

# Altivar Process ATV6000

## Variable Speed Drives

### Installation Manual

QGH83258.03  
03/2021



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# Safety Information

## Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

<b>⚠ DANGER</b>
<b>DANGER</b> indicates a hazardous situation which, if not avoided, <b>will result in</b> death or serious injury.
<b>⚠ WARNING</b>
<b>WARNING</b> indicates a hazardous situation which, if not avoided, <b>could result in</b> death or serious injury.
<b>⚠ CAUTION</b>
<b>CAUTION</b> indicates a hazardous situation which, if not avoided, <b>could result in</b> minor or moderate injury.
<b>NOTICE</b>
<b>NOTICE</b> is used to address practices not related to physical injury.

## Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

## Qualification Of Personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product. In addition, these persons must have received safety training to recognize and avoid hazards involved. These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product, by changing the settings and by the mechanical, electrical and electronic equipment of the entire system in which the product is used. All persons working on and with

the product must be fully familiar with all applicable standards, directives, and accident prevention regulations when performing such work.

## Intended Use

This product is a drive for three-phase synchronous, asynchronous motors and intended for industrial use according to this manual.

The product may only be used in compliance with all applicable safety standard and local regulations and directives, the specified requirements and the technical data. The product must be installed outside the hazardous ATEX zone. Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety measures must be implemented. Since the product is used as a component in an entire system, you must ensure the safety of persons by means of the design of this entire system (for example, machine design). Any use other than the use explicitly permitted is prohibited and can result in hazards.

## Product Related Information

**Read and understand these instructions before performing any procedure with this drive.**

### **⚠ DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

Before performing work on the drive system:

- Follow the instructions given in the section "Complete drive system power Off procedure" of the installation manual.

Before applying voltage to the drive system:

- Verify that the work has been completed and that the entire installation cannot cause hazards.
- move the ground and the short circuits on the mains input terminals and the motor output terminals.
- Verify proper grounding of all equipment.
- Verify that all protective equipment such as covers, doors, grids is installed and/or closed.

**Failure to follow these instructions will result in death or serious injury.**

**⚠️⚠️ DANGER****HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

- Only appropriately trained persons who are familiar with and fully understand the contents of the present manual and all other pertinent product documentation and who have received all necessary training to recognize and avoid hazards involved are authorized to work on and with this drive system.
- Installation, adjustment, repair and maintenance must be performed by qualified personnel.
- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Only use properly rated, electrically insulated tools and measuring equipment.
- Do not touch unshielded components or terminals with voltage present.
- Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.
- Insulate both ends of unused conductors of the motor cable
- Do not create short circuits across the DC bus terminals or the DC bus capacitors.

**Failure to follow these instructions will result in death or serious injury.**

Damaged products or accessories may cause electric shock or unanticipated equipment operation.

**⚠️⚠️ DANGER****ELECTRIC SHOCK OR UNANTICIPATED EQUIPMENT OPERATION**

Do not use damaged products or accessories.

**Failure to follow these instructions will result in death or serious injury.**

Contact your local Schneider Electric sales office if you detect any damage whatsoever.

This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere.

**⚠️ DANGER****POTENTIAL FOR EXPLOSION**

Install and use this equipment in non-hazardous locations only.

**Failure to follow these instructions will result in death or serious injury.**

Your application consists of a whole range of different interrelated mechanical, electrical, and electronic components, the drive being just one part of the application. The drive by itself is neither intended to nor capable of providing the entire functionality to meet all safety-related requirements that apply to your application. Depending on the application and the corresponding risk assessment to be conducted by you, a whole variety of additional equipment is required such as, but not limited to, external encoders, external brakes, external monitoring devices, guards, etc.

As a designer/manufacture of machines, you must be familiar with and observe all standards that apply to your machine. You must conduct a risk assessment and determine the appropriate Performance Level (PL) and/or Safety Integrity Level (SIL) and design and build your machine in compliance with all applicable standards. In doing so, you must consider the interrelation of all components of the machine. In addition, you must provide instructions for use that enable the user of your machine to perform any type of work on and with the machine such as operation and maintenance in a safe manner.

The present document assumes that you are fully aware of all normative standards and requirements that apply to your application. Since the drive cannot provide all safety-related functionality for your entire application, you must ensure that the required Performance Level and/or Safety Integrity Level is reached by installing all necessary additional equipment.

## **⚠ WARNING**

### **INSUFFICIENT PERFORMANCE LEVEL/SAFETY INTEGRITY LEVEL AND/OR UNINTENDED EQUIPMENT OPERATION**

- Conduct a risk assessment according to EN ISO 12100 and all other standards that apply to your application.
- Use redundant components and/or control paths for all critical control functions identified in your risk assessment.
- If moving loads can result in hazards, for example, slipping or falling loads, operate the drive in closed loop mode.
- Verify that the service life of all individual components used in your application is sufficient for the intended service life of your overall application.
- Perform extensive commissioning tests for all potential error situations to verify the effectiveness of the safety-related functions and monitoring functions implemented, for example, but not limited to, speed monitoring by means of encoders, short circuit monitoring for all connected equipment, correct operation of brakes and guards.
- Perform extensive commissioning tests for all potential error situations to verify that the load can be brought to a safe stop under all conditions.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The products may perform unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

## **⚠ WARNING**

### **UNANTICIPATED EQUIPMENT OPERATION**

- Carefully install the wiring in accordance with the EMC requirements.
- Do not operate the product with unknown or unsuitable settings or data.
- Perform a comprehensive commissioning test.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

<b>▲ WARNING</b>
<p><b>LOSS OF CONTROL</b></p> <ul style="list-style-type: none"> <li>• The designer of any control scheme must consider the potential failure modes of control paths and, for critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart.</li> <li>• Separate or redundant control paths must be provided for critical control functions.</li> <li>• System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.</li> <li>• Observe all accident prevention regulations and local safety guidelines (1).</li> <li>• Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.</li> </ul> <p><b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b></p>

(1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control and to NEMA ICS 7.1 (latest edition), Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems.

<b>▲ WARNING</b>
<p><b>LOSS OF CONTROL</b></p> <p>Perform a comprehensive commissioning test to verify that communication monitoring properly detects communication interruptions</p> <p><b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b></p>

<b>NOTICE</b>
<p><b>DESTRUCTION DUE TO INCORRECT MAINS VOLTAGE</b></p> <p>Before switching on and configuring the product, verify that it is approved for the mains voltage.</p> <p><b>Failure to follow these instructions can result in equipment damage.</b></p>

## Complete Drive System Power Off Procedure

Perform the following actions to verify the absence of voltage

Step	Description
1	Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
2	Wear appropriate personal protective equipment (PPE). e.g. Arc flash protection, helmet & visor, Insulation gloves.
3	Before disconnecting mains voltage, verify that the red LEDs of all power cells are ON by checking the LED state via the openings in the cabinet doors. If one or more of the red LEDs of the power cells are OFF, do not perform any further work, but contact your local Schneider Electric representative.

Step	Description
4	Switch OFF all main power supply and ground the mains breaker. Switch OFF all external auxiliary power supply (230V / 400V / ...) and lock them in off position.
5	Lock the grounding switch of the mains breaker with your personal lock and place a "Do Not Turn On" label on the medium voltage circuit breaker.
6	Wait 20 minutes to allow the DC bus capacitors to discharge. The DC bus LEDs located on each power cell are not an indicator of the absence of DC bus voltage.
7	Verify that the red LEDs on all power cells are OFF. If one or more of the red LEDs of the power cells remain ON for 20 minutes after the mains voltage has been disconnected, do not perform any further work, but contact your local Schneider Electric representative
8	Remove free key K0 from the medium voltage circuit breaker of the drive system and release the keys to open the cabinet doors.
9	Open the transformer cabinet doors and verify the absence of voltage with a properly rated voltage sensing device on the mains terminals and motor terminals.
10	If there is no voltage detected on the mains terminals, short circuit the input terminals to ground using a properly rated grounding equipment.
11	If there is no voltage detected on the motor terminals, short circuit the terminal to ground using a properly rated grounding equipment.
12	Verify that no other voltage is present in the drive system.

# About the Book

## Document Scope

The purpose of this document is to:

- give you mechanical and electrical information related to the ATV6000 drive.
- show you how to install and wire this drive.

## Validity Note

Original instructions and information given in this manual have been written in English (before optional translation).

This documentation is valid for the Altivar Process ATV6000 Medium Voltage Drives.

The asterisks (\*) available to this document is linked to the following information: Based on previous data. This is not a guarantee of future performance or performance in your particular circumstances.

The technical characteristics of the devices described in the present document also appear online. To access the information online, go to the Schneider Electric home page [www.se.com/ww/en/download/](http://www.se.com/ww/en/download/).

The characteristics that are described in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

## Related Documents

Use your tablet or your PC to quickly access detailed and comprehensive information on all our products on [www.se.com](http://www.se.com).

The internet site provides the information you need for products and solutions:

- The Handbook for detailed characteristics and selection guides,
- The CAD files to help design your installation,
- All software and firmware to maintain your installation up to date,
- Additional documents for better understanding of drive systems and applications
- And finally all the User Guides related to your drive, listed below:

Title of Documentation	Catalog Number
Digital Catalog for Industrial Automation	Digi-Cat
Altivar Process range brochure	998-20307132(English)
Recommended Cybersecurity Best Practices	CS-Best-Practices-2019-340 (English)
ATV6000 Handbook	QGH83255(English), PHA51119(French), PHA51121 (German), PHA51120(Spanish), GDE94089(Italian), PHA51122(Russian), PHA51118(Chinese)
ATV6000 Installation Manual	QGH83258(English), QGH83259(French), QGH83261 (German), QGH83260(Spanish), GDE94087(Italian), QGH83257(Chinese)
ATV6000 Programming Manual for Operator and Advanced Operator	QGH83265(English), QGH83266(French), QGH83268 (German), QGH83267(Spanish), GDE94088(Italian)
ATV6000 Embedded Ethernet Manual	PHA30472(English)
ATV6000 Modbus SL Manual	MFR24213(English)
ATV6000 PROFIBUS Manual	PHA30474 (English)
ATV6000 DeviceNet Manual	PHA30471(English)
ATV6000 EtherCat Manual	PHA30473 (English)
ATV6000 Profinet Manual	PHA30475(English)
ATV6000 CANopen Manual	PHA30470(English)
SoMove: FDT	SoMove_FDT(English, French, German, Spanish, Italian, Chinese)
Altivar Process ATV6000: DTM	
Recommended Cybersecurity Best Practices	CS-Best-Practices-2019-340 (English)

You can download these technical publications and other technical information from our website at [www.se.com/en/download](http://www.se.com/en/download)



## Terminology

The technical terms, terminology, and the corresponding descriptions in this manual normally use the terms or definitions in the relevant standards.

