC●C11Y...C31Y	9.000
		EXC●C40Y...C63Y	18.000
		EXA●C63Y...M10Y	9.000
		EXA●M12Y...M20Y	11.000
	With motor choke	EXC●C11Y...C31Y	9.000
		EXC●C40Y...C63Y	9.000
		EXA●C63Y...M10Y	9.000
		EXA●M12Y...M20Y	11.000
Additional enclosure plinth for braking unit	EXC●C20Y...C63Y	VW3 AE 0810	9.000
Plinth equipped with a fine mesh grille	EXS5C11Y...C16Y	VW3 AE 0812	2.000
	EXS5C20Y...C31Y	VW3 AE 0813	3.000
	EXS5C40Y...C63Y	VW3 AE 0815	5.000
Air conditioning	Without motor choke	EXS5C11Y...C16Y	56.000
		EXS5C20Y...C31Y	71.000
		EXS5C40Y...C63Y	86.000
	With motor choke	EXS5C11Y...C16Y	71.000
		EXS5C20Y...C31Y	71.000
		EXS5C40Y...C63Y	86.000

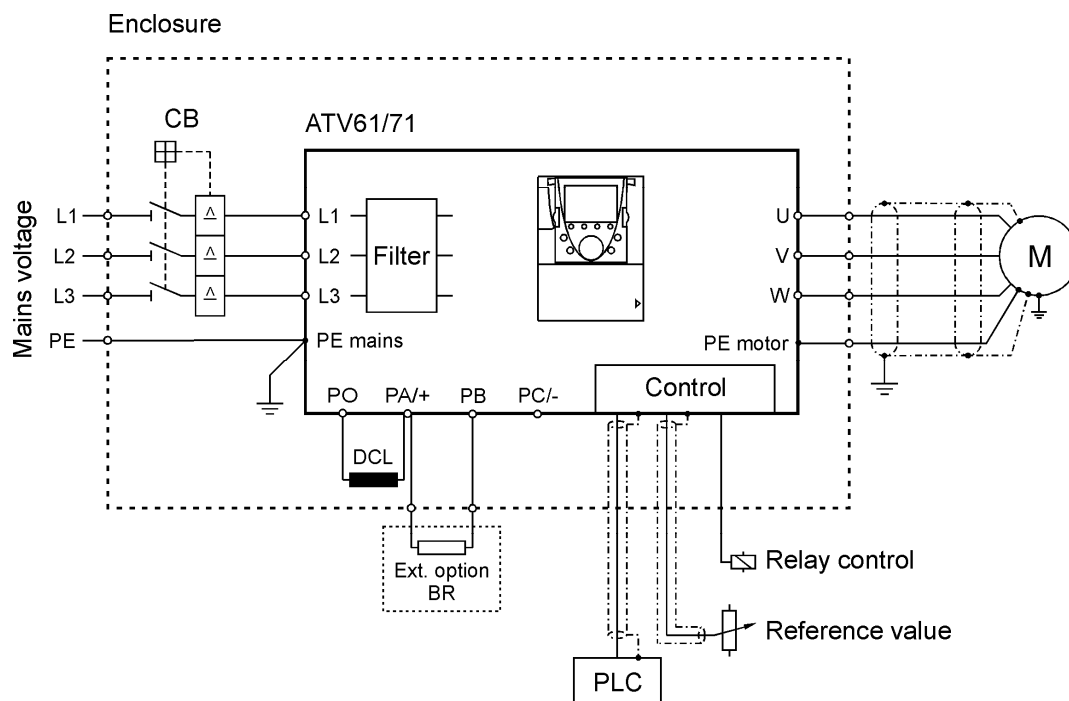
Wiring diagram

The following diagrams show the typical wiring of the frequency inverters including the options which may be required for protection of the plant or the device, depending on the application.

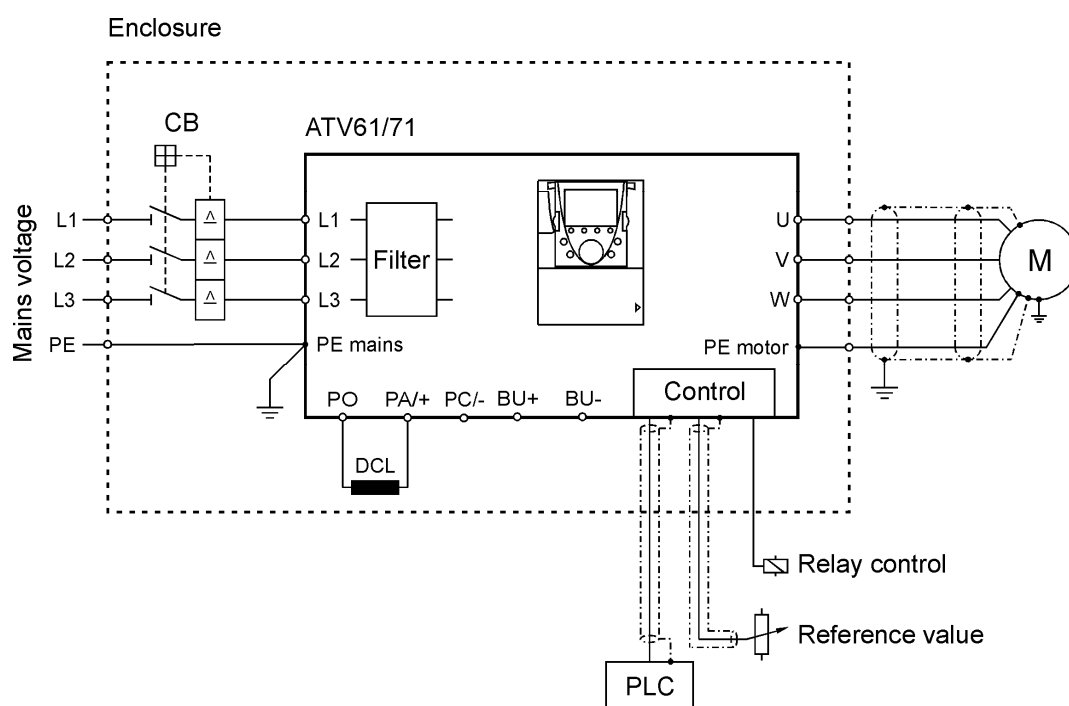
Description of the used abbreviations:

ATV61/71	Frequency inverter
MS.....	Main switch built-in as standard (to be used if required according to the local regulations)
Option CB	Circuit breaker Can be installed instead of the main switch
NH	Main fuses built-in as standard considering table "chapter "Fuses and cable cross sections" "
Option LC.....	Line contactor (to be used if required according to the local regulations)
Line reactor	Line reactor built-in as standard to reduce the current harmonics on the mains caused by the DC link. For ATV71EXA●●●●● it is available as option.
DCL	The DC choke is built-in as standard instead of a line reactor at ATV71EXS5●●●N4.
internal filter	EMC filter built-in as standard considering category C3 according to EN 61800-3 "Use in industrial environments"
Opt. motor choke.....	To reduce the voltage peaks at the motor in case of long motor cables
Opt. sinus filter.....	For nearly sinusoidal motor voltage and for prevention of additional noises at the motor.
Option BU	Braking unit At devices with low power a braking transistor is built-in as standard. Beyond it a braking unit can be used optionally. See chapter "Braking unit BU", page 159
Option BR	Braking resistor Option for short deceleration time or short-time dynamic loads

ATV71ES5D90N4...C16N4

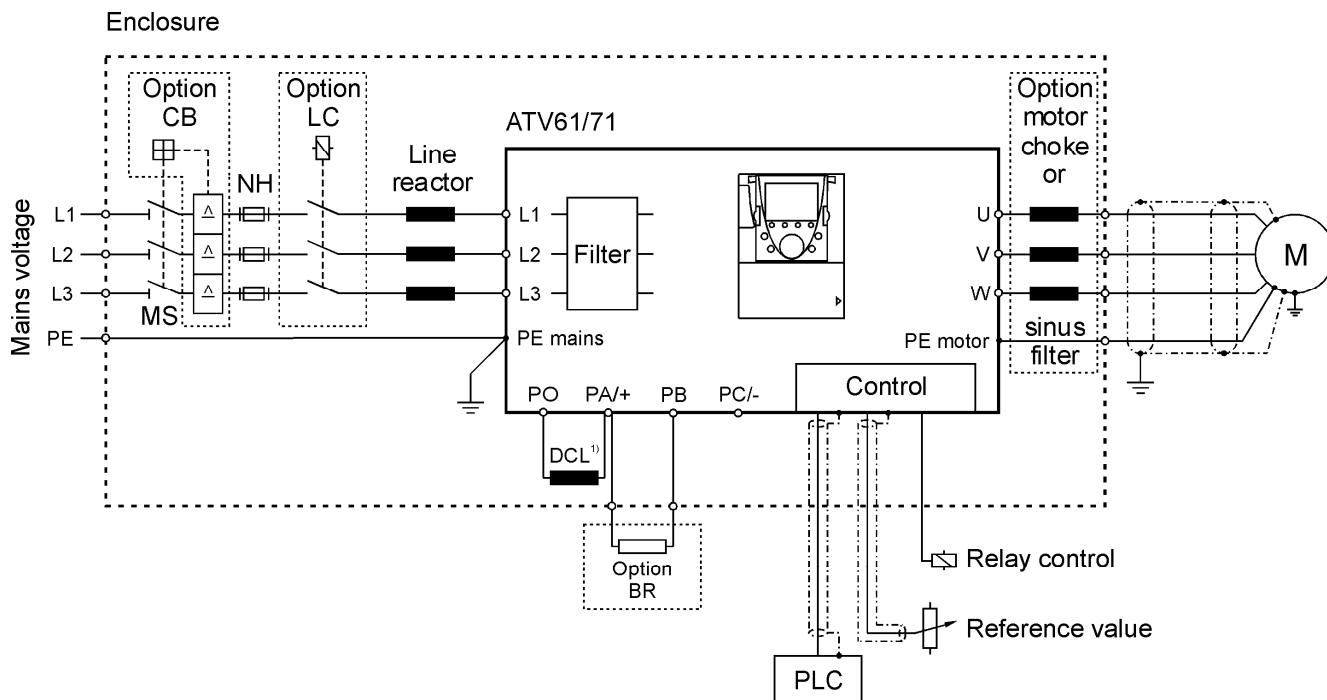


ATV71ES5C20N4...C50N4



ATV71EX...D90N4...C16N4
 ATV71EX...D90N...C13N
 ATV71EX...C11Y...C16Y

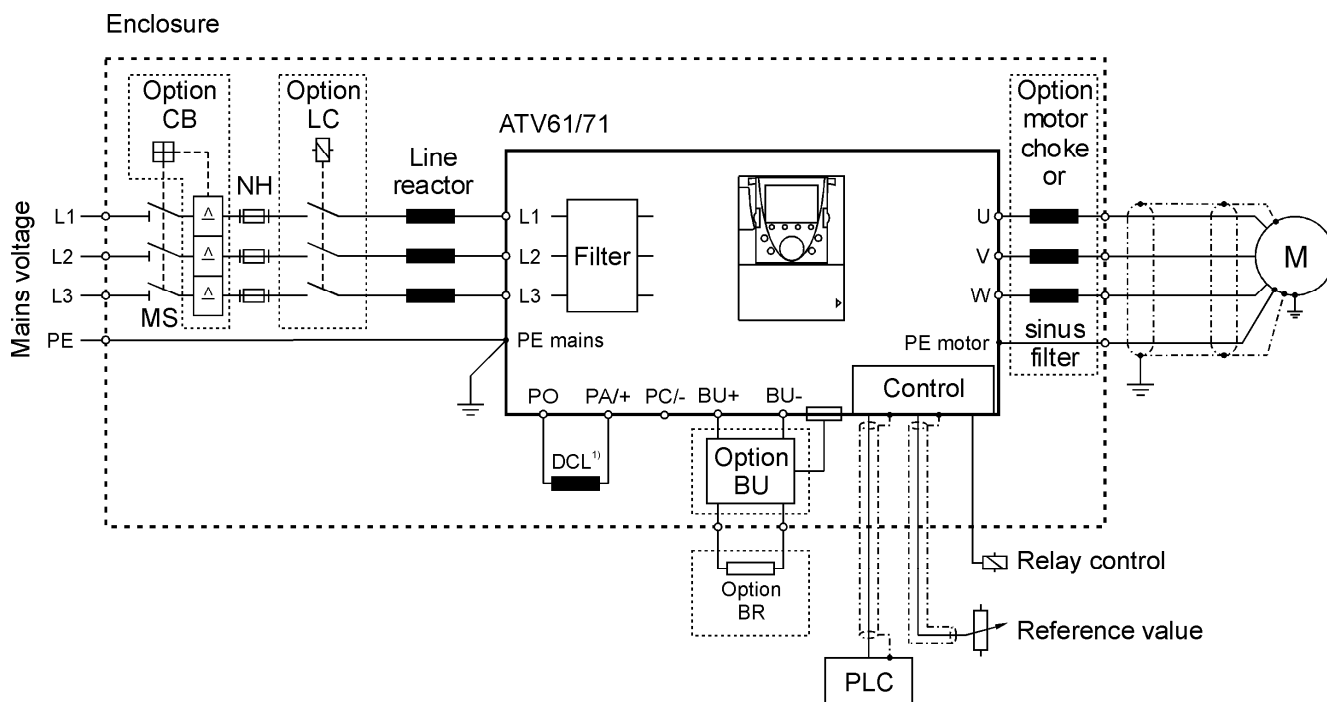
Standard design 6-pulse



1) At ATV71EXS5...N4 a DC choke DCL is built-in instead of a line reactor.

ATV71EX●●C20N4...C31N4
ATV71EX●●C16N...C25N
ATV71EX●●C20Y...C31Y

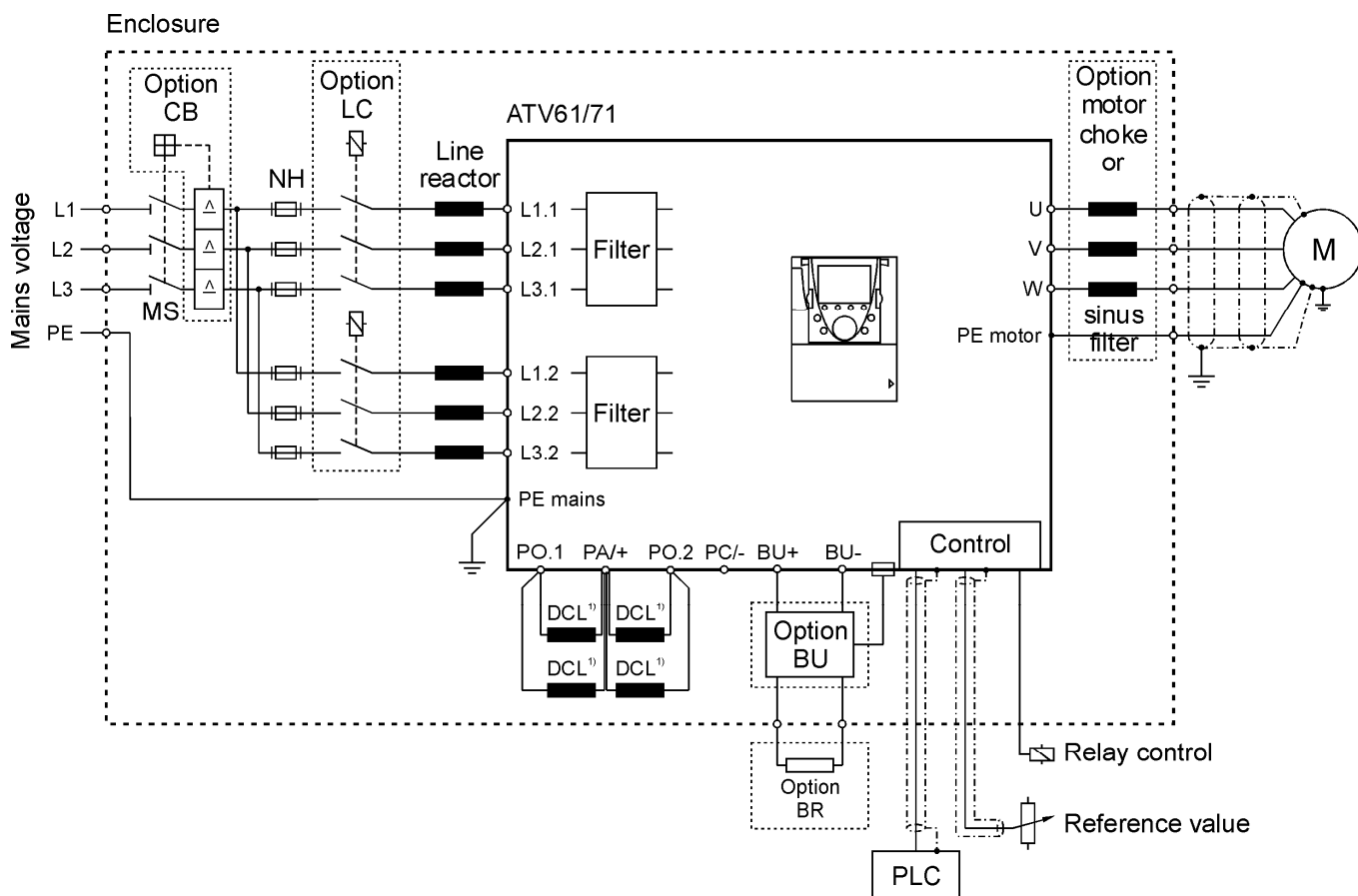
Standard design 6-pulse



1) At ATV71EXS5●●●N4 a DC choke DCL is built-in instead of a line reactor.