In the area of drive systems this includes, but is not limited to, terms such as **error**, **error message**, **failure**, **fault**, **fault reset**, **protection**, **safe state**, **safety function**, **warning**, **warning message**, and so on.

Among others, these standards include:

- IEC 61800 series: Adjustable speed electrical power drive systems
- IEC 61508 Ed.2 series: Functional safety of electrical/electronic/programmable electronic safety-related
- EN 954-1 Safety of machinery - Safety related parts of control systems
- ISO 13849-1 & 2 Safety of machinery - Safety related parts of control systems
- IEC 61158 series: Industrial communication networks - Fieldbus specifications
- IEC 61784 series: Industrial communication networks - Profiles
- IEC 60204-1: Safety of machinery - Electrical equipment of machines – Part 1: General requirements

In addition, the term **zone of operation** is used in conjunction with the description of specific hazards, and is defined as it is for a **hazard zone** or **danger zone** in the EC Machinery Directive (2006/42/EC) and in ISO 12100-1.

## Contact Us

Select your country on:

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# Technical Data and Features

## Presentation

### Control and Transformer Cabinet

Clever and modular arrangement of control section in front of transformer. This section with independent access allows the integration of additional components according to your personal needs.

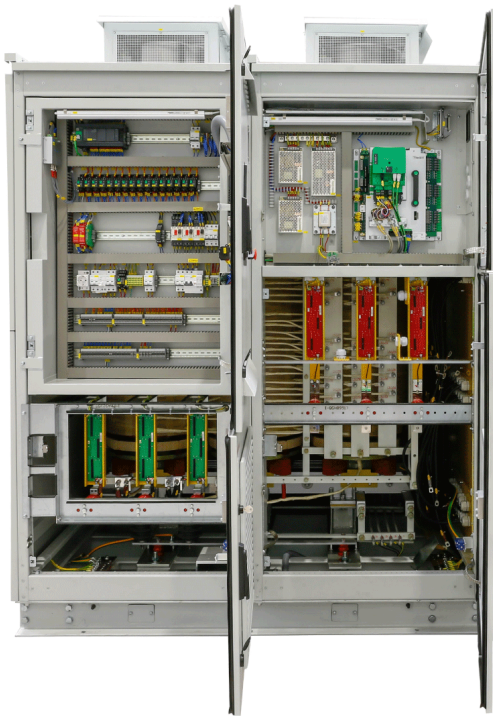


Fig. Control and transformer cabinet

#### Benefits

- Space optimized dimensions without squeezing components in small compartments, granting you a nominal service life avoiding hot spot inside the system.
- The integrated transformer and multilevel structure helps to avoid bearing currents in existing motors. This results in a capability to run your old motor on a new MV drive, leading to a drastic reduction of energy costs where your damper controlled fan or throttle controlled pump is concerned.

### Power cells Cabinet

The power cells cabinet contains the inverter function of the ATV6000. It is a modular cabinet that can be used with the transformer cabinet according to the implementation requirements. The power cells are placed onto a fast-track system providing a convenient access to it.



Fig. Power cells cabinet and Power cell

#### Benefits

- Clear arrangement of components helping your team in maintenance and service
- Compact and low weight cell design saving maintenance shutdown time
- Easier installation to save time

## Drive Topology

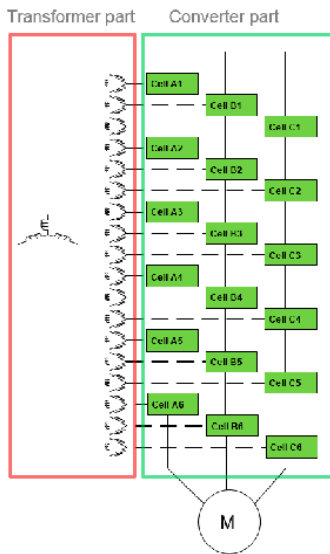


Fig. ATV6000 multilevel architecture

Its simple two level power cell design takes away the complexity of multilevel architecture and makes it into a clear and easy understandable technology. This saves your maintenance cost because the crew will easily understand Altivar 6000.

One of the core component of ATV6000 is the “Power cell”. This “Power cell” is a single phase, two level output switching device, supplied by a 700/720 V low voltage winding of a transformer.

The big advantage of this is, that the switching elements are state-of-the-art LV components. By putting this AC - supplies in series, higher voltages are achieved. The number of “Power cells” determines the output voltage. Every cell provides a small step of motor supply, resulting in a smooth waveform. Phase shifting can be done on the secondary windings of transformer, allowing an elimination of harmonics of input.

The drive regulation system and control system are installed at front of the drive to provide an optimized footprint. The transformer and cell section can be separated for easy installation.

As an option the adequate cooling fans on top of the cabinet can be supplied by an additional secondary windings of the integrated transformer to avoid additional 3phase supplies for the drive

Schneider Electric offers this transformer in a standard efficiency as well as in increased high efficiency.

## Benefits

### Services-oriented drives

**Increase availability and reduce Downtime for service continuity by 20%\***



#### Improved operator efficiency

- Generation of robust, actionable, and relevant information
- Advanced communication and predictive maintenance capabilities
- Functionalities for remote intervention and online support
- Easy troubleshooting with QR code
- Comfortable usability with the connected 10" Magelis HMI screen
- Key performance indicators

#### Fast and easy on-site maintenance operation

- Quicker intervention
- Optimized management of spare parts stock with modular architecture
- Easy front access design

## Digital services

**More uptime & shorter recovery time with predictive maintenance and reduce TCO by 20%\***



- Predictive maintenance, including continuous monitoring, risk assessment, and mitigation plan, with EcoStruxure™ Asset Advisor
- Identification of energy saving potential
- Optimized maintenance budgeting
- 360° diagnostics, with report and analysis
- Records of your crucial assets
- Access to 24/7 Schneider Electric service assistance

## EcoStruxure Asset Advisor

### Preventive analytics to increase operational performance of your drives systems



ATV6000 provides a unique solution to optimize the operation and maintenance of your installation. It allows you to manage maintenance tasks on your assets with preventive and predictive management based on real-time assessments and predictive analytics. All thanks to the combination of smart connected device technologies and powerful cloud-based risk prediction capabilities.

The ATV6000 with EcoStruxure Asset Advisor transforms data into insight to help run your operations more efficiently and safer, with more availability, and increased profits.

#### Continuous health monitoring

The operator gets a complete health monitoring view of its assets and conditions of usage (drive, transformer, MCB, motor) and the assets are seen as super-sensors providing relevant data and KPIs.

#### Risk evaluation

The operator knows in real-time where and what risks are on the installation. Predictive analytics constantly evaluates the level and criticality of risk by looking at an asset, the process duty cycle, and the condition of usage. This enables the ability to predict, in advance, a potential failure or dysfunction of the installation.

#### Risk mitigation

The operator receives notification of the necessary maintenance task required at the right time to secure the asset and production at minimal cost, mitigating the risks of downtime.

## QR code interface

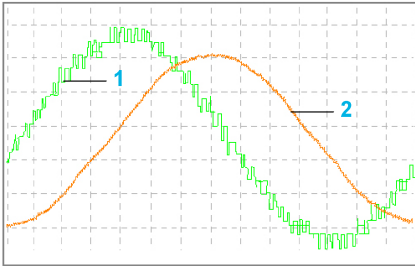
### Empowered operator to improve efficiency



The ATV6000 provides a smart and easy to use QR-code interface to provide the operator with relevant drive information. With just one scan of the QR-code with a mobile device (as tablet or smartphone) on the name plate or the HMI screen you get easy access to technical documentation or technical online support for easy error management.

## Energy management

Optimize usage of energy and reduce consumption by up to 30%\*

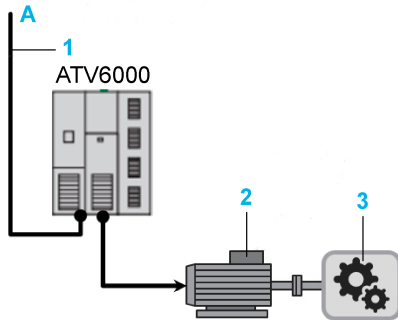


1 Voltage on motor side

2 Current on motor side

### Better usage of energy

- Embedded power management with < 5% measurement error
- Key performance indicators and service life monitoring on energy usage
- Smart data collection and access to real-time information



A Mains

1 Drive input voltage, Drive input current, Drive input power

2 Motor current, Motor voltage, Motor speed, Motor winding & bearing temperature, Consumption kWh

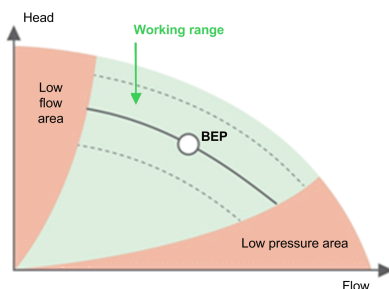
3 Over-/Underload, Stall, Cavitation, Flow, Pressure, BEP

### Use of clean power

- Designed for seamless integration into installation
- No need to add harmonic mitigation on mains side
- Minimized energy waste
- Reduced motor losses, vibrations, and torque pulses with advanced harmonic-free technology

## Process optimization

Improve productivity and availability by up to 20%\*



BEP Best Efficiency Point Function

### Error tolerant operations

Equipped with level inverter bypass features, ATV6000 help to reduce process interruption.