ATV71EX●●C40N4...C50N4
 ATV71EX●●C31N...C50N
 ATV71EX●●C40Y...C63Y

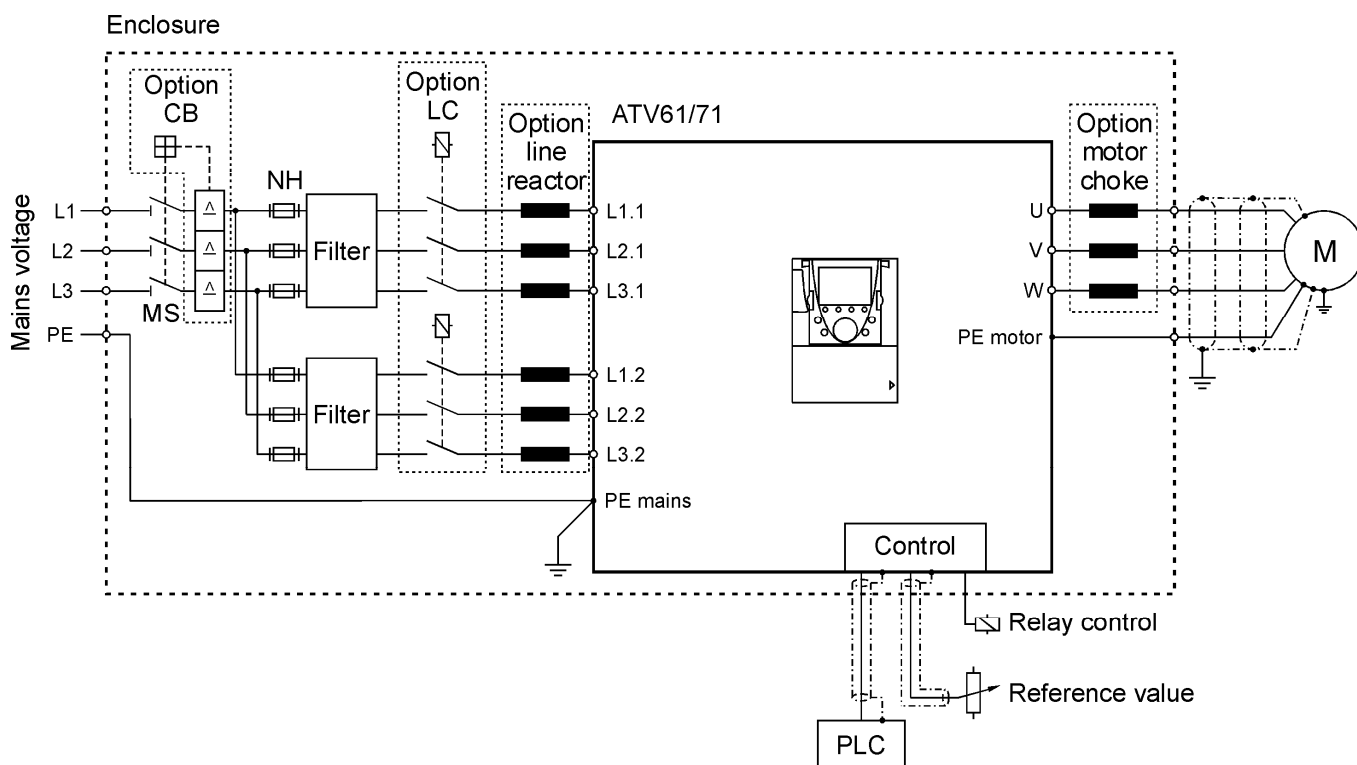
Standard design 6-pulse



1) At ATV71EXS5●●●N4 a DC choke DCL is built-in instead of a line reactor.

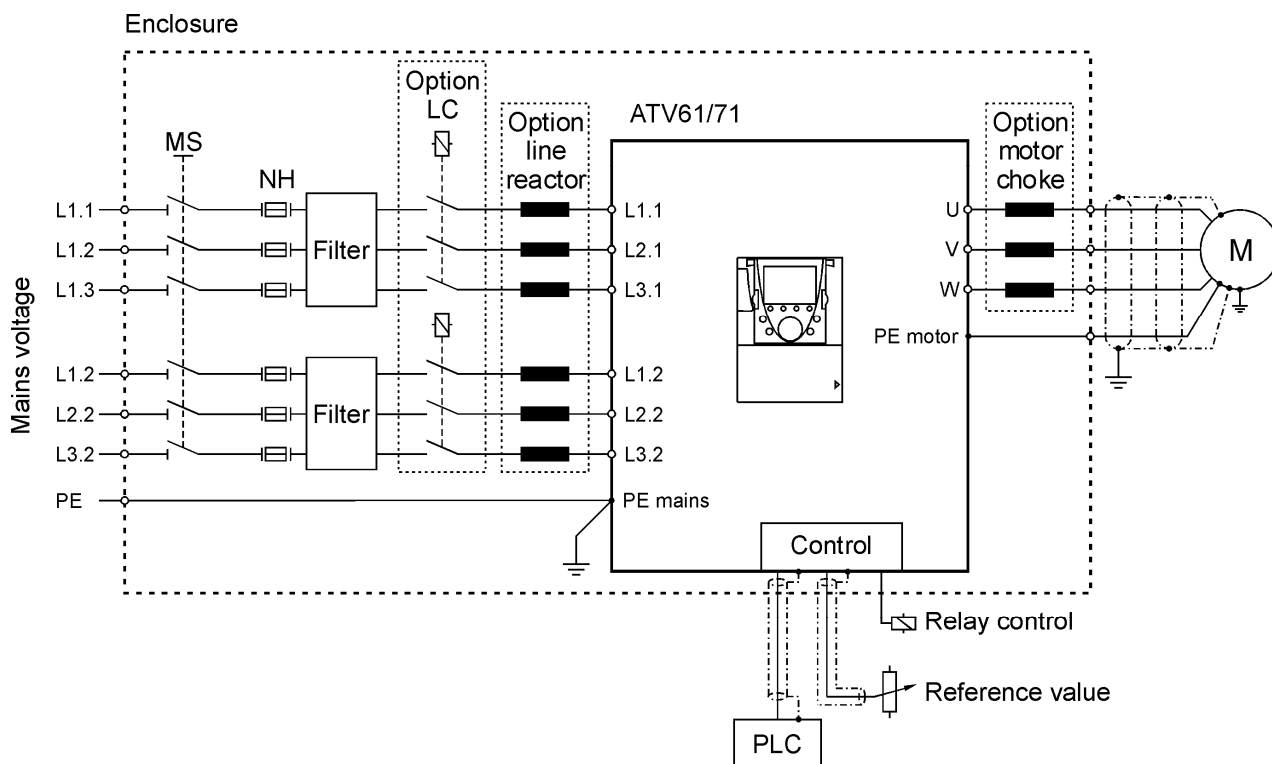
ATV71EXA•C50N4...C63N4
ATV71EXA•C50N...C80N
ATV71EXA•C63Y...M10Y

Standard design 6-pulse



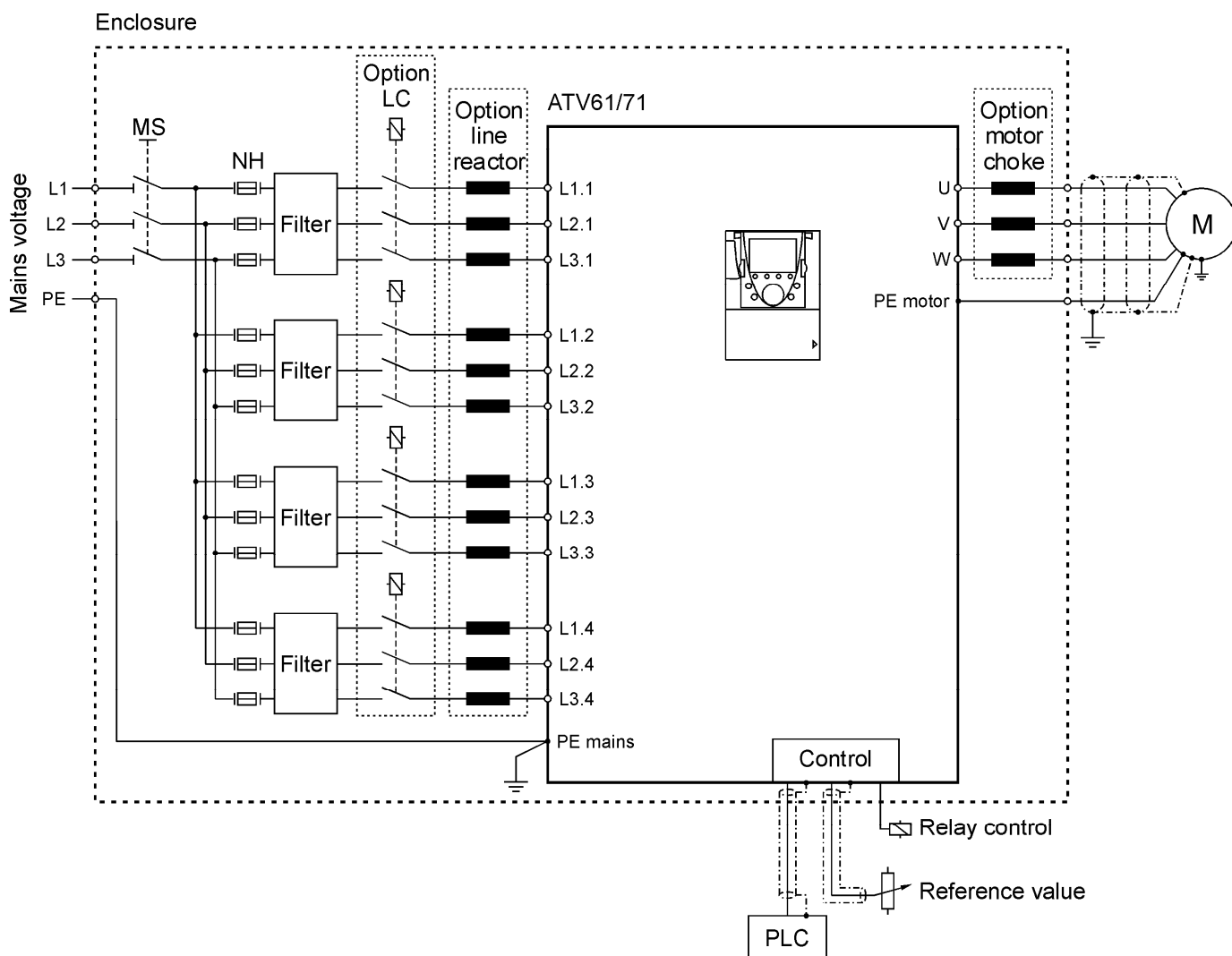
ATV71EXA•C50N4...C63N4
ATV71EXA•C50N...C80N
ATV71EXA•C63Y...M10Y

Optional 12-pulse design



ATV71EXA•C71N4...M13N4
ATV71EXA•C90N...M15N
ATV71EXA•M12Y...M20Y

Standard design 6-pulse

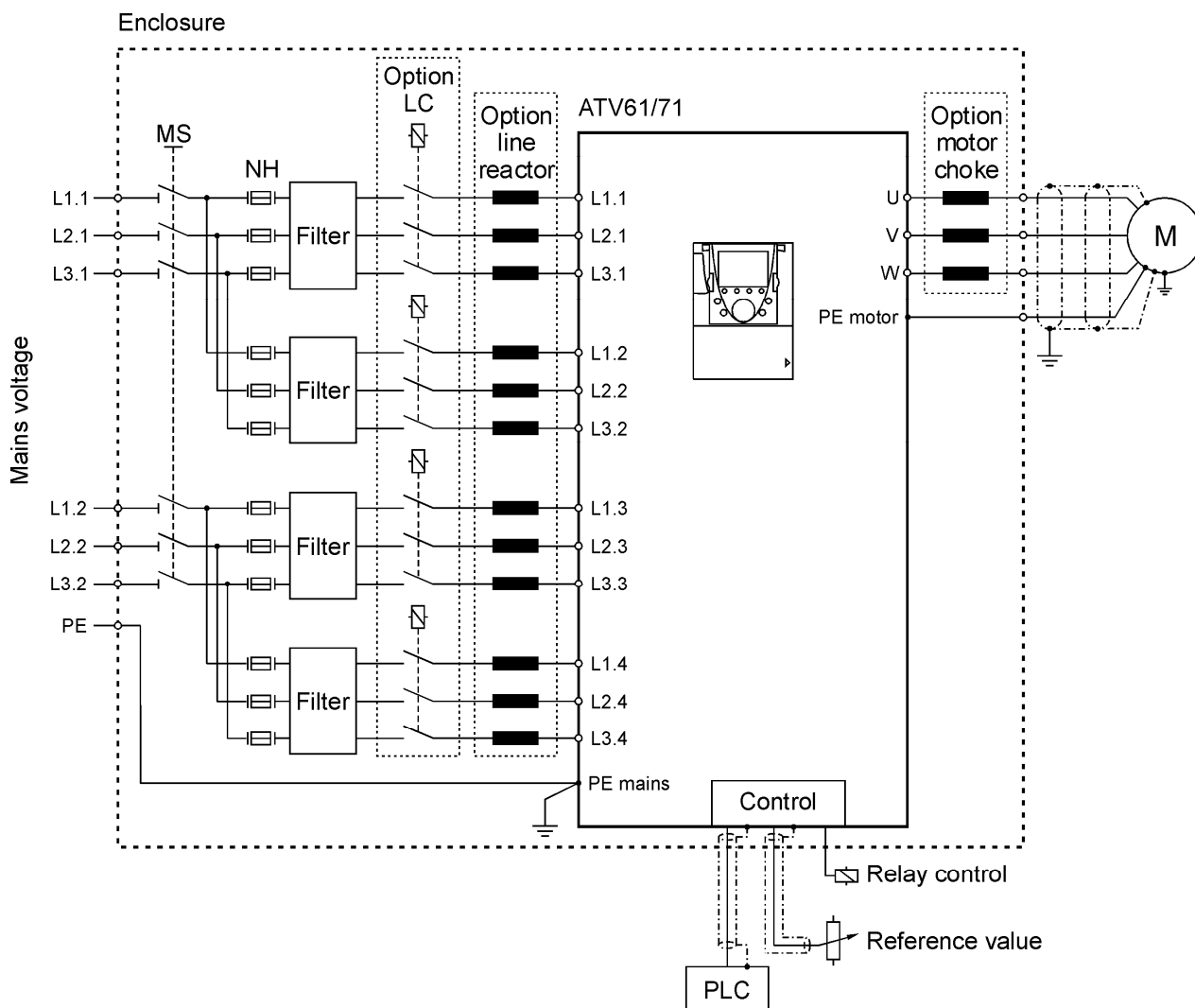


ATV71EXA•C71N4...M13N4

ATV71EXA•C90N...M15N

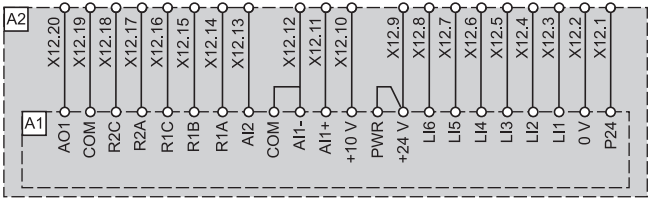
ATV71EXA•M12Y...M20Y

Optional 12-pulse design



Control terminals X12 for the basic device

The signal inputs and outputs of the frequency inverter are wired to the customer terminals X12 with plug connection (max. cable cross section: 2.5 mm²).

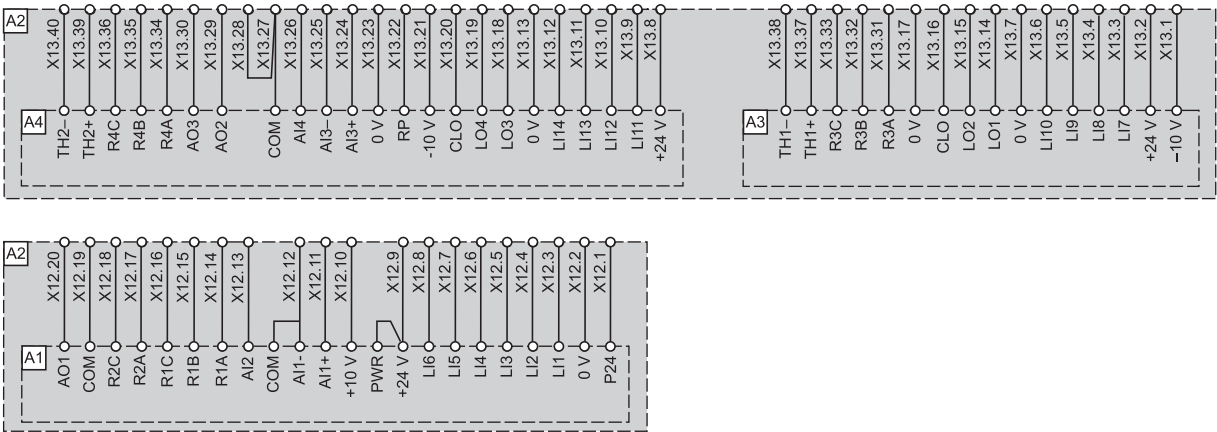


Order number: VW3 AE 1201

A1 Frequency inverter ATV71
A2 Enclosure

Control terminals X12 and X13 for the basic device and I/O extension cards

The signal inputs and outputs of the frequency inverter and of the option cards are wired to the customer terminals X12 and X13 with plug connection (max. cable cross section: 2.5 mm²).



Order number: VW3 AE 1202

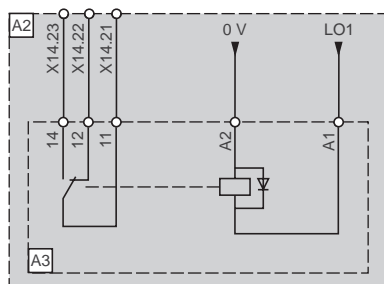
A1 Frequency inverter ATV71
A2 Enclosure
A3 Basic I/O extension card
A4 Extended I/O extension card

Relay output OC

This option contains a 24 V DC relay with a switching capacity of max. 6 A at 250 V AC or 30 V DC. The potential-free signal outputs are directly connected to the customer control terminals X14 (max. cable cross section: 4 mm²). The inductor is wired to the logic output of the frequency inverter. With this option each logic status information of the inverter or the process can be issued as a message by means of a logic output.



This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 155 for further information.



Relay output LO1

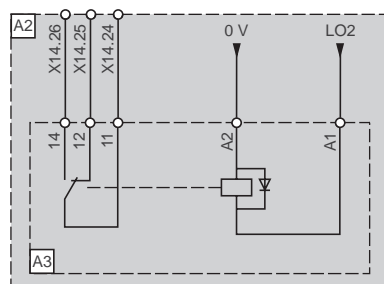
Order number: VW3 AE 2201

A2 Enclosure

A3 Relay



This option requires a basic I/O extension card!



Relay output LO2

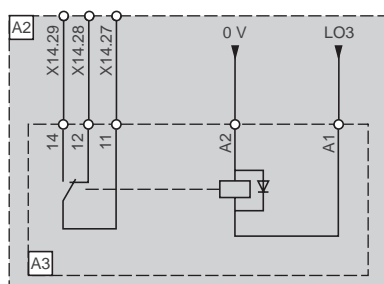
Order number: VW3 AE 2201

A2 Enclosure

A3 Relay



This option requires a basic I/O extension card!



Relay output LO3

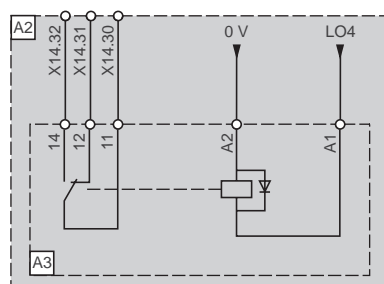
Order number: VW3 AE 2201

A2 Enclosure

A3 Relay



This option requires an extended I/O extension card!



Relay output LO4

Order number: VW3 AE 2201

A2 Enclosure

A3 Relay



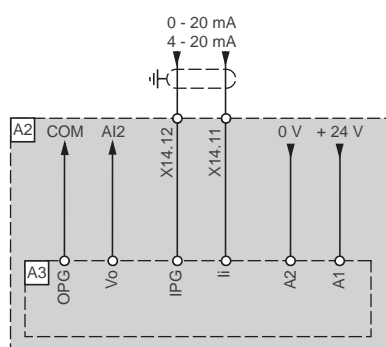
This option requires an extended I/O extension card!

Additional electrical input isolation

This option contains an isolated amplifier configured for an analog input. The signal inputs of the amplifier are directly connected to the customer control terminals X14 (max. cable cross section: 4 mm²). The output is wired to the analog input of the frequency inverter. It operates according to the principle of optoelectronic potential separation and has three-way separation between input, output and supply.



This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 155 for further information.



Analog input AI2

Order number: VW3 AE 1901

A2 Enclosure

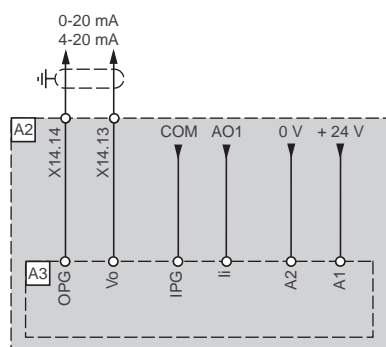
A3 Isolated amplifier

Additional electrical output isolation

This option contains an isolated amplifier configured for an analog output. The signal outputs of the amplifier are directly connected to the customer control terminals X14 (max. cable cross section: 4 mm²). The input is wired to the analog output of the frequency inverter. It operates according to the principle of optoelectronic potential separation and has three-way separation between input, output and supply.



This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 155 for further information.

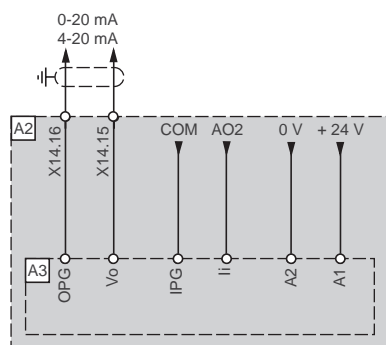


Analog output AO1

Order number: VW3 AE 1902

A2 Enclosure

A3 Isolated amplifier



Analog output AO2

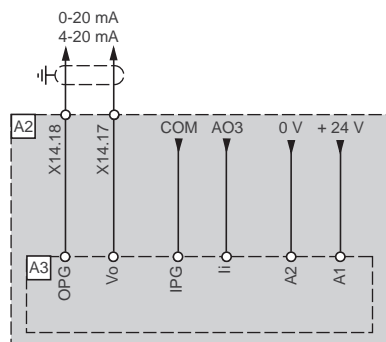
Order number: VW3 AE 1902

A2 Enclosure

A3 Isolated amplifier



This option requires an extended I/O extension card!



Analog output AO3

Order number: VW3 AE 1902

A2 Enclosure

A3 Isolated amplifier



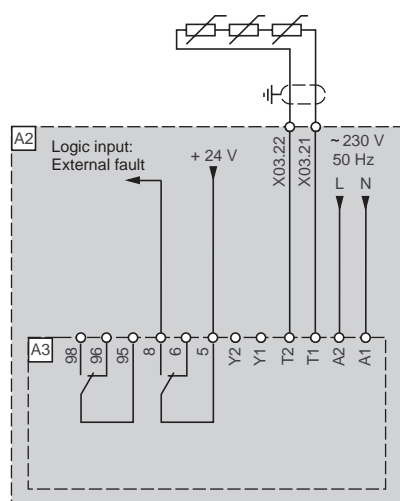
This option requires an extended I/O extension card!

PTC relay

This option consists of a PTC thermistor relay to monitor the PTC thermistors of the motor. Up to three PTC sensors can be connected to this option. The output of the PTC thermistor relay is assigned to the inverter terminals which can be parameterized for alarm or trip. The thermistor input is wired to the customer terminals X03 (max. cable cross section: 4 mm²).



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 154 for further information.



Order number: VW3 AE 2001

A2 Enclosure

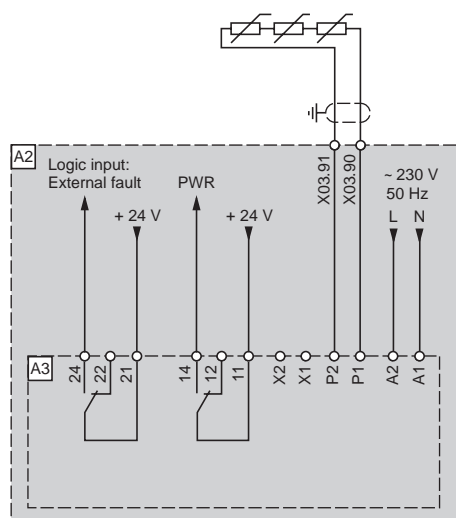
A3 PTC relay

PTC relay with PTB (ATEX) certification

This option consists of a PTC thermistor relay with PTB certificate for operation in EX-environments to monitor the PTC thermistors of the motor. Up to three PTC sensors can be connected to this option. The output of the PTC thermistor relay is assigned to the inverter terminals (PWR). The thermistor input is wired to the customer terminals X03 (max. cable cross section: 4 mm²).



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 154 for further information.



Order number: VW3 AE 2002

A2 Enclosure

A3 PTC relay

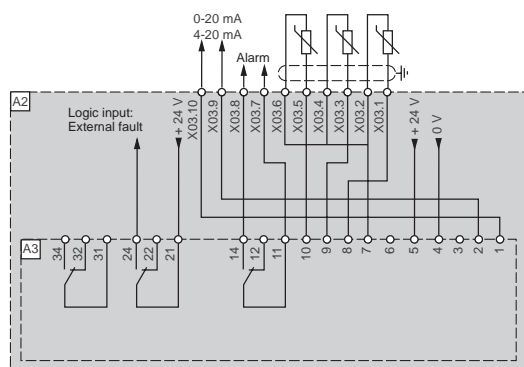
Pt100 relay

Pt100 sensors in motor winding

This option contains a Pt100 relay to monitor the Pt100 sensors of the motor. As standard it is prepared for three sensors for the windings. The alarm message is assigned to the terminals and the trip will cause a trip shut-down at the inverter. The input for the sensors, the alarm relay and the analog output are wired to the customer terminals X03 (max. cable cross section: 4 mm²).



This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 155 for further information.



Order number: VW3 AE 2003

A2 Enclosure

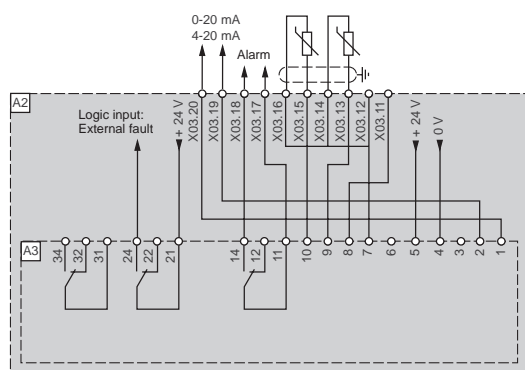
A3 Pt100 relay

Pt100 sensors in bearings

This option contains a Pt100 relay to monitor the Pt100 sensors of the motor. As standard it is prepared for two sensors for the bearings. The alarm message is assigned to the terminals and the trip will cause a trip shut-down at the inverter. The input for the sensors, the alarm relay and the analog output are wired to the customer terminals X03 (max. cable cross section: 4 mm²).



This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 155 for further information.



Order number: VW3 AE 2004

A2 Enclosure

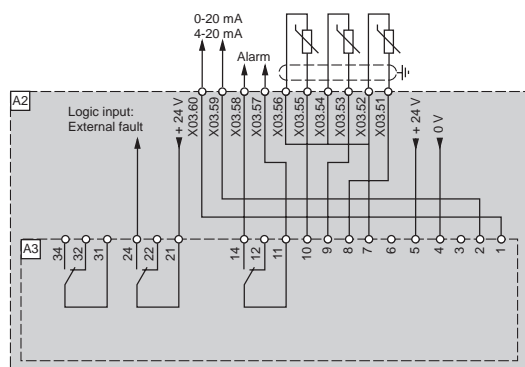
A3 Pt100 relay

Pt100 sensors in the transformer

This option contains a Pt100 relay to monitor the Pt100 sensors in the transformer. As standard it is prepared for three sensors for the windings. The alarm message is assigned to the terminals and the trip will cause a trip shut-down at the inverter. The input for the sensors, the alarm relay and the analog output are wired to the customer terminals X03 (max. cable cross section: 4 mm²).



This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 155 for further information.



Order number: VW3 AE 2005

A2 Enclosure

A3 Pt100 relay

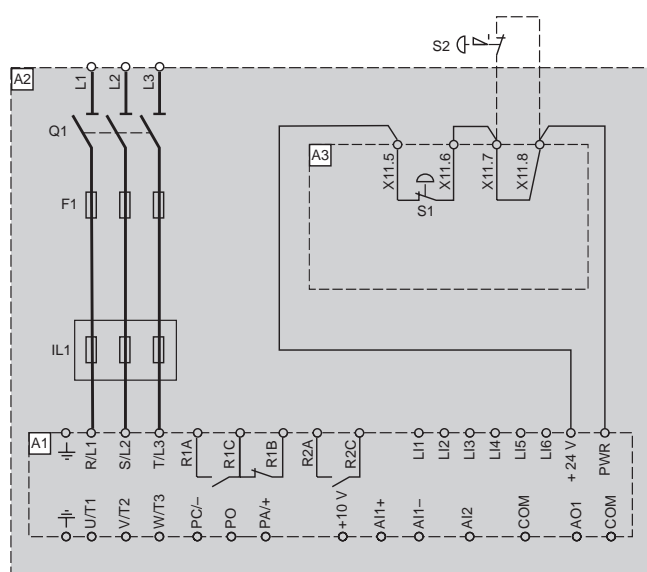
Safe Standstill

The Altivar frequency inverters include the "Safe Standstill" (Power Removal) safety function as standard. This function prevents any unintended start-up of the motor and guarantees the safety of the machine and plant personnel. The Safe Standstill function is wired to the customer terminals X11 (max. cable cross section: 4 mm²).

Safety category 1
Stop category 0

according to EN 954-1 / ISO 13849-1 category 1; IEC/EN 61508, SIL1
according to IEC/EN 60204-1

Emergency stop button



Order number: VW3 AE 1504

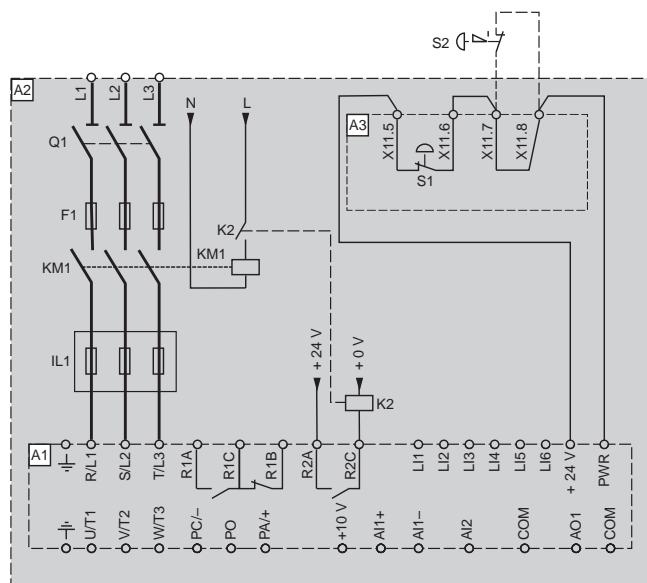
A1 Frequency inverter ATV71

A2 Enclosure

A3 Emergency stop wiring

S1 Emergency stop button consisting of
Mushroom head pushbutton (Harmony style 4:
ZB4 BS54)
Auxiliary contact (Harmony style 4: ZB4 BZ102)

When line contactor is existing:



A1 Frequency inverter ATV71

A2 Enclosure

A3 Emergency stop wiring

S1 Emergency stop button consisting of
Mushroom head pushbutton (Harmony style 4:
ZB4 BS54)
Auxiliary contact (Harmony style 4: ZB4 BZ102)