### Proactive maintenance approach

With improved warning functions in case of unusual conditions, and sophisticated measures to help protect equipment against damage. The ATV6000 is also highly modular, enabling fast maintenance operation.

### Maximized performance and production output

Ensuring sustainable operation efficiency through making necessary adjustment in case of best efficiency point (BEP) deviation.

### Our IIoT-enabled EcoStruxure solution

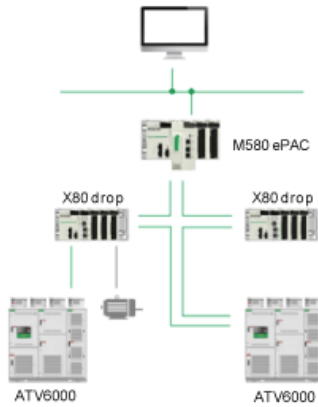
Provides compatibility with Process Expert System (PES) architectures, Modicon M580 controllers, and Foxboro EVO DCS systems.

The ATV6000's smart drive capabilities offer innovative features based on IIoT, mobility, detecting, analysing, and recommending solutions to boost your operation and maintenance activities.

The drive is EcoStruxure-ready, providing a complete integrated solution for overall equipment effectiveness.

It allows you to save time and exploit the full range of capabilities of your equipment on a single platform.

- EcoStruxure PES and Modicon™ M580-compatible, enabling use of dedicated libraries for quicker product implementation and commissioning
- DTM library and application function blocks provide full programming and diagnostic functions
- EcoStruxure Asset Advisor uses the drive as a super sensor for predictive maintenance



## Tailored solutions

### Deliver solutions to optimize your operation efficiency and investment (time & expenditure)

- Delivers a highly versatile platform to meet demanding customer requirements beyond those of standard drives
- Provides a high level of customization to fit specific purposes
- Offers flexibility with electrical or mechanical modifications and extensions easily delivered
- Utilizes a simplified design process and shortened system implementation time

## General Technical Data

<b>Input</b>	18-66 pulse diode rectifier bridge
<b>Output</b>	Multilevel PWM with 2 level low-voltage IGBT inverter cells
<b>Input voltage</b>	<ul style="list-style-type: none"> <li>• 3.3 kV, 4.16 kV, 5.5 kV, 6.0 kV, 6.3 kV, 6.6 kV, 10 kV, 11 kV</li> <li>• 2.4 kV and 13.8 kV on request</li> <li>• Variation: ± 10 %</li> </ul>
<b>Allowable voltage fluctuation</b>	The drive is subject to derating operation when the voltage drop of power supply is within -25 % of nominal voltage.
<b>Input frequency</b>	50/60 Hz ± 5 %
<b>Incoming short circuit withstand</b>	31.5 kA for 150 ms
<b>Overload capability</b>	<ul style="list-style-type: none"> <li>• Normal duty: 120 % 60 s/10 min and 150 % 3 s/10 min</li> <li>• Heavy duty: 150 % 60 s/10 min, 185 % 3 s/10 min</li> </ul>
<b>Total harmonics THD(i)</b>	Comply with the requirements of power quality standard of IEEE519-2014
<b>Input power factor</b>	≥0.96 from 20 % to 100 % of load
<b>Cable entry</b>	Bottom (on request for others)
<b>Frequency resolution</b>	0.01 Hz
<b>Power cells command signals transmission</b>	Fiber optic transmission
<b>Efficiency at rated power</b>	Inverter efficiency is 98.5 %. Drive efficiency including input transformer is 96 % to 96.5 % depending on product.
<b>Type of motor</b>	Asynchronous motor, synchronous motor, permanent magnet motor (Surface / Interior magnet).
<b>Three-phase output voltage for motor connection</b>	0 to respective output voltage.
<b>Output frequency</b>	0.1 to 120 Hz
<b>Input transformer</b>	Indoor type integrated in the frequency variable device, the dry phase-shifting transformer can be supplied for 18-66 pulse rectifier
<b>Control power supply</b>	100...240 Vac ± 10 % (47...63 Hz), 1 kVA capacity. Other AC and DC voltage on request
<b>Auxiliary power supply</b>	230 Vac ± 10 %, 50/60Hz, 1kVA capacity for standard configuration, value depending on auxiliary options used.
<b>Cooling fan power supply</b>	400 VAC ± 10 %, 50Hz, capacity depending on drive reference. Other voltage on request
<b>Communication protocols</b>	Modbus TCP, EtherNet/IP, Modbus serial
<b>HMI</b>	10 inch, color graphic, touch screen, multi-languages
<b>Control interface</b>	8 DI, 3AI, 2AO, 3 relay output (more on request)
<b>Degree of protection (cabinet)</b>	<ul style="list-style-type: none"> <li>• Standard: IP31, IP22 air exhaust</li> <li>• Option: IP41, IP42</li> </ul>
<b>Paint</b>	RAL 7035
<b>Cooling</b>	Forced air ventilation
<b>EMC</b>	EN/IEC 61800-3 environment 2 category C4 for power, C3 for control
<b>Reference standard</b>	IEC EN 61800-3, IEC EN 61800-4, IEC EN 61800-5-1, IEC EN 60529, IEEE 519 and other optional ones
<b>Product certification</b>	CE, EAC, CSA
<b>Environment features</b>	
<b>Storage temperature</b>	0 °C to 50 °C
<b>Transportation temperature</b>	-25 °C to 70 °C
<b>Working temperature</b>	0 to 40 °C, up to 50°C possible with derating (1).

Environment features	
<b>Relative humidity</b>	Up to 90% (without condensation) Optional: maximum up to 95% (without condensation)
<b>Altitude</b>	≤1000 m, up to 2000m possible with derating <sup>(1)</sup> .
<b>Noise level</b>	80/83/85 dB (A)
<b>Over Voltage Category</b>	IEC61800 (Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy)
<ul style="list-style-type: none"> <li>• Drive line side</li> <li>• Drive motor side</li> <li>• Secures Control power supply</li> <li>• Auxiliary and fan power supply</li> </ul>	<ul style="list-style-type: none"> <li>• Category III</li> <li>• Category II</li> <li>• Category II</li> <li>• Category III</li> </ul>
<b>Pollution in accordance with IEC 61800-5-1</b>	Pollution degree 2
<b>Environmental parameters (operation)</b>	Refer to IEC60721-3-3
<ul style="list-style-type: none"> <li>• Climatic conditions</li> <li>• Mechanical conditions</li> <li>• Biological conditions</li> <li>• Chemical conditions</li> <li>• Mechanically active substances</li> </ul>	<ul style="list-style-type: none"> <li>• 3K3</li> <li>• 3M1</li> <li>• 3B1</li> <li>• 3C2</li> <li>• 3S1</li> </ul>
(1): Derating must be applied on the drive system and the value of the derating is defined by Schneider Services depending on the customer application and the local environment conditions	

## **DANGER**

### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Verify that environmental conditions such as temperature, relative humidity, air contamination, shock, and vibration comply with the specifications provided in the present manual.

**Failure to follow these instructions will result in death or serious injury.**

If one of the condition differs from the specifications, contact your local Schneider Electric representative.

This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere.

## **DANGER**

### **POTENTIAL FOR EXPLOSION**

Install and use this equipment in non-hazardous locations only.

**Failure to follow these instructions will result in death or serious injury.**



## Type designation

The product designation of the ATV6000 consists of several points of reference (characters and figures). The meaning of each point is illustrated in the following example.

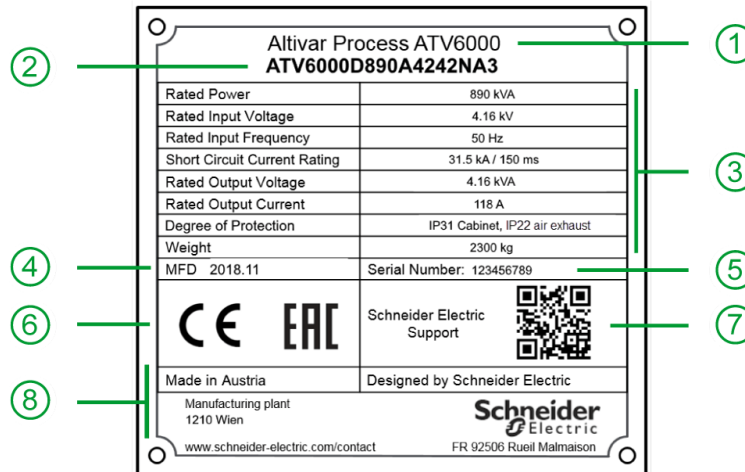
### For ATV6000

	<b>ATV6000</b>	<b>C</b>	<b>470</b>	<b>A</b>	<b>66</b>	<b>66</b>	<b>N</b>	<b>A</b>	<b>3</b>
<b>Product Range</b>									
ATV 6000									
<b>Factor for power rating</b>									
D x 1 kVA									
C x 10 kVA									
M x 100 kVA									
<b>Transformer rating</b>									
470 470									
... ..									
<b>Cooling type</b>									
A Air cooled									
<b>Input voltage</b>									
24 2.4 kV									
33 3.0 kV									
42 4.16 kV									
55 5.5 kV									
60 6.0 kV									
63 6.3 kV									
66 6.6 kV									
10 10 kV									
11 11 kV									
14 13.8 kV									
<b>Output voltage</b>									
24 2.4 kV									
... ..									
14 13.8 kV									
<b>Style (1)</b>									
N No bypass									
B Powercell bypass									
C Powercell bypass n+1									
D Powercell bypass n+2									
<b>Standard</b>									
A CE Standard									
B CE High efficiency									
C CE Optimized transformer									
<b>IP rating</b>									
3 IP31									
4 IP41									
5 IP42									

(1) Power cell bypass is available up to 490 A

## Nameplate Example

The nameplate contains the following data:



### Legend

Marking	Description	Marking	Description
①	Product Type	②	Part number
③	Technical data	④	Manufacturing date
⑤	Serial number	⑥	Certifications
⑦	QR code	⑧	Legal information