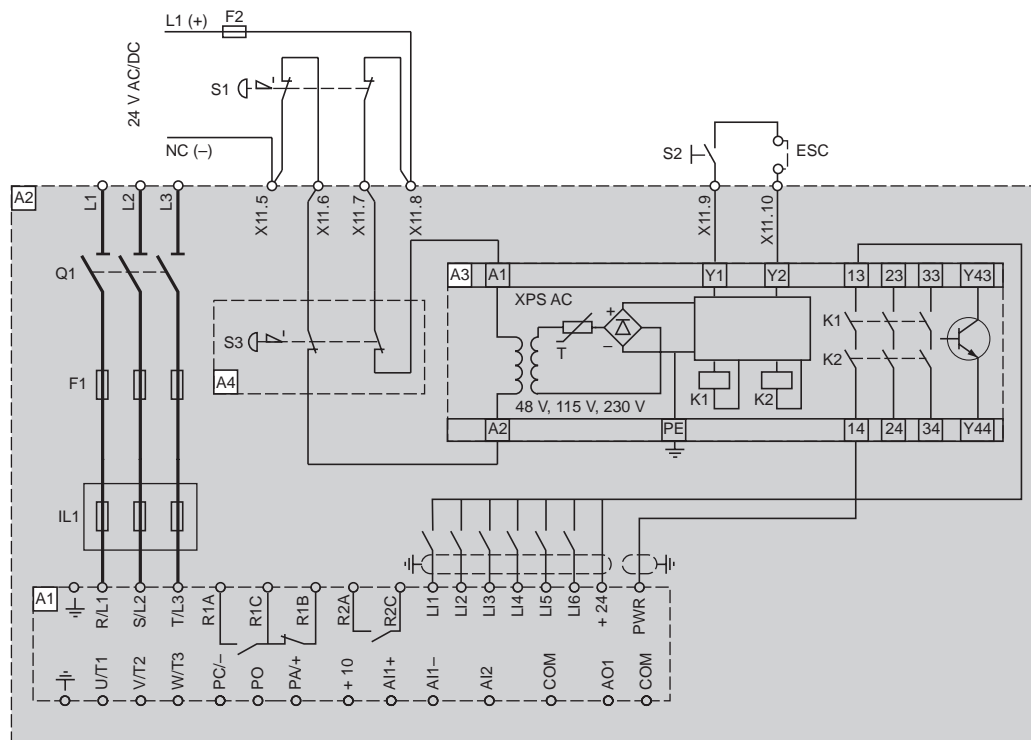
Safety category 3

Stop category 0

according to EN 954-1 / ISO 13849-1 category 3; IEC/EN 61508, SIL2

according to IEC/EN 60204-1

"Preventa type AC" fault relay



Order number: VW3 AE 1502

A1Frequency inverter ATV71

A2Enclosure

A3Safety switching device "Preventa XPS-AC5121"

A4Emergency stop button (VW3 AE 1501)

S3 Emergency stop button consisting of
Mushroom head pushbutton (Harmony style 4: ZB4
BS54)
Auxiliary contact (Harmony style 4: ZB4 BZ102)

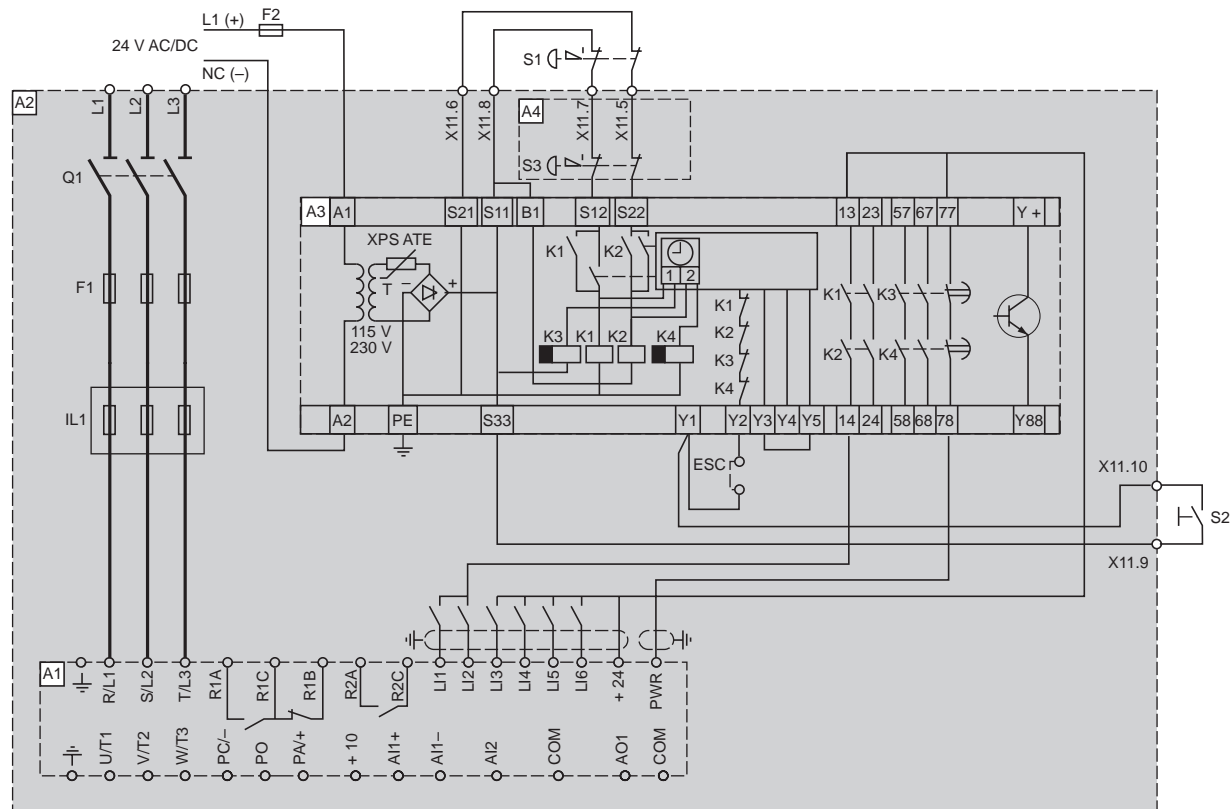


This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 155 for further information.

Safety category 3
Stop category 1

according to EN 954-1 / ISO 13849-1 category 3; IEC/EN 61508, SIL2
according to IEC/EN 60204-1

"Preventa type ATE" fault relay



Order number: VW3 AE 1503

- A1 Frequency inverter ATV71
- A2 Enclosure
- A3 Safety switching device "Preventa XPS-ATE5110"
- A4 Emergency stop button (VW3 AE 1501)
- S3 Emergency stop button consisting of
Mushroom head pushbutton (Harmony style 4: ZB4
BS54)
Auxiliary contact (Harmony style 4: ZB4 BZ102)



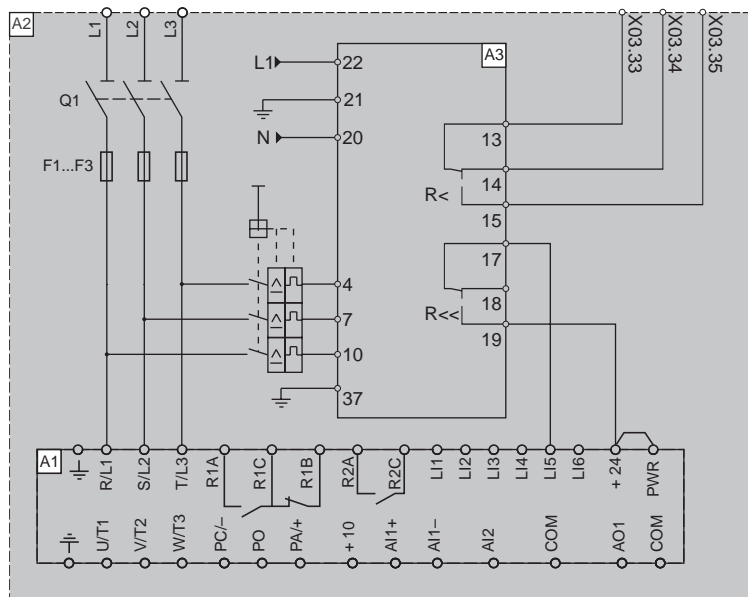
This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 155 for further information.

Insulation monitoring for IT networks

This option monitors each phase to earth fault.



This option is only qualified for IT networks.



A1Frequency inverter ATV71

A2Enclosure

A3Isolation monitoring device

Order number: VW3 AE 2601

The trigger R<< is connected to the inverter as standard.
The alarm message R< is assigned to the terminals (X3.33 to X3.35).



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 154 for further information.

Design for IT networks

The frequency inverter is prepared for connection to nongrounded networks (IT networks).

Order number: VW3 AE 2701



When a 230 V control voltage is required for the ATV71EX.....N4 devices, the option control transformer or an external control supply is necessary.

Supply voltage 230 V AC

For some options and for the supply of the cooling system of high-power devices a 230 V/50 Hz supply voltage is necessary.

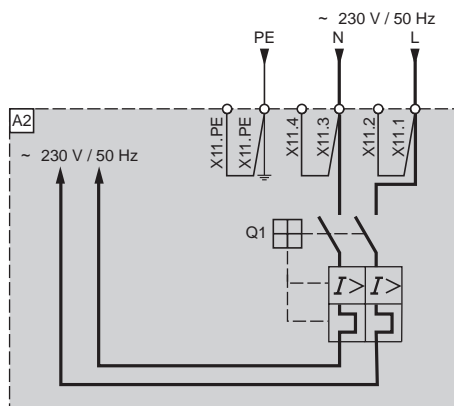
Following devices already include a control voltage transformer for 230 V (partially also for 400 V) as standard:

- ATV71EXA●●●●N4
- ATV71EX●●●●N
- ATV71EX●●●●Y

When the control voltage is provided external, the option "external supply voltage" has to be selected.

Option external supply terminals

This option includes customer terminals X11 (max. cable cross section: 4 mm²) for the connection of an external supply voltage and a circuit breaker with 6 A for protection. The external supply voltage has to be dimensioned for a load from 225 up to 800 kVA, depending on the used 230 V options.



Order number: VW3 AE 1301

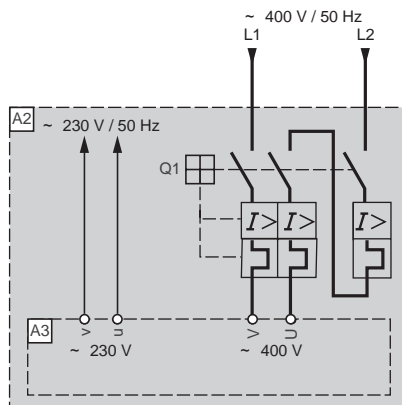
A2 Enclosure
 Q1 Circuit breaker 6A
 X11 Customer terminals

Option control transformer 400 V / 230 V

If the 230V supply voltage cannot be provided external, it is possible to integrate a control voltage transformer belated at following devices:

- ATV71EXC●●●●N4
- ATV71EXS5●●●●N4

This option includes a supply voltage transformer 400 V / 230 V and a motor circuit breaker.



Order number: VW3 AE 0302 (500 VA)
 VW3 AE 0303 (800 VA)

A2 Enclosure
 A3 Option control transformer
 K1 Line contactor
 Q1 Motor circuit breaker

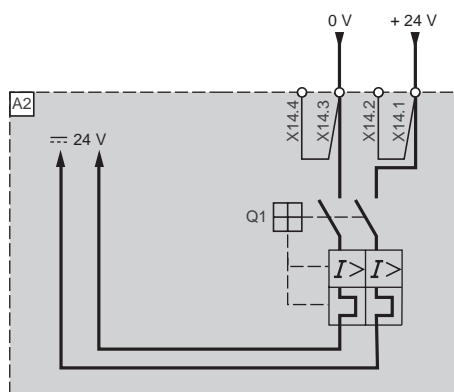
Buffer voltage 24 V DC

A buffer voltage is necessary for the options line contactor (controlled by the inverter), additional electrical isolation and control relay for open collector or if the control electronic of the frequency inverter without mains supply should be in operation (e.g. to keep the bus communication alive).

There are two possibilities to generate this voltage:

External buffer voltage

This option includes customer terminals X14 (max. cable cross section: 4 mm²) for the connection of an external buffer voltage (min. 2 A) and a circuit breaker with 2 A for protection.



Order number: VW3 AE 1402

A2 Enclosure

Q1 Circuit breaker 2A

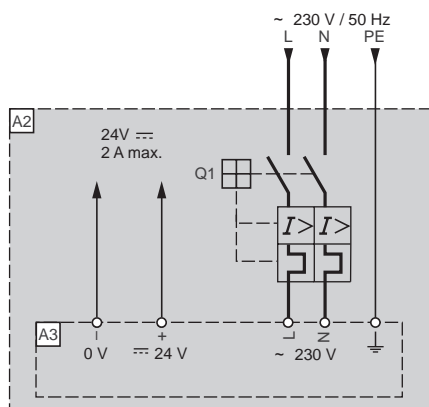
X14 Customer terminals

Additional 24 V DC power supply

This option includes a fuse protected 24 V / 1.6 A DC power supply and a circuit breaker.



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 154 for further information.



Order number: VW3 AE 1401

A2 Enclosure

A3 Additional 24 V power supply

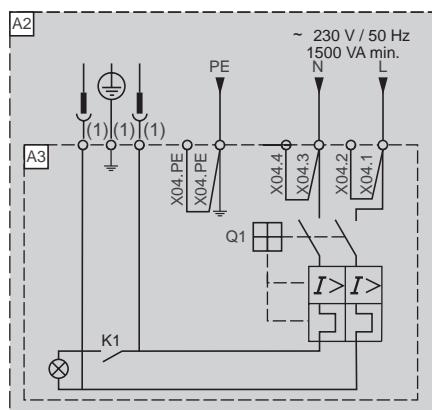
Q1 Circuit breaker 2A

Enclosure lighting

This option contains a fluorescent lamp and a power socket according to VDE standard (230 V / 50 Hz), a door contact switch and a circuit breaker. The option is wired to the customer terminals X04 (max. cable cross section: 4 mm²).



This option requires an additional external 230 V supply (min. 1500 VA). This supply has to be human protected!



Order number: VW3 AE 1601

A2 Enclosure

A3 Enclosure lamp

K1 Door contact

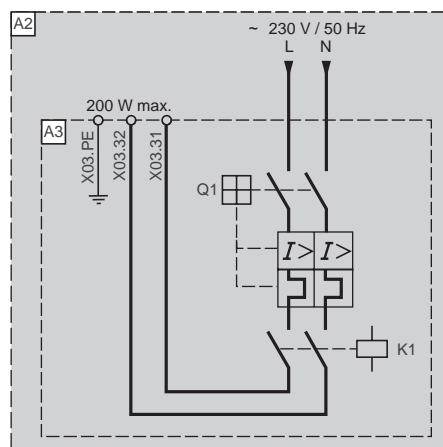
Q1 Circuit breaker 2A

Motor heating

This option includes the terminals and a contactor for an external motor heating. It allows to connect a motor heater up to 200 W. The output is wired to the customer terminals X03 (max. cable cross section: 4 mm²). The activation takes place by the line contactor or by the inverter. The motor heating is active when the inverter is in off-state.



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 154 for further information.



Order number: VW3 AE 2101

A2 Enclosure

A3 Motor heater

K1 Contactor

Q1 Motor circuit breaker

External motor fan

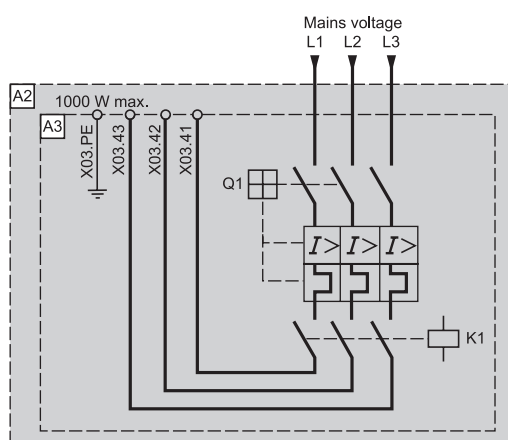
This option includes the terminals, a contactor and a circuit breaker for an external motor fan. It allows to connect an external motor fan up to 1000 W. The output is wired to the customer terminals X03 (max. cable cross section: 4 mm²). The activation takes place by the line contactor or by the inverter. The external motor fan is active when the inverter is in operation.



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 154 for further information.



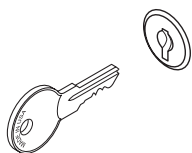
For this option the mains voltage and the voltage of the external fan must be identical. Different voltages on request.



Order number: VW3 AE 2102

A2 Enclosure
 A3 Protected supply voltage
 K1 Contactor
 Q1 Motor circuit breaker

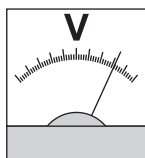
Key switch „local / remote“



This option includes a key switch built-in the enclosure door, which switches between remote mode (terminals or bus) and panel mode. The panel control of the device occurs by means of the keys on the built-in LED-keypad or the removable operation panel, which is also built-in the enclosure door.

Order number: VW3 AE 1801

Voltmeter „Line voltage“



This option indicates the line voltage. It includes a measuring instrument built-in into the enclosure door and a phase selection switch.

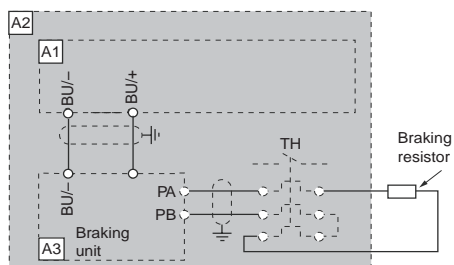


Also in case of 12-pulse supply only one voltmeter is built-in. If two instruments are desired, you have to order two instruments.

Order number:

- Supply voltage 400 V VW3 AE 2301
- Supply voltage 500 V VW3 AE 2302
- Supply voltage 690 V VW3 AE 2303

Braking unit BU



A1 Frequency inverter ATV71

A2 Enclosure ATV71EXC●

A3 Braking unit



This option is only necessary for frequency inverters with high power; below these devices there is already a braking transistor built-in!



Parameters permit the entry of the resistor data and thus the protection of the braking resistor from an excessively long operating time.

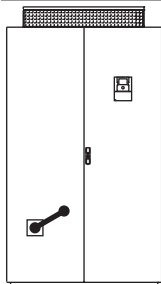


If the braking resistor does not match the overload characteristic to be used or the local regulations require an additional protective device, a thermal relay should be integrated into the mains disconnection mechanism.

Allocation table

Description		ATV71	Order number	Weight [kg]
Braking unit	400 V	EX●●C20N4...C28N4	VW3 A7E 101	31.000
		EXC●C31N4...C50N4	VW3 AE 1003	190.000
		EXS5C31N4...C50N4	VW3 A7E 102	205.000
	500 V	EXC●C16N...C25N	VW3 AE 1004	190.000
		EXS5C16N...C25N	VW3 A7E 103	205.000
		EXC●C31N...C50N	VW3 AE 1005	190.000
		EXS5C31N...C50N	VW3 A7E 104	205.000
	690V	EXC●C20Y...C31Y	VW3 AE 1004	190.000
		EXS5C20Y...C31Y	VW3 A7E 103	205.000
		EXC●C40Y...C63Y	VW3 AE 1005	190.000
		EXS5C40Y...C63Y	VW3 A7E 104	205.000

Door handle for main switch



The main switch is able to switch the supply voltage of the frequency inverter. The external door handle enables handling of the switch without opening the enclosure door.

The main switch is built-in as standard. This option contains only an extended spindle for the door handle.



In case of 12-pulse design this option is not permitted because the 12-pulse main switch already includes a door handle.

Allocation table

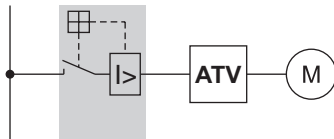
Description		ATV71	Order number	Weight [kg]
Isolating handle for switch	400 V	EX●●D90N4, C11N4	VW3 AE 0103	1.000
		EX●●C13N4...C28N4	VW3 AE 0104	2.000
		EX●●C31N4...C50N4	VW3 AE 0105	2.000
		EXA●C50N4...M13N4	VW3 AE 0105	2.000
	500 V	EX●●D90N...C13N	VW3 AE 0103	1.000
		EX●●C16N...C25N	VW3 AE 0104	2.000
		EX●●C31N...C50N	VW3 AE 0105	2.000
		EXA●C50N...M15N	VW3 AE 0105	2.000
	690 V	EX●●C11Y...C16Y	VW3 AE 0103	1.000
		EX●●C20Y...C31Y	VW3 AE 0104	2.000
		EX●●C40Y...C63Y	VW3 AE 0105	2.000
		EXA●C63Y...M20Y	VW3 AE 0105	2.000

Cubicle options (depending on power)

Altivar 71 Plus

Options

Circuit breaker



The circuit breaker is built-in instead of the main switch. It provides a safe switching-off at overload.

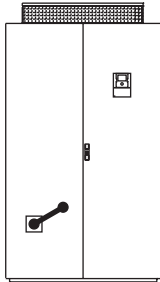


For 12-pulse supply the option "Circuit breaker" is only available on request.

Allocation table

Description		ATV71	Order number	Weight [kg]
Circuit breaker	400 V	EX●●D90N4, C11N4	VW3 AE 0106	1.400
		EX●●C13N4...C20N4	VW3 AE 0107	1.400
		EX●●C25N4...C31N4	VW3 AE 0109	1.400
		EX●●C40N4	VW3 AE 0111	–
		EX●●C50N4	VW3 AE 0112	–
		EXA●C50N4	VW3 AE 0112	–
		EXA●C63N4	VW3 AE 0113	–
		EXA●C71N4	VW3 AE 0174	–
		EXA●C90N4	VW3 AE 0166	–
		EXA●M11N4	VW3 AE 0167	–
		EXA●M13N4	VW3 AE 0168	–
	500 V	EX●●D90N	VW3 AE 0141	–
		EX●●C11N	VW3 AE 0142	–
		EX●●C13N	VW3 AE 0144	–
		EX●●C16N, C20N	VW3 AE 0146	1.400
		EX●●C25N	VW3 AE 0147	1.400
		EX●●C31N, C40N	VW3 AE 0150	–
		EX●●C50N	VW3 AE 0151	–
		EXA●C50N	VW3 AE 0151	–
		EXA●C63N	VW3 AE 0169	–
		EXA●C80N	VW3 AE 0170	–
		EXA●C90N	VW3 AE 0175	–
		EXA●M11N	VW3 AE 0171	–
		EXA●M13N	VW3 AE 0172	–
		EXA●M15N	VW3 AE 0173	–
	690 V	EXC●C11Y, C13Y	VW3 AE 0143	4.000
		EXC●C16Y	VW3 AE 0145	4.000
		EXC●C20Y	VW3 AE 0146	1.400
		EXC●C25Y...C31Y	VW3 AE 0147	1.400
		EXC●C40Y...C63Y	VW3 AE 0150	–
		EXA●C63Y	VW3 AE 0151	–
		EXA●C80Y	VW3 AE 0169	–
		EXA●M10Y	VW3 AE 0170	–
		EXA●M12Y	VW3 AE 0175	–
		EXA●M15Y	VW3 AE 0171	–
		EXA●M18Y	VW3 AE 0172	–
		EXA●M20Y	VW3 AE 0173	–

Door handle for circuit breaker



The external door handle enables handling of the switch without opening the enclosure door.

Allocation table

Description		ATV71	Order number	Weight [kg]
Door handle for circuit breaker	400 V	EX●●D90N4, C11N4	VW3 AE 0114	1.000
		EX●●C13N4...C31N4	VW3 AE 0115	2.000
		EX●●C40N4, C50N4	VW3 AE 0116	2.000
		EXA●C50N4, C63N4	VW3 AE 0116	2.000
		EXA●C71N4...M13N4	–	–
	500 V	EX●●D90N...C13N	VW3 AE 0114	1.000
		EX●●C16N...C25N	VW3 AE 0115	2.000
		EX●●C31N...C50N	VW3 AE 0116	2.000
		EXA●C50N...C80N	VW3 AE 0116	2.000
		EXA●C90N...M15N	–	–
	690 V	EX●●C11Y...C31Y	VW3 AE 0115	2.000
		EX●●C40Y...C63Y	VW3 AE 0116	2.000
		EXA●C63Y...M10Y	VW3 AE 0116	2.000
		EXA●M12Y...M20Y	–	–

Undervoltage coil 230V

When there is no voltage at the undervoltage coil, the circuit breaker switches off.

Allocation table

Description		ATV71	Order number	Weight [kg]
Undervoltage coil 230 V	400 V	EX●●D90N4...C31N4	VW3 AE 0117	0.500
		EX●●C40N4, C50N4	VW3 AE 0118	0.500
		EXA●C50N4...M13N4	VW3 AE 0118	0.500
	500 V	EX●●D90N...C25N	VW3 AE 0117	0.500
		EX●●C31N...C50N	VW3 AE 0118	0.500
		EXA●C50N...M15N	VW3 AE 0118	0.500
	690 V	EX●●C11Y...C31Y	VW3 AE 0117	0.500
		EX●●C40Y...C63Y	VW3 AE 0118	0.500
		EXA●C63Y...M20Y	VW3 AE 0118	0.500

Undervoltage coil 110V

When there is no voltage at the undervoltage coil, the circuit breaker switches off.

Allocation table

Description		ATV71	Order number	Weight [kg]
Undervoltage coil 110 V	400 V	EX●●D90N4...C31N4	VW3 AE 0119	0.500
		EX●●C40N4, C50N4	VW3 AE 0120	0.500
		EXA●C50N4...M13N4	VW3 AE 0120	0.500
	500 V	EX●●D90N...C25N	VW3 AE 0119	0.500
		EX●●C31N...C50N	VW3 AE 0120	0.500
		EXA●C50N...M15N	VW3 AE 0120	0.500
	690 V	EX●●C11Y...C63Y	VW3 AE 0119	0.500
		EX●●C40Y...C63Y	VW3 AE 0120	0.500
		EXA●C63Y...M20Y	VW3 AE 0120	0.500

230V motor for circuit breaker

Remote control of the circuit breaker via control commands is possible by means of this motor drive.

Allocation table

Description		ATV71	Order number	Weight [kg]
230 V motor for circuit breaker	400 V	EX●●D90N4, C11N4	VW3 AE 0121	0.950
		EX●●C13N4...C20N4	VW3 AE 0122	3.000
		EX●●C25N4...C31N4	VW3 AE 0123	3.000
		EX●●C40N4	VW3 AE 0124	7.000
		EX●●C50N4	VW3 AE 0125	7.000
		EXA●C50N4	VW3 AE 0125	7.000
		EXA●C63N4	VW3 AE 0126	7.000
		EXA●C71N4...M13N4	–	–
	500 V	EX●●D90N	VW3 AE 0154	1.000
		EX●●C11N, C13N	VW3 AE 0155	1.000
		EX●●C16N, C20N	VW3 AE 0156	3.000
		EX●●C25N	VW3 AE 0157	3.000
		EX●●C31N, C40N	VW3 AE 0158	7.000
		EX●●C50N	VW3 AE 0159	7.000
		EXA●C50N	VW3 AE 0159	7.000
		EXA●C63N	VW3 AE 0176	7.000
		EXA●C80N	VW3 AE 0177	7.000
		EXA●C90N...M15N	–	–
	690 V	EX●●C11Y...C20Y	VW3 AE 0156	3.000
		EX●●C25Y...C31Y	VW3 AE 0157	3.000
		EX●●C40Y...C63Y	VW3 AE 0158	7.000
		EXA●C63Y	VW3 AE 0159	7.000
		EXA●C80Y	VW3 AE 0176	7.000
		EXA●M10Y	VW3 AE 0177	7.000
		EXA●M12Y...M20Y	–	–

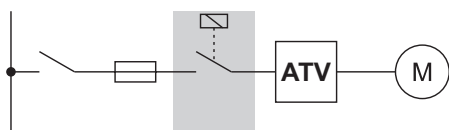
110V motor for circuit breaker

Remote control of the circuit breaker via control commands is possible by means of this motor drive.

Allocation table

Description	ATV71	Order number	Weight [kg]
110 V motor for circuit breaker	400 V	EX●●D90N4, C11N4	0.950
		EX●●C13N4...C20N4	3.000
		EX●●C25N4...C31N4	3.000
		EX●●C40N4	7.000
		EX●●C50N4	7.000
		EXA●C50N4	7.000
		EXA●C63N4	7.000
		EXA●C71N4...M13N4	–
	500 V	EX●●D90N	1.000
		EX●●C11N, C13N	1.000
		EX●●C16N, C20N	3.000
		EX●●C25N	3.000
		EX●●C31N, C40N	7.000
		EX●●C50N	7.000
		EXA●C50N	7.000
		EXA●C63N	7.000
		EXA●C80N	7.000
		EXA●C90N...M15N	–
	690 V	EX●●C11Y...C20Y	3.000
		EX●●C25Y...C31Y	3.000
		EX●●C40Y...C63Y	7.000
		EXA●C63Y	7.000
		EXA●C80Y	7.000
		EXA●M10Y	7.000
		EXA●M12Y...M20Y	–

Line contactor



By using this option, the frequency inverter is able to connect or disconnect itself from the mains by using the function "line contactor control" in combination with a logic output.

This option includes the line contactor and an auxiliary relay to switch the contactor.



More information on the function "line contactor control" can be found in the programming manual.



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 154 for further information.



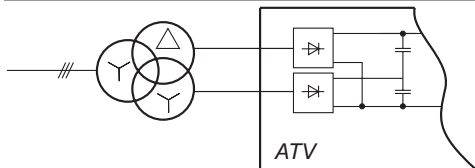
An additional power supply for the 24 V DC buffer voltage will be necessary, when the line contactor has to be controlled by the inverter using the function "line contactor control". See chapter "Buffer voltage 24 V DC", page 155 for further information.

Allocation table

Description		ATV71	Order number	Weight [kg]
Line contactor	400 V	EX●●D90N4, C11N4	VW3 AE 0206	7.000
		EX●●C13N4	VW3 AE 0218	10.000
		EXC●C16N4	VW3 AE 0218	10.000
		EXS5C16N4	VW3 AE 0215	7.000
		EXC●C20N4	VW3 AE 0209	12.000
		EXS5C20N4...C28N4	VW3 AE 0216	10.000
		EXC●C25N4...C31N4	VW3 AE 0210	14.000
		EXS5C31N4	VW3 AE 0210	14.000
		EX●●C40N4	VW3 AE 0212	24.000
		EX●●C50N4	VW3 AE 0213	28.000
		EXA●C50N4, C63N4	VW3 AE 0227 *	42.000
		EXA●C71N4...M13N4	VW3 AE 0224	84.000
	500 V	EX●●D90N	VW3 AE 0205	4.000
		EX●●C11N	VW3 AE 0206	7.000
		EX●●C13N, C16N	VW3 AE 0218	10.000
		EX●●C20N	VW3 AE 0209	12.000
		EX●●C25N	VW3 AE 0210	14.000
		EX●●C31N	VW3 AE 0221	20.000
		EX●●C40N	VW3 AE 0212	24.000
		EX●●C50N	VW3 AE 0213	28.000
		EXA●C50N...C80N	VW3 AE 0227 *	42.000
		EXA●C90N...M15N	VW3 AE 0226	84.000
	690 V	EX●●C11Y...C16Y	VW3 AE 0218	10.000
		EX●●C20Y	VW3 AE 0208	11.000
		EX●●C25Y	VW3 AE 0209	12.000
		EX●●C31Y	VW3 AE 0210	14.000
		EX●●C40Y	VW3 AE 0219	22.000
		EX●●C50Y	VW3 AE 0212	24.000
		EX●●C63Y	VW3 AE 0213	28.000
		EXA●C63Y...M10Y	VW3 AE 0227 *	42.000
		EXA●M12Y...M20Y	VW3 AE 0226	84.000

*When this option is used together with a line reactor, the option VW3 AE 0225 (50.000 kg) must be ordered additionally!

12-pulse supply



When choosing this option the inverter is prepared for 12-pulse supply. Instead of the 3-pole main switch a 6-pole main switch is used.



As the door handle is always outside the enclosure at this option, the option "Door handle for main switch" is not permitted.



At 12-pulse design, the options "cable entry via top" and "circuit breaker" are only available on request.

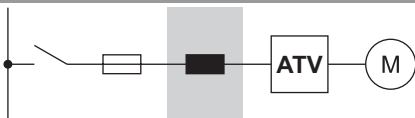


Further information is given in chapter "12-pulse supply", page 22).

Allocation table

Description		ATV71	Order number	Weight [kg]
12-pulse supply	400 V	EXA•C50N4	VW3 AE 2415	–
		EXA•C63N4	VW3 AE 2416	–
		EXA•C71N4	VW3 AE 2417	–
		EXA•C90N4	VW3 AE 2418	–
		EXA•M11N4	VW3 AE 2419	–
		EXA•M13N4	VW3 AE 2420	–
	500 V	EXA•C50N	VW3 AE 2414	–
		EXA•C63N	VW3 AE 2415	–
		EXA•C80N	VW3 AE 2416	–
		EXA•C90N	VW3 AE 2417	–
		EXA•M11N	VW3 AE 2418	–
		EXA•M13N	VW3 AE 2419	–
		EXA•M15N	VW3 AE 2420	–
	690 V	EXA•C63Y	VW3 AE 2414	–
		EXA•C80Y	VW3 AE 2415	–
		EXA•M10Y	VW3 AE 2416	–
		EXA•M12Y	VW3 AE 2417	–
		EXA•M15Y	VW3 AE 2418	–
		EXA•M18Y	VW3 AE 2419	–
		EXA•M20Y	VW3 AE 2420	–

Line reactor



The option line reactor can be used for reduction of the mains current harmonics.

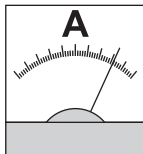


When a transformer with matching power is used, the line reactor can be omitted. See also chapter "12-pulse supply", page 22.

Allocation table

Description		ATV71	Order number	Weight [kg]
Line reactor	400 V	EXA•C50N4, C63N4	VW3 AE 2501	132.000
		EXA•C71N4	VW3 AE 2502	202.000
		EXA•C90N4...M13N4	VW3 AE 2503	264.000
	500 V	EXA•C50N	VW3 AE 2504	154.000
		EXA•C63N	VW3 AE 2505	121.000
		EXA•C80N	VW3 AE 2506	136.000
		EXA•C90N	VW3 AE 2507	308.000
		EXA•M11N, M13N	VW3 AE 2508	242.000
		EXA•M15N	VW3 AE 2509	273.000
	690 V	EXA•C63Y	VW3 AE 2504	154.000
		EXA•C80Y	VW3 AE 2505	121.000
		EXA•M10Y	VW3 AE 2506	136.000
		EXA•M12Y	VW3 AE 2507	308.000
		EXA•M15Y, M18Y	VW3 AE 2508	242.000
		EXA•M20Y	VW3 AE 2509	273.000

Amperemeter „Line current“



This option indicates the line current. It includes a measuring instrument built into the enclosure door and a current transformer.