**NOTE:** Use the nameplate to validate that the product characteristics are compatible with your local installation.

## Selection and ordering data

### Voltage class 2.4 kV

Power specifications for output voltage 2.4 kV, 9 power cells, 18 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 2.4 kV (3)</b>											
ATV6000D200A2424●●●	200	160	214	46	55.2	150	201	44	66	65	97.5
ATV6000D280A2424●●●	280	220	295	65	78	180	241	52	78	65	97.5
ATV6000D350A2424●●●	350	280	375	80.6	96.7	260	348	77	116	100	150
ATV6000D430A2424●●●	430	340	455	100	120	270	362	80	120	100	150
ATV6000D570A2424●●●	570	450	603	130	155	410	549	120	180	150	225
ATV6000D650A2424●●●	650	520	697	150	180	410	549	120	180	150	225
ATV6000D790A2424●●●	790	630	844	181	218	550	737	160	240	200	300
ATV6000D950A2424●●●	950	760	1019	220	264	610	818	176	264	220	330
ATV6000C122A2424●●●	1220	970	1300	280	336	770	1032	224	336	280	420
ATV6000C139A2424●●●	1390	1100	1475	320	384	880	1180	256	384	320	480
ATV6000C163A2424●●●	1630	1300	1743	374	449	1130	1515	328	492	410	615
ATV6000C178A2424●●●	1780	1420	1904	410	492	1130	1515	328	492	410	615
ATV6000C200A2424●●●	2000	1600	2145	460	552	1360	1823	392	588	490	735
ATV6000C213A2424●●●	2130	1700	2279	490	588	1360	1823	392	588	490	735
ATV6000C225A2424●●●	2250	1800	2413	518	622	1520	2038	440	660	550	825
ATV6000C239A2424●●●	2390	1910	2561	550	660	1520	2038	440	660	550	825
ATV6000C275A2424●●●	2750	2200	2950	633	760	2000	2682	576	864	720	1080
ATV6000C313A2424●●●	3130	2500	3352	720	864	2000	2682	576	864	720	1080
ATV6000C338A2424●●●	3380	2700	3620	777	932	2360	3164	680	1020	850	1275
ATV6000C369A2424●●●	3690	2950	3956	850	1020	2360	3164	680	1020	850	1275
ATV6000C400A2424●●●	4000	3200	4291	921	1105	2780	3728	800	1200	1000	1500
ATV6000C434A2424●●●	4340	3470	4653	1000	1200	2780	3728	800	1200	1000	1500

(1) For higher drive power please contact Schneider Electric.

(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.

(3) Please contact Schneider Electric for other combinations of input and output voltage.

### Voltage class 3.3 kV

Power specifications for output voltage 3.3 kV, 9 power cells, 18 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 3.3 kV (3)</b>											
ATV6000D390A3333●●●	390	310	415	65	78	240	321	52	78	65	97.5
ATV6000D500A3333●●●	500	400	536	83.7	100	380	509	80	120	100	150
ATV6000D590A3333●●●	590	470	630	100	120	380	509	80	120	100	150
ATV6000D700A3333●●●	700	560	750	117	141	530	710	112	168	150	225
ATV6000D790A3333●●●	790	630	844	132	158	570	764	120	180	150	225
ATV6000D890A3333●●●	890	710	952	150	180	570	764	120	180	150	225
ATV6000C100A3333●●●	1000	800	1072	167	201	760	1019	160	240	200	300
ATV6000C113A3333●●●	1130	900	1206	188	226	760	1019	160	240	200	300
ATV6000C132A3333●●●	1320	1050	1408	220	264	840	1126	176	264	220	330
ATV6000C150A3333●●●	1500	1200	1609	251	301	1070	1434	224	336	280	420
ATV6000C167A3333●●●	1670	1330	1783	280	336	1070	1434	224	336	280	420
ATV6000C190A3333●●●	1900	1520	2038	320	384	1220	1636	256	384	320	480
ATV6000C213A3333●●●	2130	1700	2279	356	427	1560	2091	328	492	410	615
ATV6000C244A3333●●●	2440	1950	2614	410	492	1560	2091	328	492	410	615
ATV6000C293A3333●●●	2930	2340	3137	490	588	1870	2507	392	588	490	735
ATV6000C328A3333●●●	3280	2620	3513	550	660	2100	2816	440	660	550	825
ATV6000C350A3333●●●	3500	2800	3754	586	703	2690	3607	563	845	720	1080
ATV6000C388A3333●●●	3880	3100	4157	649	779	2750	3687	576	864	720	1080
ATV6000C430A3333●●●	4300	3440	4613	720	864	2750	3687	576	864	720	1080
ATV6000C463A3333●●●	4630	3700	4961	774	929	3240	4344	680	1020	850	1275
ATV6000C508A3333●●●	5080	4060	5444	850	1020	3240	4344	680	1020	850	1275
ATV6000C550A3333●●●	5500	4400	5900	921	1105	3820	5122	800	1200	1000	1500
ATV6000C600A3333●●●	6000	4770	6396	1000	1200	3820	5122	800	1200	1000	1500

(1) For higher drive power please contact Schneider Electric.

(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.

(3) Please contact Schneider Electric for other combinations of input and output voltage.

### Voltage class 4.16 kV

Power specifications for output voltage 4.16 kV, 12 power cells, 24 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 4.16 kV (3)</b>											
ATV6000D350A4242●●●	350	280	375	46.5	55.8	260	348	44	66	65	97.5
ATV6000D490A4242●●●	490	390	522	65	78	310	415	52	78	65	97.5
ATV6000D570A4242●●●	570	450	603	74.7	89.6	420	563	71	107	100	150
ATV6000D630A4242●●●	630	500	670	83	99.6	470	630	79	119	100	150
ATV6000D750A4242●●●	750	600	804	100	120	480	643	80	120	100	150
ATV6000D890A4242●●●	890	710	952	118	141	680	911	113	170	150	225
ATV6000C100A4242●●●	1000	800	1072	133	159	720	965	120	180	150	225
ATV6000C113A4242●●●	1130	900	1206	150	180	720	965	120	180	150	225
ATV6000C125A4242●●●	1250	1000	1341	166	199	950	1273	159	239	200	300
ATV6000C150A4242●●●	1500	1200	1609	199	239	960	1287	160	240	200	300
ATV6000C165A4242●●●	1650	1320	1770	220	264	1060	1421	176	264	220	330
ATV6000C188A4242●●●	1880	1500	2011	249	299	1340	1796	224	336	280	420
ATV6000C210A4242●●●	2100	1680	2252	280	336	1340	1796	224	336	280	420
ATV6000C240A4242●●●	2400	1920	2574	320	384	1540	2065	256	384	320	480
ATV6000C275A4242●●●	2750	2200	2950	365	438	1970	2641	328	492	410	615
ATV6000C308A4242●●●	3080	2460	3298	410	492	1970	2641	328	492	410	615
ATV6000C338A4242●●●	3380	2700	3620	448	538	2360	3164	392	588	490	735
ATV6000C369A4242●●●	3690	2950	3956	490	588	2360	3164	392	588	490	735
ATV6000C414A4242●●●	4140	3310	4438	550	660	2650	3553	440	660	550	825
ATV6000C463A4242●●●	4630	3700	4961	614	737	3460	4639	576	864	720	1080
ATV6000C500A4242●●●	5000	4000	5364	664	797	3460	4639	576	864	720	1080
ATV6000C542A4242●●●	5420	4330	5806	720	864	3460	4639	576	864	720	1080
ATV6000C600A4242●●●	6000	4800	6436	797	956	4090	5484	680	1020	850	1275
ATV6000C640A4242●●●	6400	5120	6866	850	1020	4090	5484	680	1020	850	1275
ATV6000C700A4242●●●	7000	5600	7509	930	1116	4810	6450	800	1200	1000	1500
ATV6000C753A4242●●●	7530	6020	8072	1000	1200	4810	6450	800	1200	1000	1500

(1) For higher drive power please contact Schneider Electric.

(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.

(3) Please contact Schneider Electric for other combinations of input and output voltage.

### Voltage class 5.5 kV

Power specifications for output voltage 5.5 kV, 15 power cells, 30 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 5.5 kV (3)</b>											
ATV6000D450A5555●●●	450	355	476	44.6	53.5	330	442	42	63	65	97.5
ATV6000D570A5555●●●	570	450	603	56.5	67.8	410	549	52	78	65	97.5
ATV6000D640A5555●●●	640	510	683	65	78	410	549	52	78	65	97.5
ATV6000D790A5555●●●	790	630	844	79.1	94.9	600	804	76	114	100	150
ATV6000D890A5555●●●	890	710	952	89.2	107	630	844	80	120	100	150
ATV6000D990A5555●●●	990	790	1059	100	120	630	844	80	120	100	150
ATV6000C113A5555●●●	1130	900	1206	113	136	860	1153	108	162	150	225
ATV6000C132A5555●●●	1320	1050	1408	132	158	950	1273	120	180	150	225
ATV6000C149A5555●●●	1490	1190	1595	150	180	950	1273	120	180	150	225
ATV6000C169A5555●●●	1690	1350	1810	170	203	1270	1703	160	240	200	300
ATV6000C199A5555●●●	1990	1590	2132	200	240	1270	1703	160	240	200	300
ATV6000C219A5555●●●	2190	1750	2346	220	264	1400	1877	176	264	220	330
ATV6000C250A5555●●●	2500	2000	2682	251	301	1780	2387	224	336	280	420
ATV6000C278A5555●●●	2780	2220	2977	280	336	1780	2387	224	336	280	420
ATV6000C318A5555●●●	3180	2540	3406	320	384	2030	2722	256	384	320	480
ATV6000C350A5555●●●	3500	2800	3754	352	422	2610	3500	328	492	410	615
ATV6000C375A5555●●●	3750	3000	4023	377	452	2610	3500	328	492	410	615
ATV6000C408A5555●●●	4080	3260	4371	410	492	2610	3500	328	492	410	615
ATV6000C488A5555●●●	4880	3900	5229	490	588	3120	4183	392	588	490	735
ATV6000C538A5555●●●	5380	4300	5766	550	660	3500	4693	440	660	550	825
ATV6000C600A5555●●●	6000	4800	6436	603	723	4580	6141	576	864	720	1080
ATV6000C663A5555●●●	6630	5300	7107	666	799	4580	6141	576	864	720	1080
ATV6000C717A5555●●●	7170	5730	7684	720	864	4580	6141	576	864	720	1080
ATV6000C775A5555●●●	7750	6200	8314	779	934	5410	7254	680	1020	850	1275
ATV6000C845A5555●●●	8450	6760	9065	850	1020	5410	7254	680	1020	850	1275
ATV6000C925A5555●●●	9250	7400	9923	929	1115	6370	8542	800	1200	1000	1500
ATV6000M100A5555●●●	10000	7960	10674	1000	1200	6370	8542	800	1200	1000	1500

(1) For higher drive power please contact Schneider Electric.