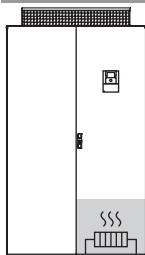


In case of 12-pulse supply one ammeter is built-in in each supply line.

Allocation table

Description	ATV71	Order number	Weight [kg]
Ammeter	400 V	EX●●D90N4... C13N4	VW3 AE 0406 0.200
		EX●●C16N4, C20N4	VW3 AE 0426 0.200
		EX●●C25N4...C31N4	VW3 AE 0409 0.200
		EX●●C40N4	VW3 AE 0427 0.200
		EX●●C50N4	VW3 AE 0411 0.200
		EXA●C50N4	VW3 AE 0411 (6p) VW3 AE 0421 (12p) 0.200
		EXA●C63N4, C71N4	VW3 AE 0413 (6p) VW3 AE 0421 (12p) 0.200
		EXA●C90N4	VW3 AE 0414 (6p) VW3 AE 0429 (12p) 0.200
		EXA●M11N4	VW3 AE 0415 (6p) VW3 AE 0423 (12p) 0.200
		EXA●M13N4	VW3 AE 0416 (6p) VW3 AE 0424 (12p) 0.200
	500 V	EX●●D90N	VW3 AE 0404 0.200
		EX●●C11N...C16N	VW3 AE 0406 0.200
		EX●●C20N, C25N	VW3 AE 0426 0.200
		EX●●C31N...C40N	VW3 AE 0409 0.200
		EX●●C50N	VW3 AE 0427 0.200
		EXA●C50N	VW3 AE 0427 (6p) VW3 AE 0428 (12p) 0.200
		EXA●C63N	VW3 AE 0411 (6p) VW3 AE 0421 (12p) 0.200
		EXA●C80N, C90N	VW3 AE 0413 (6p) VW3 AE 0421 (12p) 0.200
		EXA●M11N	VW3 AE 0414 (6p) VW3 AE 0429 (12p) 0.200
		EXA●M13N	VW3 AE 0415 (6p) VW3 AE 0423 (12p) 0.200
		EXA●M15N	VW3 AE 0416 (6p) VW3 AE 0424 (12p) 0.200
	690 V	EX●●C11Y	VW3 AE 0404 0.200
		EX●●C13Y...C25Y	VW3 AE 0406 0.200
		EX●●C31Y, C40Y	VW3 AE 0426 0.200
		EX●●C50Y, C63Y	VW3 AE 0409 0.200
		EXA●C63Y	VW3 AE 0409 (6p) VW3 AE 0428 (12p) 0.200
		EXA●C80Y	VW3 AE 0427 (6p) VW3 AE 0421 (12p) 0.200
		EXA●M10Y	VW3 AE 0411 (6p) VW3 AE 0421 (12p) 0.200
		EXA●M12Y	VW3 AE 0413 (6p) VW3 AE 0421 (12p) 0.200
		EXA●M15Y	VW3 AE 0414 (6p) VW3 AE 0429 (12p) 0.200
		EXA●M18Y, M20Y	VW3 AE 0415 (6p) VW3 AE 0423 (12p) 0.200

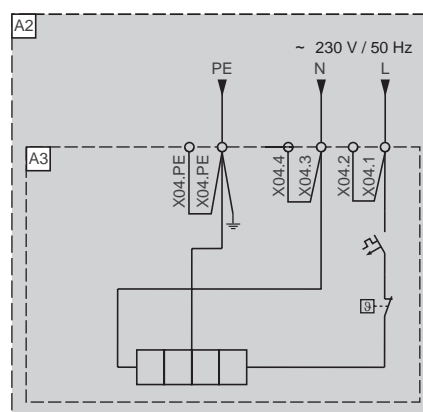
Cubicle heating



This option is used to heat the enclosure in order to avoid frost and condensation up to an ambient temperature of -10°C . It includes the enclosure heating, a thermostat and a circuit breaker. The option is wired to the customer terminals X04 (max. cable cross section: 4 mm^2).



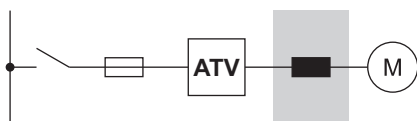
This option requires an additional external 230 V supply (500...1500 VA, depending on the option)! This supply has to be human protected!



Allocation table

Description		ATV71	Order number	Weight [kg]
Enclosure heater	400 V	EX●●D90N4...C28N4	VW3 AE 0501	0.500
		EX●●C31N4...C50N4	VW3 AE 0502	1.000
		EXA●C50N4...C63N4	VW3 AE 0502	1.000
		EXA●C71N4...M13N4	VW3 AE 0503	1.500
	500 V	EX●●D90N...C25N	VW3 AE 0501	0.500
		EX●●C31N...C50N	VW3 AE 0502	1.000
		EXA●C50N...C80N	VW3 AE 0502	1.000
		EXA●C90N...M15N	VW3 AE 0503	1.500
	690 V	EX●●C11Y...C31Y	VW3 AE 0501	0.500
		EX●●C40Y...C63Y	VW3 AE 0502	1.000
		EXA●C63Y...M10Y	VW3 AE 0502	1.000
		EXA●M12Y...M20Y	VW3 AE 0503	1.500

Motor choke



At the output of a voltage source frequency inverter there is a pulsed voltage with a pulse frequency of 2...16 kHz (ATV71EX●●●●N, Y: 2...6 kHz) and a slew rate of more than 10 kV/μs.

The use of the option motor choke has significant advantages concerning the trouble-free operation of the drive:

- Decrease of the voltage load of the motor – recommended from 50 m, necessary from 100 m for 400 V mains supply
10 m, necessary from 30 m for 690 V mains supply
- Prevention of common mode bearing currents in the motor – especially important at high power
- Great reduction of the influences to other cables – important if the separate laying of motor cables cannot be ensured

By means of the especially developed system the voltage drop at the motor choke is negligible small.



This option cannot be combined with the option sinus filter!

Allocation table

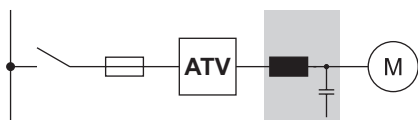
Description		ATV71	Order number	Weight [kg]
Motor choke	400 V	EXC●D90N4	VW3 AE 0603	17.000
		EXS5D90N4	VW3 AE 0615	37.000
		EXC●C11N4, C13N4	VW3 AE 0604	35.000
		EXS5C11N4, C13N4	VW3 AE 0617	55.000
		EXC●C16N4, C20N4	VW3 AE 0605	64.000
		EXS5C16N4	VW3 AE 0619	157.000
		EXS5C20N4	VW3 AE 0620	160.000
		EXC●C25N4, C28N4	VW3 AE 0606	102.000
		EXS5C25N4, C28N4	VW3 AE 0621	192.000
		EXC2C31N4	VW3 AE 0607	192.000
		EXC5C31N4	VW3 AE 0611	192.000
		EXS5C31N4	VW3 AE 0622	197.000
		EXC2C40N4	VW3 AE 0609	228.000
		EXC5C40N4	VW3 AE 0613	228.000
		EXS5C40N4	VW3 AE 0624	228.000
		EXC2C50N4	VW3 AE 0610	234.000
		EXC5C50N4	VW3 AE 0614	234.000
		EXS5C50N4	VW3 AE 0625	234.000
		EXA●C50N4, C63N4	VW3 AE 0635	132.000
		EXA●C71N4...M13N4	VW3 AE 0636	264.000
	500 V	EX●●D90N, C11N	VW3 AE 0603	17.000
		EX●●C13N, C16N	VW3 AE 0604	35.000
		EX●●C20N, C25N	VW3 AE 0605	64.000
		EXC2C31N, C40N	VW3 AE 0626	192.000
		EXC5C31N, C40N	VW3 AE 0628	192.000
		EXS5C31N, C40N	VW3 AE 0630	197.000
		EXC2C50N	VW3 AE 0627	234.000
		EXC5C50N	VW3 AE 0629	234.000
		EXS5C50N	VW3 AE 0631	234.000
		EXA●C50N...C80N	VW3 AE 0635	132.000
		EXA●C90N...M15N	VW3 AE 0636	264.000

Cubicle options (depending on power)

Altivar 71 Plus Options

Allocation table			
Description	ATV71	Order number	Weight [kg]
690 V	EX●●C11Y, C13Y	VW3 AE 0603	17.000
	EX●●C16Y, C20Y	VW3 AE 0604	35.000
	EX●●C25Y, C31Y	VW3 AE 0605	64.000
	EXC2C40Y, C50Y	VW3 AE 0626	192.000
	EXC5C40Y, C50Y	VW3 AE 0628	192.000
	EXS5C40Y, C50Y	VW3 AE 0630	197.000
	EXC2C63Y	VW3 AE 0627	234.000
	EXC5C63Y	VW3 AE 0629	234.000
	EXS5C63Y	VW3 AE 0631	234.000
	EXA●C63Y...M10Y	VW3 AE 0635	132.000
	EXA●M12Y...M20Y	VW3 AE 0636	264.000

Sinus filter



This option permits nearly sinusoidal motor voltage. Therefore, additional noises at the motor are totally prevented. The sinus filter can be also used alternatively to the option motor choke.



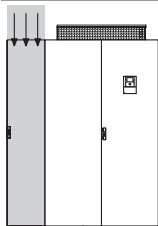
This option cannot be combined with the option sinus filter or option cable entry via the top!



The maximum operating frequency of the sinus filters is 100 Hz!

Allocation table			
Description	ATV71	Order number	Weight [kg]
Sinus filter 400 V	EXC2D90N4	VW3 AE 0641	318.000
	EXC5D90N4	VW3 AE 0653	348.000
	EXS5D90N4	VW3 AE 0665	318.000
	EXC2C11N4	VW3 AE 0642	318.000
	EXC5C11N4	VW3 AE 0654	325.000
	EXS2C11N4	VW3 AE 0666	325.000
	EXC2C13N4	VW3 AE 0644	365.000
	EXC5C13N4	VW3 AE 0656	365.000
	EXS5C13N4	VW3 AE 0668	365.000
	EXC2C16N4	VW3 AE 0645	373.000
	EXC5C16N4	VW3 AE 0657	373.000
	EXS5C16N4	VW3 AE 0669	373.000
	EXC2C20N4	VW3 AE 0647	384.000
	EXC5C20N4	VW3 AE 0659	394.000
	EXS5C20N4	VW3 AE 0671	394.000
	EXC2C25N4, C28N4	VW3 AE 0648	434.000
	EXC5C25N4, C28N4	VW3 AE 0660	434.000
	EXS5C25N4, C28N4	VW3 AE 0672	434.000
	EXC2C31N4	VW3 AE 0649	445.000
	EXC5C31N4	VW3 AE 0661	445.000
	EXS5C31N4	VW3 AE 0673	445.000
	EXC2C40N4	VW3 AE 0651	870.000
	EXC5C40N4	VW3 AE 0663	900.000
	EXS5C40N4	VW3 AE 0675	900.000
	EXC2C50N4	VW3 AE 0652	900.000
	EXC5C50N4	VW3 AE 0664	930.000
	EXS5C50N4	VW3 AE 0676	930.000

Cable entry above



This option allows the connection of the mains and motor cables from the top of the enclosure.



For 12-pulse supply the option "Cable entry via top" is only available on request.



For the width of the enclosure in combination with the cable entry via top check out the table in chapter "Width of the cubicle", page 179.

Allocation table

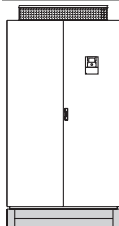
Description			ATV71	Order number	Weight [kg]
Cable entry via the top	400V	Without motor choke	EXC•D90N4, C11N4	VW3 AE 0705	108.000
			EXS5D90N4, C11N4	VW3 AE 0715	123.000
			EXC•C13N4	VW3 AE 0706	108.000
			EXS5C13N4	VW3 AE 0716	123.000
			EXC•C16N4	VW3 AE 0707	108.000
			EXS5C16N4	VW3 AE 0717	123.000
			EXC•C20N4...C28N4	VW3 AE 0708	126.000
			EXS5C20N4...C28N4	VW3 AE 0718	141.000
			EXC•C31N4	VW3 AE 0709	216.000
			EXS5C31N4	VW3 AE 0719	123.000
			EXC•C40N4	VW3 AE 0710	252.000
			EXS5C40N4	VW3 AE 0720	141.000
			EXC•C50N4	VW3 AE 0711	252.000
			EXS5C50N4	VW3 AE 0721	141.000
			EXA•C50N4...C63N4	VW3 AE 0740	126.000
			EXA•C71N4...M13N4	VW3 AE 0741	150.000
		With motor choke	EXC•D90N4, C11N4	VW3 AE 0705	108.000
			EXS5D90N4, C11N4	VW3 AE 0715	123.000
			EXC•C13N4	VW3 AE 0706	108.000
			EXS5C13N4	VW3 AE 0716	123.000
			EXC•C16N4	VW3 AE 0707	108.000
			EXS5C16N4	VW3 AE 0722	123.000
			EXC•C20N4...C28N4	VW3 AE 0708	126.000
			EXS5C20N4...C28N4	VW3 AE 0723	141.000
			EXC•C31N4	VW3 AE 0712	108.000
			EXS5C31N4	VW3 AE 0724	–
			EXC•C40N4	VW3 AE 0713	126.000
			EXS5C40N4	VW3 AE 0725	–
			EXC•C50N4	VW3 AE 0714	126.000
			EXS5C50N4	VW3 AE 0726	–
			EXA•C50N4...C63N4	VW3 AE 0740	126.000
			EXA•C71N4...M13N4	VW3 AE 0741	150.000
	500 V	Without motor choke	EXC•D90N...C13N	VW3 AE 0728	108.000
			EXS5D90N...C13N	VW3 AE 0732	–
			EXC•C16N...C25N	VW3 AE 0729	126.000
			EXS5C16N...C25N	VW3 AE 0733	–
			EXC•C31N...C50N	VW3 AE 0730	252.000
			EXS5C31N...C50N	VW3 AE 0734	252.000
			EXA•C50N...C80N	VW3 AE 0740	126.000
			EXA•C90N...M15N	VW3 AE 0741	150.000
		With motor choke	EXC•D90N...C13N	VW3 AE 0728	108.000
			EXS5D90N...C13N	VW3 AE 0735	108.000
			EXC•C16N...C25N	VW3 AE 0729	126.000
			EXS5C16N...C25N	VW3 AE 0736	126.000
			EXC•C31N...C50N	VW3 AE 0731	126.000
			EXS5C31N...C50N	VW3 AE 0737	252.000
			EXA•C50N...C80N	VW3 AE 0740	126.000
			EXA•C90N...M15N	VW3 AE 0741	150.000

*Cubicle options
(depending on power)*

Altivar 71 Plus
Options

Allocation table				
Description		ATV71	Order number	Weight [kg]
690 V	Without motor choke	EXC•C11Y...C16Y	VW3 AE 0728	108.000
		EXS5C11Y...C16Y	VW3 AE 0732	–
		EXC•C20Y...C31Y	VW3 AE 0729	126.000
		EXS5C20Y...C31Y	VW3 AE 0733	–
		EXC•C40Y...C63Y	VW3 AE 0730	252.000
		EXS5C40Y...C63Y	VW3 AE 0734	252.000
		EXA•C63Y...M10Y	VW3 AE 0740	126.000
		EXA•M12Y...M20Y	VW3 AE 0741	150.000
	With motor choke	EXC•C11Y...C16Y	VW3 AE 0728	108.000
		EXS5C11Y...C16Y	VW3 AE 0735	108.000
		EXC•C20Y...C31Y	VW3 AE 0729	126.000
		EXS5C20Y...C31Y	VW3 AE 0736	126.000
		EXC•C40Y...C63Y	VW3 AE 0731	126.000
		EXS5C40Y...C63Y	VW3 AE 0737	252.000
		EXA•C63Y...M10Y	VW3 AE 0740	126.000
		EXA•M12Y...M20Y	VW3 AE 0741	150.000

Cubicle plinth 200 mm



There are different additional plinths for the Altivar in IP23 or IP54 design available. Which plinth is necessary depends on the built-in options of the ATV71. Check out the allocation table below. The height of the enclosure will increase of 200 mm.



The ATV71 in IP54 design with separated air flow is delivered with a plinth as standard.

Allocation table

Description			ATV71	Order number	Weight [kg]
Enclosure plinth	400 V	Without motor choke	EXC•D90N4...C16N4	VW3 AE 0801	11.000
			EXC•C20N4...C28N4	VW3 AE 0802	13.000
			EXC•C31N4, C40N4	VW3 AE 0803	15.000
			EXC•C50N4	VW3 AE 0804	17.000
			EXA•C50N4...C63N4	VW3 AE 0820 **	38.000
			EXA•C71N4...M13N4	VW3 AE 0822	69.000
		With motor choke	EXC•D90N4...C16N4	VW3 AE 0801	11.000
			EXC•C20N4...C28N4	VW3 AE 0802	13.000
			EXC•C31N4, C40N4	VW3 AE 0805	24.000
			EXC•C50N4	VW3 AE 0806	26.000
			EXA•C50N4...C63N4	VW3 AE 0820 **	38.000
			EXA•C71N4...M13N4	VW3 AE 0822	69.000
		With line reactor	EXA•C50N4...C63N4	VW3 AE 0820 **	38.000
			EXA•C71N4...M13N4	VW3 AE 0824	78.000
Additional enclosure plinth for cable entry via the top		Without motor choke	EXC•D90N4...C28N4	VW3 AE 0807	9.000
			EXC•C31N4...C50N4	VW3 AE 0808	18.000
			EXA•C50N4...C63N4	VW3 AE 0825	9.000
			EXA•C71N4...M13N4	VW3 AE 0826	11.000
		With motor choke	EXC•D90N4...C28N4	VW3 AE 0807	9.000
			EXC•C31N4...C50N4	VW3 AE 0809	9.000
			EXA•C50N4...C63N4	VW3 AE 0825	9.000
			EXA•C71N4...M13N4	VW3 AE 0826	11.000
Additional enclosure plinth For braking unit			EXC•C20N4...C28N4	– *	–
			EXC•C31N4...C50N4	VW3 AE 0810	9.000
Additional enclosure plinth for sinus filter			EXC•D90N4...C31N4	VW3 AE 0816	11.000
			EXC•C40N4, C50N4	VW3 AE 0817	13.000
Enclosure plinth	500 V	No option	EXC•D90N...C13N	VW3 AE 0801	11.000
			EXC•C16N...C25N	VW3 AE 0802	13.000
			EXC•C31N...C50N	VW3 AE 0804	17.000
			EXA•C50N...C80N	VW3 AE 0820 **	38.000
			EXA•C90N...M15N	VW3 AE 0822	69.000
		With motor choke	EXC•D90N...C13N	VW3 AE 0801	11.000
			EXC•C16N...C25N	VW3 AE 0802	13.000
			EXC•C31N...C50N	VW3 AE 0806	26.000
			EXA•C50N...C80N	VW3 AE 0820 **	38.000
			EXA•C90N...M15N	VW3 AE 0822	69.000
		With line reactor	EXA•C50N...C80N	VW3 AE 0820 **	38.000
			EXA•C90N...M15N	VW3 AE 0824	78.000

Cubicle options (depending on power)

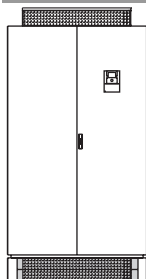
Altivar 71 Plus Options

Allocation table					
Description			ATV71	Order number	Weight [kg]
Additional enclosure plinth for cable entry via the top	Without motor choke		EXC●D90N...C25N	VW3 AE 0807	9.000
			EXC●C31N...C50N	VW3 AE 0808	18.000
			EXA●C50N...C80N	VW3 AE 0825	9.000
			EXA●C90N...M15N	VW3 AE 0826	11.000
	With motor choke		EXC●D90N...C25N	VW3 AE 0807	9.000
			EXC●C31N...C50N	VW3 AE 0809	9.000
			EXA●C50N...C80N	VW3 AE 0825	9.000
			EXA●C90N...M15N	VW3 AE 0826	11.000
Additional enclosure plinth for braking unit			EXC●C16N...C50N	VW3 AE 0810	9.000
Enclosure plinth 690 V	No option		EXC●C11Y...C16Y	VW3 AE 0801	11.000
			EXC●C20Y...C31Y	VW3 AE 0802	13.000
			EXC●C40Y...C63Y	VW3 AE 0804	17.000
			EXA●C63Y...M10Y	VW3 AE 0820 **	38.000
			EXA●M12Y...M20Y	VW3 AE 0822	69.000
	With motor choke		EXC●C11Y...C16Y	VW3 AE 0801	11.000
			EXC●C20Y...C31Y	VW3 AE 0802	13.000
			EXC●C40Y...C63Y	VW3 AE 0806	26.000
			EXA●C63N...M10N	VW3 AE 0820 **	38.000
			EXA●M12Y...M20Y	VW3 AE 0822	69.000
	With line reactor		EXA●C63Y...M10Y	VW3 AE 0820 **	38.000
			EXA●M12Y...M20Y	VW3 AE 0824	78.000
Additional enclosure plinth for cable entry via the top	Without motor choke		EXC●C11Y...C31Y	VW3 AE 0807	9.000
			EXC●C40Y...C63Y	VW3 AE 0808	18.000
			EXA●C63Y...M10Y	VW3 AE 0825	9.000
			EXA●M12Y...M20Y	VW3 AE 0826	11.000
	With motor choke		EXC●C11Y...C31Y	VW3 AE 0807	9.000
			EXC●C40Y...C63Y	VW3 AE 0809	9.000
			EXA●C63Y...M10Y	VW3 AE 0825	9.000
			EXA●M12Y...M20Y	VW3 AE 0826	11.000
Additional enclosure plinth for braking unit			EXC●C20Y...C63Y	VW3 AE 0810	9.000

*..... Therefore is no extra enclosure plinth necessary.

**..... When using a line reactor and line contactor the option VW3 AE 0821 (40.000 kg) has to be used instead of the option VW3 AE 0820.

Plinth grill fine



Extra fine grill (2.5 mm diameter) for the plinth of the enclosure.



This option is only available for the ATV71 in IP54 with separated air flow !

Allocation table

Description		ATV71	Order number	Weight [kg]
Plinth equipped with a fine mesh grille	400 V	EXS5D90N4...C16N4	VW3 AE 0812	2.000
		EXS5C20N4...C28N4	VW3 AE 0813	3.000
		EXS5C31N4, C40N4	VW3 AE 0814	4.000
		EXS5C50N4	VW3 AE 0815	5.000
	500 V	EXS5D90N...C13N	VW3 AE 0812	2.000
		EXS5C16N...C25N	VW3 AE 0813	3.000
		EXS5C31N...C50N	VW3 AE 0815	5.000
	690 V	EXS5C11Y...C16Y	VW3 AE 0812	2.000
		EXS5C20Y...C31Y	VW3 AE 0813	3.000
		EXS5C40Y...C63Y	VW3 AE 0815	5.000

Air condition (for IP54 with separated air flow)

When using this option the cooling of the control part losses in an IP54 cubicle with separated air flow is possible without filter fans. It includes an air condition mounted in the cubicle door and a circuit breaker. The trip relay is assigned to the inverter terminals and will cause in case of an error a trip shut-down of the inverter.



This option affects the depth of the cubicle!
See chapter "Width of the cubicle", page 179 for further details.



This option is only available for the ATV71 in IP54 with separated air flow !



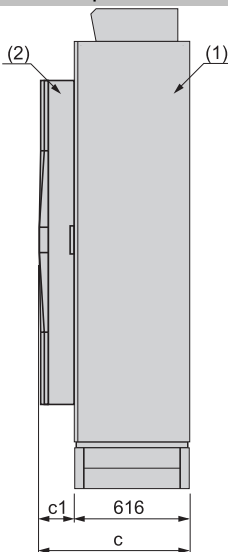
Because of the dimensions of the air condition following options in the enclosure door are not possible for ATV71EXS•D90N4...C28N4, D90N...C25N and C11Y...C31Y devices:

- Ammeter
- Voltmeter
- Emergency stop button (Safe standstill)
- Key switch
- Door handle for circuit breaker
- Isolating handle for switch

Cubicle options (depending on power)

Altivar 71 Plus Options

Allocation table					
Description			ATV71	Order number	Weight [kg]
Air conditioning	400 V	Without motor choke	EXS5D90N4	VW3 AE 0901	29.500
			EXS5C11N4	VW3 AE 0902	29.500
			EXS5C13N4	VW3 AE 0903	29.500
			EXS5C16N4	VW3 AE 0904	56.000
			EXS5C20N4...C28N4	VW3 AE 0905	71.000
			EXS5C31N4	VW3 AE 0906	71.000
			EXS5C40N4	VW3 AE 0907	71.000
			EXS5C50N4	VW3 AE 0908	86.000
		With motor choke	EXS5D90N4	VW3 AE 0909	56.000
			EXS5C11N4	VW3 AE 0911	56.000
			EXS5C13N4	VW3 AE 0912	56.000
			EXS5C16N4	VW3 AE 0914	71.000
			EXS5C20N4...C28N4	VW3 AE 0915	71.000
			EXS5C31N4	VW3 AE 0916	71.000
	500 V	Without motor choke	EXS5D90N...C13N	VW3 AE 0919	56.000
			EXS5C16N...C25N	VW3 AE 0920	71.000
			EXS5C31N...C50N	VW3 AE 0921	86.000
		With motor choke	EXS5D90N...C13N	VW3 AE 0922	71.000
			EXS5C16N...C25N	VW3 AE 0923	71.000
			EXS5C31N...C50N	VW3 AE 0924	86.000
	690 V	Without motor choke	EXS5C11Y...C16Y	VW3 AE 0919	56.000
			EXS5C20Y...C31Y	VW3 AE 0920	71.000
			EXS5C40Y...C63Y	VW3 AE 0921	86.000
		With motor choke	EXS5C11Y...C16Y	VW3 AE 0922	71.000
			EXS5C20Y...C31Y	VW3 AE 0923	71.000
			EXS5C40Y...C63Y	VW3 AE 0924	86.000

Protection degree IP54 with separated air flow and option air condition			
Cubicle depth	Order number	c1	c
	VW3 AE 0901	231 mm	847 mm
	VW3 AE 0902	231 mm	847 mm
	VW3 AE 0903	231 mm	847 mm
	VW3 AE 0904	180 mm	796 mm
	VW3 AE 0905	240 mm	856 mm
	VW3 AE 0906	240 mm	856 mm
	VW3 AE 0907	240 mm	856 mm
	VW3 AE 0908	360 mm	976 mm
	VW3 AE 0909	180 mm	796 mm
	VW3 AE 0911	180 mm	796 mm
	VW3 AE 0912	180 mm	796 mm
	VW3 AE 0914	240 mm	856 mm
	VW3 AE 0915	240 mm	856 mm
	VW3 AE 0916	240 mm	856 mm
	VW3 AE 0917	360 mm	976 mm
	VW3 AE 0918	360 mm	976 mm
	VW3 AE 0919	180 mm	796 mm
	VW3 AE 0920	240 mm	856 mm
	VW3 AE 0921	360 mm	976 mm

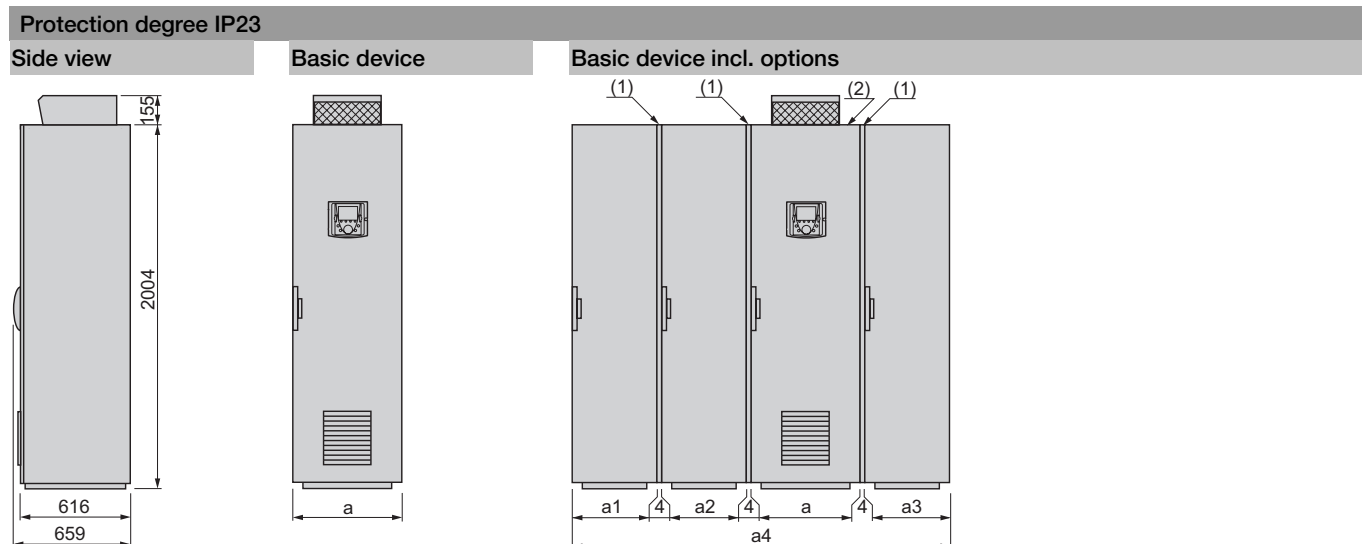
(1) Standard IP54 enclosure with separated air flow

(2) Option air condition

*Cubicle options
(depending on power)*

Altivar 71 Plus
Options

The following tables specify the width of the enclosure that depends on the protection degree and the use of the options cable entry via the top and motor choke.



ATV71	Option	a	a1	a2	a3	a4
EXC2D90N4...EXC2C16N4	With or without general options (3) or options depending on the power	616	–	–	–	616
	Cable entry via the top (4)	608	–	408	–	1020
	Sinus filter	608	–	–	608	1220
EXC2C20N4...EXC2C28N4	With or without general options (3) or options depending on the power	816	–	–	–	816
	Cable entry via the top (4)	808	–	408	–	1220
	Sinus filter	808	–	–	608	1420
EXC2D90N...EXC2C13N, EXC2C11Y...EXC2C16Y	With or without general options or options depending on the power	616	–	–	–	616
	Cable entry via the top	608	–	408	–	1020
EXC2C16N...EXC2C25N, EXC2C20Y...EXC2C31Y	With or without general options or options depending on the power	816	–	–	–	816
	Cable entry via the top	808	–	408	–	1220
	Braking unit	808	–	408	–	1220
	Braking unit + cable entry via the top	808	408	400	–	1624

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

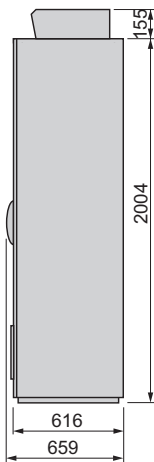
(2) Standard IP23 enclosure

(3) Except option "Sinus filter" which needs an additional enclosure.

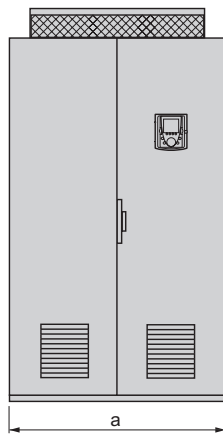
(4) Option "cable entry via the top" is not compatible with the option "sinus filter".

Protection degree IP23

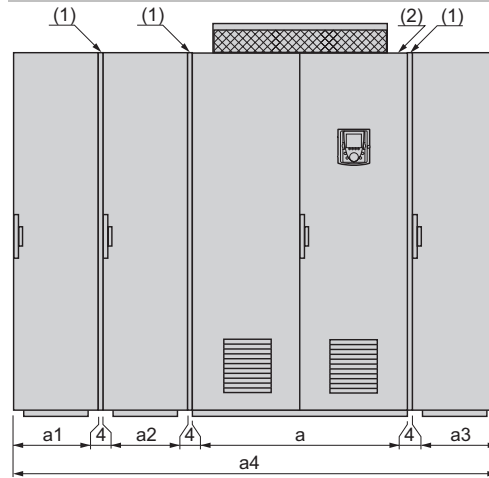
Side view



Basic device



Basic device incl. options



ATV71	Option	a	a1	a2	a3	a4
EXC2C31N4	With or without general options (3) or options depending on the power	1016	–	–	–	1016
	Cable entry via the top (4)	1000	–	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	–	408	–	1420
	Braking unit + cable entry via the top (4)	1000	408	400	408	2228
	Motor choke	1008	–	–	408	1420
	Sinus filter	1008	–	–	608	1620
	Sinus filter + braking unit	1000	–	408	608	2024
EXC2C40N4	With or without general options (3) or options depending on the power	1016	–	–	–	1016
	Cable entry via the top (4)	1000	–	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	–	408	–	1420
	Braking unit + cable entry via the top (4)	1000	408	400	408	2228
	Motor choke	1008	–	–	408	1420
	Sinus filter	1008	–	–	808	1820
	Sinus filter + braking unit	1000	–	408	808	2224
EXC2C50N4	With or without general options (3) or options depending on the power	1216	–	–	–	1216
	Cable entry via the top (4)	1200	–	408	408	2024
	Braking unit and / or options depending on the power (3)	1208	–	408	–	1620
	Braking unit + cable entry via the top (4)	1200	408	400	408	2428
	Motor choke	1208	–	–	408	1620
	Sinus filter	1208	–	–	808	2020
	Sinus filter + braking unit	1200	–	408	808	2424
EXC2C31N...EXC2C50N, EXC2C40Y...EXC2C63Y	With or without general options or options depending on the power	1216	–	–	–	1216
	Cable entry via the top	1200	–	408	408	2024
	Braking unit and/or options depending on the power	1208	–	408	–	1620
	Braking unit + cable entry via the top	1200	408	400	408	2428
	Motor choke	1208	–	–	408	1620

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

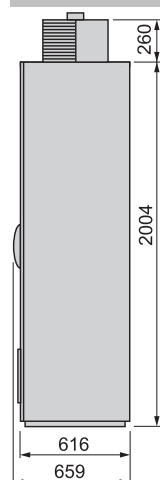
(2) Standard IP23 enclosure

(3) Except option "Sinus filter" which needs an additional enclosure.