(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.

(3) Please contact Schneider Electric for other combinations of input and output voltage.

### Voltage class 6 kV

Power specifications for output voltage 6 kV, 15 power cells, 30 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 6 kV (3)</b>											
ATV6000D450A6060●●●	450	355	476	40.9	49	330	442	39	58.5	65	97.5
ATV6000D570A6060●●●	570	450	603	51.8	62.1	420	563	49	73.5	65	97.5
ATV6000D700A6060●●●	700	560	750	65	78	450	603	52	78	65	97.5
ATV6000D790A6060●●●	790	630	844	72.5	87	590	791	69	104	100	150
ATV6000D890A6060●●●	890	710	952	81.7	98	670	898	78	117	100	150
ATV6000C108A6060●●●	1080	860	1153	100	120	690	925	80	120	100	150
ATV6000C125A6060●●●	1250	1000	1341	115	138	950	1273	110	165	150	225
ATV6000C138A6060●●●	1380	1100	1475	127	152	1040	1394	120	180	150	225
ATV6000C163A6060●●●	1630	1300	1743	150	180	1040	1394	120	180	150	225
ATV6000C188A6060●●●	1880	1500	2011	173	207	1390	1864	160	240	200	300
ATV6000C213A6060●●●	2130	1700	2279	196	235	1390	1864	160	240	200	300
ATV6000C239A6060●●●	2390	1910	2561	220	264	1520	2038	176	264	220	330
ATV6000C263A6060●●●	2630	2100	2816	242	290	1940	2601	224	336	280	420
ATV6000C304A6060●●●	3040	2430	3258	280	336	1940	2601	224	336	280	420
ATV6000C348A6060●●●	3480	2780	3728	320	384	2220	2977	256	384	320	480
ATV6000C375A6060●●●	3750	3000	4023	345	414	2840	3808	328	492	410	615
ATV6000C413A6060●●●	4130	3300	4425	380	456	2840	3808	328	492	410	615
ATV6000C445A6060●●●	4450	3560	4774	410	492	2840	3808	328	492	410	615
ATV6000C532A6060●●●	5320	4250	5699	490	588	3400	4559	392	588	490	735
ATV6000C588A6060●●●	5880	4700	6302	550	660	3820	5122	440	660	550	825
ATV6000C638A6060●●●	6380	5100	6839	587	704	4900	6571	564	846	720	1080
ATV6000C688A6060●●●	6880	5500	7375	633	760	5000	6705	576	864	720	1080
ATV6000C782A6060●●●	7820	6250	8381	720	864	5000	6705	576	864	720	1080
ATV6000C863A6060●●●	8630	6900	9253	794	953	5900	7912	680	1020	850	1275
ATV6000C924A6060●●●	9240	7390	9910	850	1020	5900	7912	680	1020	850	1275
ATV6000M100A6060●●●	10000	8000	10728	921	1105	6950	9320	800	1200	1000	1500
ATV6000M109A6060●●●	10900	8680	11640	1000	1200	6950	9320	800	1200	1000	1500

(1) For higher drive power please contact Schneider Electric.

(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.

(3) Please contact Schneider Electric for other combinations of input and output voltage.

### Voltage class 6.3 kV

Power specifications for output voltage 6.3 kV, 15 power cells, 30 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 6.3 kV (3)</b>											
ATV6000D450A6363●●●	450	355	476	38.9	46.6	330	442	37	55.5	65	97.5
ATV6000D570A6363●●●	570	450	603	49.3	59.1	420	563	47	70.5	65	97.5
ATV6000D630A6363●●●	630	500	670	54.8	65.7	470	630	52	78	65	97.5
ATV6000D740A6363●●●	740	590	791	65	78	470	630	52	78	65	97.5
ATV6000D790A6363●●●	790	630	844	69.1	82.9	600	804	66	99	100	150
ATV6000D890A6363●●●	890	710	952	77.8	93.3	670	898	74	111	100	150
ATV6000C114A6363●●●	1140	910	1220	100	120	720	965	80	120	100	150
ATV6000C132A6363●●●	1320	1050	1408	115	138	1000	1341	110	165	150	225
ATV6000C150A6363●●●	1500	1200	1609	132	158	1090	1461	120	180	150	225
ATV6000C170A6363●●●	1700	1360	1823	150	180	1090	1461	120	180	150	225
ATV6000C194A6363●●●	1940	1550	2078	170	204	1450	1944	160	240	200	300
ATV6000C228A6363●●●	2280	1820	2440	200	240	1450	1944	160	240	200	300
ATV6000C250A6363●●●	2500	2000	2682	220	264	1600	2145	176	264	220	330
ATV6000C282A6363●●●	2820	2250	3017	247	296	2040	2735	224	336	280	420
ATV6000C319A6363●●●	3190	2550	3419	280	336	2040	2735	224	336	280	420
ATV6000C364A6363●●●	3640	2910	3902	320	384	2330	3124	256	384	320	480
ATV6000C413A6363●●●	4130	3300	4425	362	434	2990	4009	328	492	410	615
ATV6000C468A6363●●●	4680	3740	5015	410	492	2990	4009	328	492	410	615
ATV6000C513A6363●●●	5130	4100	5498	449	539	3570	4787	392	588	490	735
ATV6000C558A6363●●●	5580	4460	5980	490	588	3570	4787	392	588	490	735
ATV6000C627A6363●●●	6270	5010	6718	550	660	4010	5377	440	660	550	825
ATV6000C688A6363●●●	6880	5500	7375	603	723	5250	7040	576	864	720	1080
ATV6000C750A6363●●●	7500	6000	8046	658	789	5250	7040	576	864	720	1080
ATV6000C820A6363●●●	8200	6560	8797	720	864	5250	7040	576	864	720	1080
ATV6000C888A6363●●●	8880	7100	9521	778	934	6200	8314	680	1020	850	1275
ATV6000C969A6363●●●	9690	7750	10392	850	1020	6200	8314	680	1020	850	1275
ATV6000M105A6363●●●	10500	8400	11264	921	1105	7290	9776	800	1200	1000	1500
ATV6000M114A6363●●●	11400	9120	12230	1000	1200	7290	9776	800	1200	1000	1500

(1) For higher drive power please contact Schneider Electric.

(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.

(3) Please contact Schneider Electric for other combinations of input and output voltage.



### Voltage class 6.6 kV

Power specifications for output voltage 6.6 kV, 15 (18) power cells, 30 (36) input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)	Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)	Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins		
										kVA	kW
<b>Voltage class: 6.6 kV (3)</b>											
ATV6000D450A6666●●●	450	355	476	37.1	44.5	330	442	35	52.5	65	97.5
ATV6000D570A6666●●●	570	450	603	47.1	56.5	430	576	45	67.5	65	97.5
ATV6000D630A6666●●●	630	500	670	52.3	62.7	470	630	50	75	65	97.5
ATV6000D780A6666●●●	780	620	831	65	78	590	791	62	93	100	150
ATV6000D890A6666●●●	890	710	952	74.3	89.1	670	898	71	107	100	150
ATV6000C100A6666●●●	1000	800	1072	83.7	100	760	1019	80	120	100	150
ATV6000C119A6666●●●	1190	950	1273	100	120	760	1019	80	120	100	150
ATV6000C138A6666●●●	1380	1100	1475	115	138	1050	1408	110	165	150	225
ATV6000C163A6666●●●	1630	1300	1743	136	163	1140	1528	120	180	150	225
ATV6000C179A6666●●●	1790	1430	1917	150	180	1140	1528	120	180	150	225
ATV6000C200A6666●●●	2000	1600	2145	167	201	1520	2038	160	240	200	300
ATV6000C225A6666●●●	2250	1800	2413	188	226	1520	2038	160	240	200	300
ATV6000C263A6666●●●	2630	2100	2816	220	264	2010	2695	211	317	280	420
ATV6000C288A6666●●●	2880	2300	3084	241	289	2140	2869	224	336	280	420
ATV6000C334A6666●●●	3340	2670	3580	280	336	2140	2869	224	336	280	420
ATV6000C382A6666●●●	3820	3050	4090	320	384	2930	3929	307	461	410	615
ATV6000C425A6666●●●	4250	3400	4559	356	427	3130	4197	328	492	410	615
ATV6000C489A6666●●●	4890	3910	5243	410	492	3740	5015	392	588	490	735
ATV6000C538A6666●●●	5380	4300	5766	450	540	3740	5015	392	588	490	735
ATV6000C585A6666●●●	5850	4680	6275	490	588	3740	5015	392	588	490	735
ATV6000C657A6666●●●	6570	5250	7040	550	660	5040	6758	528	792	720	1080
ATV6000C713A6666●●●	7130	5700	7643	596	716	5470	7335	573	860	720	1080
ATV6000C775A6666●●●	7750	6200	8314	649	779	5500	7375	576	864	720	1080
ATV6000C860A6666●●●	8600	6880	9226	720	864	6490	8703	680	1020	850	1275
ATV6000C925A6666●●●	9250	7400	9923	774	929	6490	8703	680	1020	850	1275
ATV6000M102A6666●●●	10200	8120	10889	850	1020	7640	10245	800	1200	1000	1500
ATV6000M110A6666●●●	11000	8800	11800	921	1105	7640	10245	800	1200	1000	1500
ATV6000M120A6666●●●	12000	9550	12806	1000	1200	7640	10245	800	1200	1000	1500

(1) For higher drive power please contact Schneider Electric.

(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.

(3) Please contact Schneider Electric for other combinations of input and output voltage.

**Voltage class 10 kV**

Power specifications for output voltage 10 kV, 24 power cells, 48 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 10 kV (3)</b>											
ATV6000D450A1010●●●	450	355	476	24.5	29.4	330	442	23	34.5	35	52.5
ATV6000D500A1010●●●	500	400	536	27.6	33.1	370	496	26	39.0	35	52.5
ATV6000D630A1010●●●	630	500	670	35	42	400	536	28	42	35	52.5
ATV6000D700A1010●●●	700	560	750	38.7	46.4	530	710	37	55.5	65	97.5
ATV6000D790A1010●●●	790	630	844	43.5	52.2	590	791	41	61.5	65	97.5
ATV6000D890A1010●●●	890	710	952	49	58.8	680	911	47	70.5	65	97.5
ATV6000C100A1010●●●	1000	800	1072	55.2	66.2	750	1005	52	78	65	97.5
ATV6000C118A1010●●●	1180	940	1260	65	78	750	1005	52	78	65	97.5
ATV6000C138A1010●●●	1380	1100	1475	76	91.2	1050	1408	73	110	100	150
ATV6000C150A1010●●●	1500	1200	1609	82.9	99.4	1140	1528	79	119	100	150
ATV6000C180A1010●●●	1800	1440	1931	100	120	1150	1542	80	120	100	150
ATV6000C200A1010●●●	2000	1600	2145	111	133	1530	2051	106	159	150	225
ATV6000C225A1010●●●	2250	1800	2413	124	149	1720	2306	119	179	150	225
ATV6000C272A1010●●●	2720	2170	2910	150	180	1730	2319	120	180	150	225
ATV6000C300A1010●●●	3000	2400	3218	166	199	2300	3084	159	239	200	300
ATV6000C325A1010●●●	3250	2600	3486	180	216	2310	3097	160	240	200	300
ATV6000C350A1010●●●	3500	2800	3754	193	232	2310	3097	160	240	200	300
ATV6000C398A1010●●●	3980	3180	4264	220	264	2540	3406	176	264	220	330
ATV6000C438A1010●●●	4380	3500	4693	242	290	3240	4344	224	336	280	420
ATV6000C507A1010●●●	5070	4050	5431	280	336	3240	4344	224	336	280	420
ATV6000C538A1010●●●	5380	4300	5766	297	356	3700	4961	256	384	320	480
ATV6000C579A1010●●●	5790	4630	6208	320	384	3700	4961	256	384	320	480
ATV6000C625A1010●●●	6250	5000	6705	345	414	4740	6356	328	492	410	615
ATV6000C742A1010●●●	7420	5930	7952	410	492	4740	6356	328	492	410	615
ATV6000C813A1010●●●	8130	6500	8716	449	539	5670	7603	392	588	490	735
ATV6000C887A1010●●●	8870	7090	9507	490	588	5670	7603	392	588	490	735
ATV6000C995A1010●●●	9950	7960	10674	550	660	6370	8542	440	660	550	825
ATV6000M107A1010●●●	10700	8500	11398	587	704	8160	10942	564	846	720	1080
ATV6000M115A1010●●●	11500	9200	12337	635	762	8340	11184	576	864	720	1080
ATV6000M131A1010●●●	13100	10420	13973	720	864	8340	11184	576	864	720	1080
ATV6000M143A1010●●●	14300	11400	15287	787	945	9840	13195	680	1020	850	1275
ATV6000M154A1010●●●	15400	12300	16494	850	1020	9840	13195	680	1020	850	1275
ATV6000M169A1010●●●	16900	13500	18103	932	1119	11580	15529	800	1200	1000	1500

Power specifications for output voltage 10 kV, 24 power cells, 48 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
	kVA	kW	HP	A	A	kW	HP	A	A	A	A
<b>Voltage class: 10 kV (3)</b>											
ATV6000M181A1010●●●	18100	14470	19404	1000	1200	11580	15529	800	1200	1000	1500
<p>(1) For higher drive power please contact Schneider Electric.</p> <p>(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.</p> <p>(3) Please contact Schneider Electric for other combinations of input and output voltage.</p>											

### Voltage class 11 kV

Power specifications for output voltage 11 kV, 27 power cells, 54 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 11 kV (3)</b>											
ATV6000D500A1111●●●	500	400	536	25.1	30.1	380	509	24	36	35	52.5
ATV6000D690A1111●●●	690	550	737	35	42	440	590	28	42	35	52.5
ATV6000D790A1111●●●	790	630	844	39.6	47.5	600	804	38	57	65	97.5
ATV6000C100A1111●●●	1000	800	1072	50.2	60.2	760	1019	48	72	65	97.5
ATV6000C129A1111●●●	1290	1030	1381	65	78	820	1099	52	78	65	97.5
ATV6000C150A1111●●●	1500	1200	1609	75.3	90.3	1140	1528	72	108	100	150
ATV6000C175A1111●●●	1750	1400	1877	87.9	105	1270	1703	80	120	100	150
ATV6000C199A1111●●●	1990	1590	2132	100	120	1270	1703	80	120	100	150
ATV6000C225A1111●●●	2250	1800	2413	113	136	1720	2306	108	162	150	225
ATV6000C250A1111●●●	2500	2000	2682	126	151	1910	2561	120	180	150	225
ATV6000C298A1111●●●	2980	2380	3191	150	180	1910	2561	120	180	150	225
ATV6000C325A1111●●●	3250	2600	3486	163	196	2480	3325	156	234	200	300
ATV6000C375A1111●●●	3750	3000	4023	188	226	2540	3406	160	240	200	300
ATV6000C438A1111●●●	4380	3500	4693	220	264	2800	3754	176	264	220	330
ATV6000C557A1111●●●	5570	4450	5967	280	336	3560	4774	224	336	280	420
ATV6000C637A1111●●●	6370	5090	6825	320	384	4070	5457	256	384	320	480
ATV6000C713A1111●●●	7130	5700	7643	358	429	5220	7000	328	492	410	615
ATV6000C817A1111●●●	8170	6530	8756	410	492	5220	7000	328	492	410	615
ATV6000C888A1111●●●	8880	7100	9521	446	535	6240	8367	392	588	490	735
ATV6000C975A1111●●●	9750	7800	10459	490	588	6240	8367	392	588	490	735
ATV6000M110A1111●●●	11000	8760	11747	550	660	7000	9387	440	660	550	825
ATV6000M125A1111●●●	12500	10000	13410	628	753	9170	12297	576	864	720	1080
ATV6000M144A1111●●●	14400	11460	15368	720	864	9170	12297	576	864	720	1080
ATV6000M159A1111●●●	15900	12700	17030	797	957	10830	14523	680	1020	850	1275
ATV6000M170A1111●●●	17000	13530	18144	850	1020	10830	14523	680	1020	850	1275
ATV6000M188A1111●●●	18800	15000	20115	942	1130	12740	17084	800	1200	1000	1500
ATV6000M199A1111●●●	19900	15920	21349	1000	1200	12740	17084	800	1200	1000	1500

(1) For higher drive power please contact Schneider Electric.

(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.

(3) Please contact Schneider Electric for other combinations of input and output voltage.

### Voltage class 13.8 kV

Power specifications for output voltage 13.8 kV, 33 power cells, 66 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)	Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)	Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins		
										kVA	kW
<b>Voltage class: 13.8 kV (3)</b>											
ATV6000D870A1414●●●	870	690	925	35	42	550	737	28	42	35	52.5
ATV6000C113A1414●●●	1130	900	1206	45	54	850	1139	43	64.5	65	97.5
ATV6000C138A1414●●●	1380	1100	1475	55	66	1030	1381	52	78	65	97.5
ATV6000C162A1414●●●	1620	1290	1729	65	78	1030	1381	52	78	65	97.5
ATV6000C188A1414●●●	1880	1500	2011	75.1	90.1	1430	1917	72	108	100	150
ATV6000C225A1414●●●	2250	1800	2413	90.1	108	1590	2132	80	120	100	150
ATV6000C249A1414●●●	2490	1990	2668	100	120	1590	2132	80	120	100	150
ATV6000C288A1414●●●	2880	2300	3084	115	138	2190	2936	110	165	150	225
ATV6000C325A1414●●●	3250	2600	3486	130	156	2390	3205	120	180	150	225
ATV6000C374A1414●●●	3740	2990	4009	150	180	2390	3205	120	180	150	225
ATV6000C413A1414●●●	4130	3300	4425	165	198	3150	4224	158	237	200	300
ATV6000C450A1414●●●	4500	3600	4827	180	216	3190	4277	160	240	200	300
ATV6000C500A1414●●●	5000	4000	5364	200	240	3510	4706	176	264	220	330
ATV6000C549A1414●●●	5490	4390	5887	220	264	3510	4706	176	264	220	330
ATV6000C625A1414●●●	6250	5000	6705	250	300	4470	5994	224	336	280	420
ATV6000C699A1414●●●	6990	5590	7496	280	336	4470	5994	224	336	280	420
ATV6000C799A1414●●●	7990	6390	8569	320	384	5110	6852	256	384	320	480
ATV6000C888A1414●●●	8880	7100	9521	355	426	6550	8783	328	492	410	615
ATV6000M103A1414●●●	10300	8190	10982	410	492	6550	8783	328	492	410	615
ATV6000M113A1414●●●	11300	9000	12069	450	540	7830	10500	392	588	490	735
ATV6000M123A1414●●●	12300	9790	13128	490	588	7830	10500	392	588	490	735
ATV6000M138A1414●●●	13800	10990	14737	550	660	8790	11787	440	660	550	825
ATV6000M150A1414●●●	15000	12000	16092	601	721	11500	15421	576	864	720	1080
ATV6000M165A1414●●●	16500	13200	17701	661	793	11500	15421	576	864	720	1080
ATV6000M180A1414●●●	18000	14380	19283	720	864	11500	15421	576	864	720	1080
ATV6000M189A1414●●●	18900	15100	20249	756	907	13580	18211	680	1020	850	1275
ATV6000M200A1414●●●	20000	16000	21456	801	961	13580	18211	680	1020	850	1275
ATV6000M212A1414●●●	21200	16900	22663	850	1020	13580	18211	680	1020	850	1275
ATV6000M232A1414●●●	23200	18500	24808	926	1111	15980	21429	800	1200	1000	1500