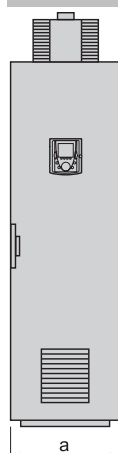
(4) Option "cable entry via the top" is not compatible with the option "sinus filter".

Protection degree IP54

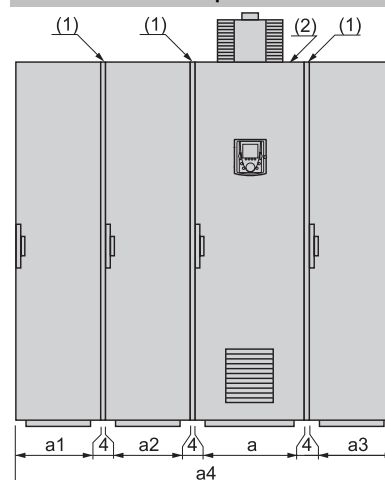
Side view



Basic device



Basic device incl. options



ATV71	Option	a	a1	a2	a3	a4
EXC5D90N4...EXC5C16N4	With or without general options (3) or options depending on the power	616	–	–	–	616
	Cable entry via the top (4)	608	–	408	–	1020
	Sinus filter	608	–	–	608	1220
EXC5C20N4...EXC5C28N4	With or without general options (3) or options depending on the power	816	–	–	–	816
	Cable entry via the top (4)	808	–	408	–	1220
	Sinus filter	808	–	–	608	1420
EXC5D90N...EXC5C13N, EXC5C11Y...EXC5C16Y	With or without general options or options depending on the power	616	–	–	–	616
	Cable entry via the top	608	–	408	–	1020
EXC5C16N...EXC5C25N, EXC5C20Y...EXC5C31Y	With or without general options or options depending on the power	816	–	–	–	816
	Cable entry via the top	808	–	408	–	1220
	Braking unit	808	–	408	–	1220
	Braking unit + cable entry via the top	808	408	400	–	1624

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

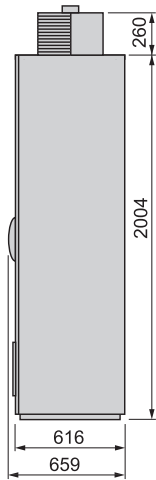
(2) Standard IP54 enclosure

(3) Except option "Sinus filter" which needs an additional enclosure.

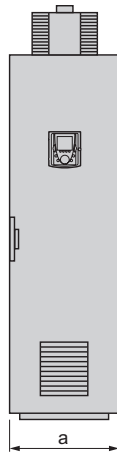
(4) Option "cable entry via the top" is not compatible with the option "sinus filter".

Protection degree IP54

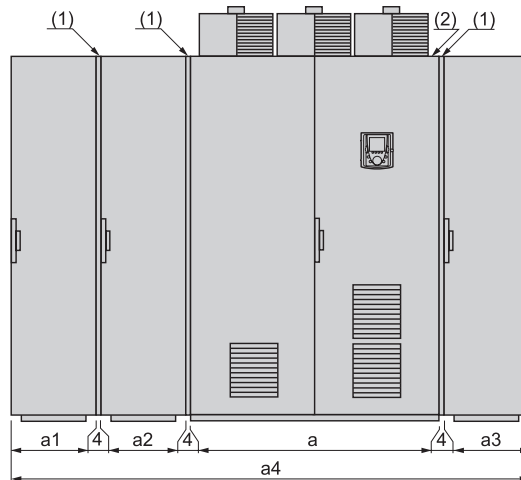
Side view



Basic device



Basic device incl. options



ATV71	Option	a	a1	a2	a3	a4
EXC5C31N4	With or without general options (3) or options depending on the power	1016	–	–	–	1016
	Cable entry via the top (4)	1000	–	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	–	408	–	1420
	Braking unit + cable entry via the top (4)	1000	408	400	408	2228
	Motor choke	1008	–	–	408	1420
	Sinus filter	1008	–	–	608	1620
	Sinus filter + braking unit	1000	–	408	608	2024
EXC5C40N4	With or without general options (3) or options depending on the power	1016	–	–	–	1016
	Cable entry via the top (4)	1000	–	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	–	408	–	1420
	Braking unit + cable entry via the top (4)	1000	408	400	408	2228
	Motor choke	1008	–	–	408	1420
	Sinus filter	1008	–	–	808	1820
	Sinus filter + braking unit	1000	–	408	808	2224
EXC5C50N4	With or without general options (3) or options depending on the power	1216	–	–	–	1216
	Cable entry via the top (4)	1200	–	408	408	2024
	Braking unit and / or options depending on the power (3)	1208	–	408	–	1620
	Braking unit + cable entry via the top (4)	1200	408	400	408	2428
	Motor choke	1208	–	–	408	1620
	Sinus filter	1208	–	–	808	2020
	Sinus filter + braking unit	1200	–	408	808	2424
EXC5C31N...EXC5C50N, EXC5C40Y...EXC5C63Y	With or without general options or options depending on the power	1216	–	–	–	1216
	Cable entry via the top	1200	–	408	408	2024
	Braking unit and/or options depending on the power	1208	–	408	–	1620
	Braking unit + cable entry via the top	1200	408	400	408	2428
	Motor choke	1208	–	–	408	1620

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

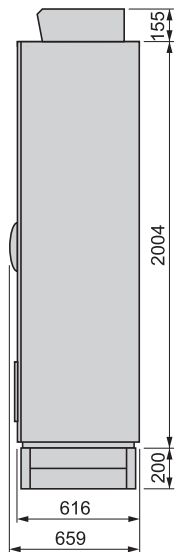
(2) Standard IP54 enclosure

(3) Except option "Sinus filter" which needs an additional enclosure.

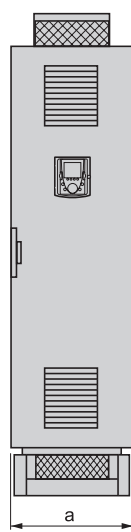
(4) Option "cable entry via the top" is not compatible with the option "sinus filter".

Protection degree IP54 with separated air flow

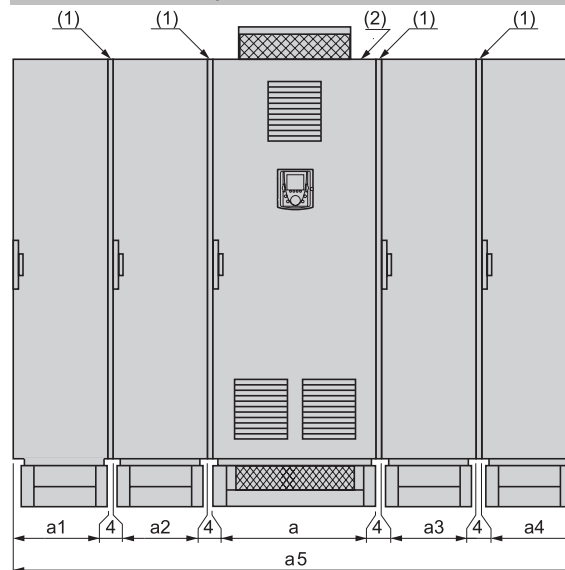
Side view



Basic device



Basic device incl. options



ATV71	Option	a	a1	a2	a3	a4	a5
EXS5D90N4...EXS5C13N4	With or without general options (3) or options depending on the power	616	–	–	–	–	616
	Cable entry via the top (4)	608	–	408	–	–	1020
	Sinus filter	608	–	–	608	–	1220
EXS5C16N4	With or without general options (3) or options depending on the power	616	–	–	–	–	616
	Motor choke	608	–	–	408	–	1020
	Cable entry via the top (4)	608	–	408	–	–	1020
	Motor choke + cable entry via the top	600	–	408	408	–	1424
	Sinus filter	608	–	–	608	–	1220
EXS5C20N4...EXS5C28N4	With or without general options (3) or options depending on the power	816	–	–	–	–	816
	Cable entry via the top (4)	808	–	408	–	–	1220
	Sinus filter	808	–	–	608	–	1420
	Motor choke	808	–	–	408	–	1220
	Motor choke + cable entry via the top	800	–	–	408	–	1220
EXS5D90N...EXS5C13N, EXS5C11Y...EXS5C16Y	With or without general options (3) or options depending on the power	608	–	–	408	–	1020
	Cable entry via the top (4)	608	–	–	408	–	1020
	Motor choke and cable entry via the top	600	–	408	408	–	1424
EXS5C16N...EXS5C25N, EXS5C20Y...EXS5C31Y	With or without general options (3) or options depending on the power	808	–	–	408	–	1220
	Cable entry via the top (4)	808	–	–	408	–	1220
	Braking unit	800	–	408	408	–	1624
	Braking unit + cable entry via the top	800	–	408	408	–	1624
	Motor choke + cable entry via the top	800	–	408	408	–	1624
	Motor choke + braking unit + cable entry via the top	800	408	400	408	–	2028

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

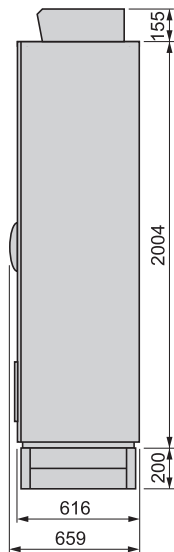
(2) Standard IP54 enclosure

(3) Except option "Sinus filter" which needs an additional enclosure.

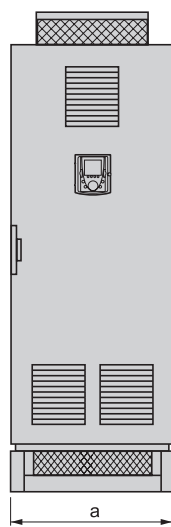
(4) Option "cable entry via the top" is not compatible with the option "sinus filter".

Protection degree IP54 with separated air flow

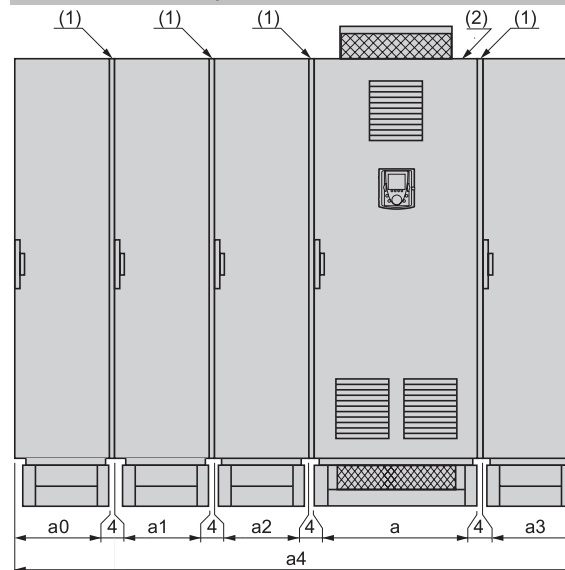
Side view



Basic device



Basic device incl. options



ATV71	Option	a	a0	a1	a2	a3	a4
EXS5C31N4	With or without general options (3) or options depending on the power	1008	–	–	408	–	1420
	Cable entry via the top (4)	1000	–	–	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	–	408	400	–	1824
	Braking unit + cable entry via the top (4)	1000	–	408	400	408	2228
	Motor choke	1000	–	–	408	408	1824
	Sinus filter	1000	–	–	408	608	2024
	Sinus filter + braking unit	1000	–	408	400	608	2428
EXS5C40N4	With or without general options (3) or options depending on the power	1008	–	–	408	–	1420
	Cable entry via the top (4)	1000	–	–	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	–	408	400	–	1824
	Braking unit + cable entry via the top (4)	1000	–	408	400	408	2228
	Motor choke	1000	–	–	408	408	1824
	Sinus filter	1000	–	–	408	808	2224
	Sinus filter + braking unit	1000	–	408	400	808	2628
EXS5C50N4	With or without general options (3) or options depending on the power	1208	–	–	408	–	1620
	Cable entry via the top (4)	1200	–	–	408	408	2024
	Braking unit and / or options depending on the power (3)	1208	–	408	400	–	2024
	Braking unit + cable entry via the top (4)	1200	–	408	400	408	2428
	Motor choke	1200	–	–	400	408	2028
	Sinus filter	1200	–	–	408	808	2424
	Sinus filter + braking unit	1200	–	408	400	808	2828
EXS5C31N...EXS5C50N, EXS5C40Y...EXS5C63Y	With or without general options (3) or options depending on the power	1208	–	–	408	–	1620
	Cable entry via the top (4)	1200	–	408	400	408	2428
	Braking unit and / or options depending on the power (3)	1208	–	408	400	–	2024
	Braking unit + cable entry via the top (4)	1200	408	400	400	408	2832
	Motor choke	1200	–	–	408	408	2024

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

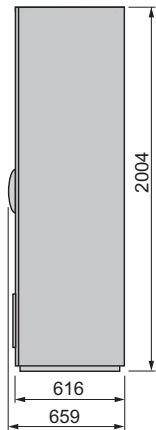
(2) Standard IP54 enclosure

(3) Except option "Sinus filter" which needs an additional enclosure.

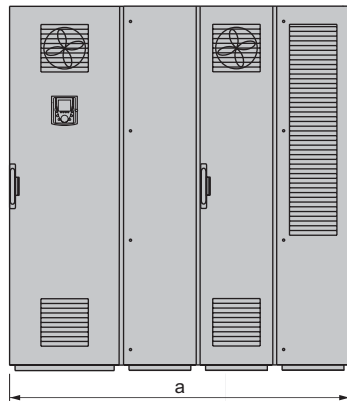
(4) Option "cable entry via the top" is not compatible with the option "sinus filter".

Design with internal cooling circuit

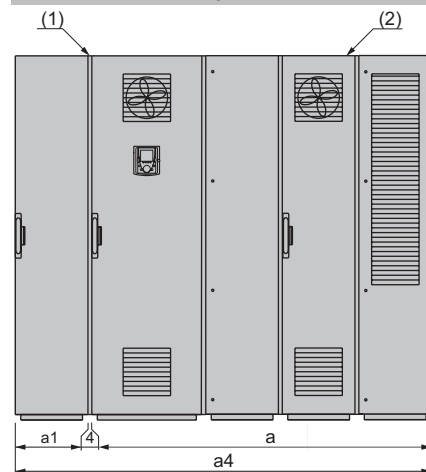
Side view



Basic device



Basic device incl. options



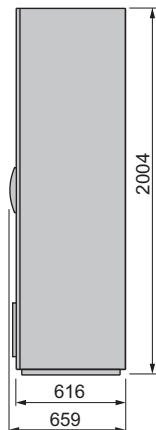
ATV71	Option	a	a1	a2	a3	a4
EXA●C50N4...C63N4	With or without general options or options depending on the power	1828	–	–	–	1828
EXA●C50N...C80N	Line contactor and line reactor	2028	–	–	–	2028
EXA●C63Y...M10Y	Cable entry via the top	1820	408	–	–	2232
	Line contactor and line reactor with cable entry above	2020	408	–	–	2432

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

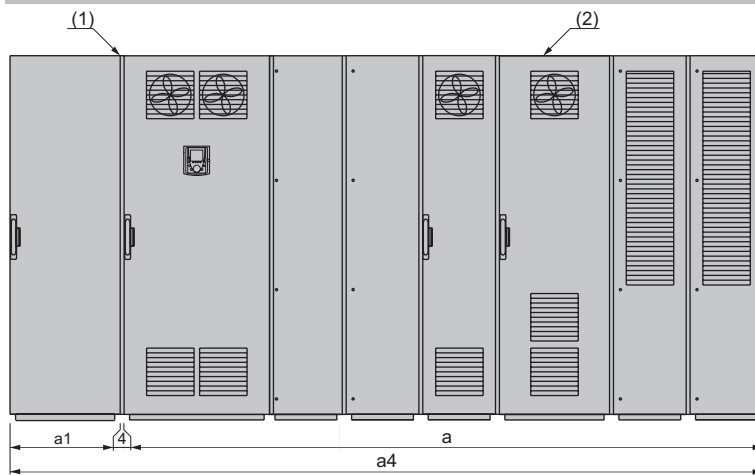
(2) Standard enclosure

Design with internal cooling circuit

Side view



Basic device incl. options



ATV71	Option	a	a1	a2	a3	a4
EXA●C71N4...M13N4	With or without general options or options depending on the power	3440	–	–	–	3032
EXA●C90N...M15N	Line reactor	3840	–	–	–	3840
EXA●M12Y...M20Y						

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

(2) Standard enclosure

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Due to evolution of standards and equipment, the characteristics indicated in texts and images of this document do not constitute a commitment on our part without confirmation.
Design: Schneider Electric Power Drives
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