Power specifications for output voltage 13.8 kV, 33 power cells, 66 input pulses											
Model	Transformer rating (1)	Normal duty				Heavy duty				Power cell	
		Maximum motor shaft power (2)		Nominal continuous current	120% overload 1 min/10 mins	Maximum motor shaft power (2)		Nominal continuous current	150% overload 1 min/10 mins	Individual power cell rating	Max overload 3 sec/10 mins
		kVA	kW	HP	A	A	kW	HP	A	A	A
<b>Voltage class: 13.8 kV (3)</b>											
ATV6000M250A1414●●●	25000	20000	26820	1000	1200	15980	21429	800	1200	1000	1500
<p>(1) For higher drive power please contact Schneider Electric.</p> <p>(2) Values valid for synchronous motor and asynchronous motor. The specifications for the maximum motor shaft power is based on a motor efficiency of 95%, and power factor 0.88.</p> <p>(3) Please contact Schneider Electric for other combinations of input and output voltage.</p>											

## Key Interlock System

### Main Features

Key interlock system is used to help to prevent opening a door when the mains supply is present and also helps to prevent powering on the drive system when a door is still unlocked. (Only the control cabinet is unlocked when the mains supply is applied).

Key box is used to mechanically lock electrical installations. The basic functionalities are:

- The lock only can work with special key.
- The lock must self- lock (i.e. cannot rotate) without special key.
- The key can not be pulled out when it is rotated to locked position.
- The lock can not popup the key automatically. Hereafter, a 4 key product example.



Figure 1-8

**NOTE:** the keys for interlock system are located in a file box inside the control cabinet.

**Description**

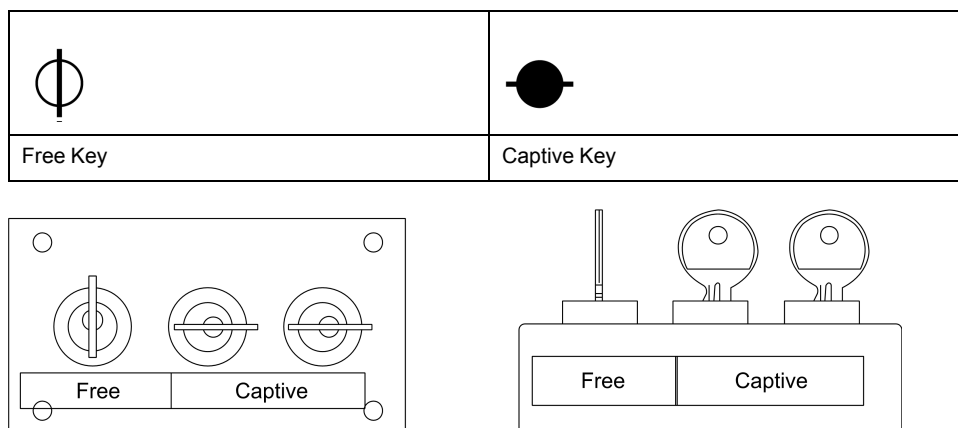


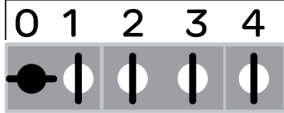
Figure 1-9

**Power on Procedure**

Step	Action										
1	Once installation is completed, close all the doors and take the captive key out of each door. <b>Closed door:</b> <div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">●</td> <td style="text-align: center;">●</td> <td style="text-align: center;">●</td> <td style="text-align: center;">●</td> </tr> </table> <p>Figure 1-10</p> <p>The free key <b>0</b> only can be released when the captive keys <b>1,2,3,4</b> have been turned to captive position.</p> </div>	0	1	2	3	4		●	●	●	●
0	1	2	3	4							
	●	●	●	●							
2	Put the keys from all the doors into the key box then turn to captive position (control compartment is not part of the interlock system).										
3	Take the free key out after all the captive keys are in the captive position.										

Step	Action
4	Switch off the grounded switch of the main circuit breaker, interlock the free key with main circuit breaker.
5	Get authorization from the person(s) in charge to work on and with this equipment to Power On.

**Power off Procedure (for Maintenance)**

Step	Action
1	Switch the main circuit breaker off then switch on its grounding switch.
2	Take the free key out the main circuit breaker.
3	Put the free key into the key box and turn to captive position.
4	Turn the captive keys to free position and then take them out to open the corresponding door for maintenance. <b>Opened door:</b>  <p>Figure 1-11</p> <p>The <b>1,2,3,4</b> keys may be released when the free key <b>0</b> has been turned to the captive position.</p>

**NOTE:** If the free key K0 we provide cannot be used as the Key for the mains circuit breaker cabinet, it's mandatory to attach the both keys together on a permanent manner (Free Key k0 and Circuit Breaker Key) to forbid to use them separately.

**An interlock compatible box can be provided as an option.**

The standard brand of mechanical locks provided for the ATV6000 is STI. In case the key of the MCB [Main circuit breaker] and the key K0 of the VSD cannot be attached together, it is possible to supply an MCB compatible box if brands such as Fortress or others are used on site. The interlock compatible box has a dual cylinder lock system: one cylinder for the MCB's brand and the other is a "Free key" lock, from the brand Ronis.

- Once the MCB's brand and key identification code of lock cylinder is provided, an MCB interlock compatible box such as the picture can be provided.
- The MCB's key can only be released when the "Free key" (K0) is inserted into the compatible box and turned to the captive position.
- Switch off the grounded switch of the MCB; lock the MCB with the MCB's key.

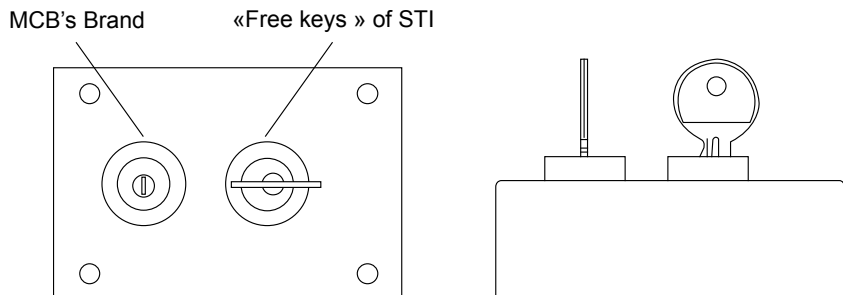


Figure 1-12



**Dash Blocks (out of supply scope)**

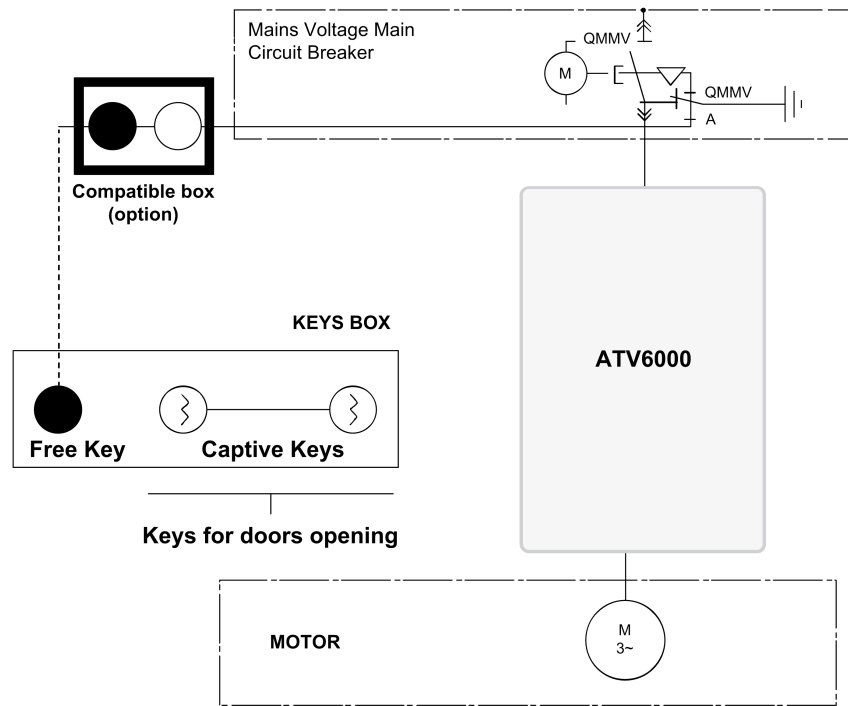


Figure 1-13

**Interlock with Main Circuit Breaker**

The main circuit breaker can be switched on only if the free key “K0” is taken out from the key box and interlocked with the main circuit breaker. Once the main circuit breaker is powered on, the free key is trapped and cannot be taken out, so that the doors cannot be opened.

To open the doors for maintenance purposes, the free key can be removed from the main circuit breaker only if the main circuit breaker is grounded. If any door is opened, the main circuit breaker cannot be powered on.

# Steps for Setting Up

## Procedure

### 1. Receive and inspect the drive

Check that the part number printed on the label is the same as that on the purchase order.

Remove the drive from its packaging and check that it has not been damaged.

### 2. Verify the supply voltage

Verify that the supply voltage is compatible with the voltage range of the drive.

### 3. Mount the drive

Mount the drive in accordance with the instructions in this document.

Install any internal and external option.

Steps 1 to 4 must be performed with the power off.



### 4. Wire the drive

Connect the line supply, ensuring that the drive is grounded whilst the power supply is off.

Connect the motor, ensuring that its connections correspond to the voltage.

Connect the control wires according to the drawing.

### 5. Commissioning and programming

Contact your local Schneider Electric representative.

# Transportation, Storage and Disposal

## Transport and Storage Conditions

The product should be protected from rain and excessive sun exposure. The room where the drive is stored should be well dry and ventilated, ensure that there is no corrosive gas in the storage room.

The following temperature range is permissible during transportation and storage:

- Transportation temperature: -25°C to 70°C (-13°F to 158°F)
- Storage temperature: 0°C to 50°C(32°F to 122°F)

The following relative humidity is permissible during transportation and storage:

- Relative humidity: up to 90%(without condensate)

If the product is stored for more than six months, the oxidation and aging of cabinets and components of ATV6000 must be inspected completely.

### Long Time Storage for the Drive or Power Cell (as spare parts)

If the drive or the power cell (as spare parts) were not connected to mains for an extended period of time, the capacitors must be restored to their full performance before the motor is started.

<b><i>NOTICE</i></b>
<p><b>REDUCED CAPACITOR PERFORMANCE</b></p> <ul style="list-style-type: none"> <li>• Apply mains voltage to the drive for one hour before starting the motor if the drive has not been connected to mains for 12 months.</li> <li>• Verify that no Run command can be applied before the period of one hour has elapsed.</li> </ul> <p><b>Failure to follow these instructions can result in equipment damage.</b></p>

If the specified procedure cannot be performed without a Run command because of internal mains contactor control, perform this procedure with the power stage enabled, but the motor being at standstill so that there is no appreciable mains current in the capacitors.

### Long Time Storage for the Optional Internal UPS

If UPS does not work for a long time, it must be charged and discharged completely once every 6 months to help ensure the service life of the battery.

## Storage and Handling Instructions for Spare Parts

### **NOTICE**

#### **RISK OF COMPONENT DAMAGE DUE TO INCORRECT HANDLING AND STORAGE**

- Apply static-free precautions when handling these components.
- Do not touch components without wearing a wrist grounding strap.
- Put the component on a grounded working surface to help protect against electrostatic discharges.
- Take components only at their edges.
- The storage conditions and the packaging must be checked regularly.
- Any damage that occurs during the storage period must be repaired immediately.
- Follow the “storage place requirements” described below.

**Failure to follow these instructions can result in equipment damage.**

#### **Storage place requirements:**

- Protected against vibration and shocks.
- Free from dust, sand, vermin, and insects.
- Free from corrosive gases, salt mist, and others that could damage electronic equipment.
- Keep dry; relative air humidity up to 90% without condensation.
- Keep spare parts in their original packaging.
- Store printed circuit board assembly in anti-static bags or boxes.
- Storage temperature range: 0°C to 50°C(32°F to 122°F).

Damaged products or accessories may cause electric shock or unanticipated equipment operation.

### **DANGER**

#### **ELECTRIC SHOCK OR UNANTICIPATED EQUIPMENT OPERATION**

Do not use damaged products or accessories.

**Failure to follow these instructions will result in death or serious injury.**

Contact your local Schneider Electric sales office if you detect any damage whatsoever.

## Unpacking and Inspection

Proceed as follows:

Step	Action
1	Remove all packaging material carefully. Do not use sharp tools.
2	Check if drive and spare parts are not damaged.
3	Check if deliveries are consistent with the purchase order and the packing list.
4	Contact your local Schneider Electric sales office if you detect any damage whatsoever. The user must record any damage in detail, obtain a confirmation signature from the carrier, take photos.

### CAUTION

#### INCORRECT UNPACKING

Do not use sharp tools to open the packaging.

**Failure to follow these instructions can result in injury or equipment damage.**

## End of Life / Disposal

The components of the product consist of different materials which can be recycled and which must be disposed of separately.

- Dispose of the packaging in compliance with all applicable regulations.
- Dispose of the components of the product in compliance with all applicable regulations.

## Lifting and Transport

Verify the size and weight of ATV6000 to choose proper lifting equipment. It is required to have the general layout drawing which contains relevant dimensions and weight information of the product before it is transported.

### **▲ WARNING**

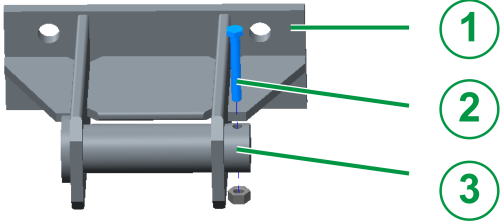
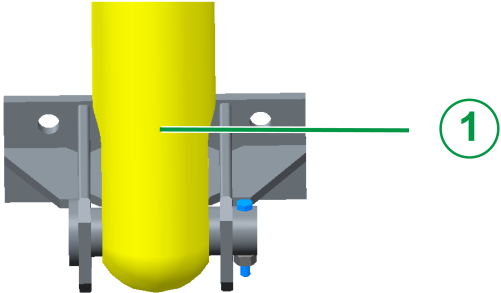
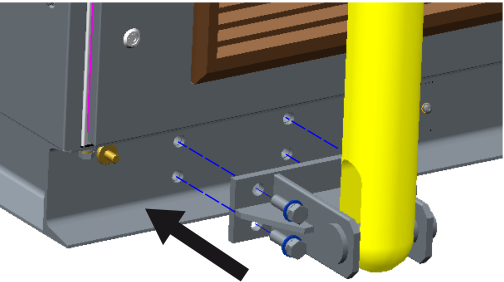
#### **INCORRECT LIFTING AND HANDLING**

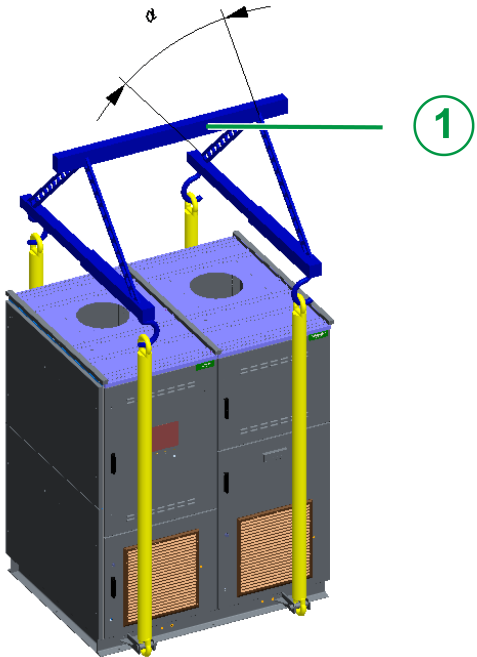

- Lifting and handling must be performed by qualified personnel in accordance with the requirements of the site and in compliance with all pertinent regulations.
- Use lifting and handling equipment appropriate for the load and take all necessary measures to avoid swinging, inclination, toppling and any other potentially hazardous conditions.
- Verify that there are no persons or obstructions in the area of operation of the lifting and handling equipment.
- Use a cross spreader to lift and handle the product.
- Only lift and handle the product with the lifting bars provided with the product.
- To prevent possible damage to the frame of equipment from excessive compressive forces by lifting belts, ensure the angle is not less than 30°, additional spreader beams need be equipped if necessary.
- During lifting and handling, do not exceed an acceleration of 0.1 m/s<sup>2</sup> and a speed of 6m/min.
- Load swinging must be less than 6 °.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Cabinet Lifting

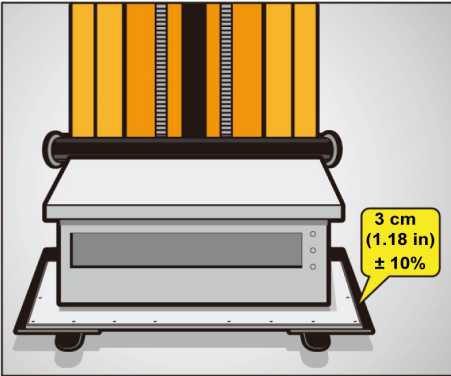
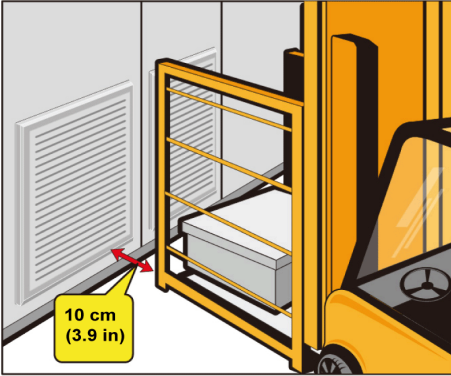
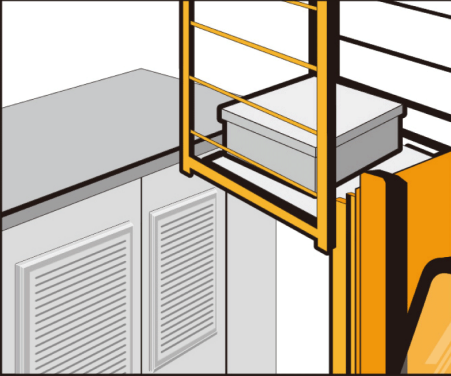
Lifting equipment and lifting belts are not part of the delivery and must be provided by the customer.

Mounting steps	Key points	Illustration
<p>Unscrew the M8 screw, pull out the clevis pin.</p>	<p>4 lifting lugs is packed in drive package.</p> <p><b>NOTE:</b> There are two sizes of lifting lugs : <math>\leq 10t</math> and <math>\geq 10t</math>.</p>	 <p>1 Lifting lugs 2 M8 screw 3 Clevis pin</p>
<p>Insert the clevis pin within the lifting belt, secure the clevis pin with the M8 screw and nuts. Refer to the torque setting table</p>		 <p>1 Lifting belt</p>
<p>Remove the screws from base frame, assemble the lifting lugs on the base frame then tighten the screws. Refer to the torque setting table</p>	<p>M16 bolt for the drive which weight less than 10 tons, M20 for the drive which weight more than 10 tons.</p>	

Mounting steps	Key points	Illustration
<p>Use 4 lifting belts to lift the cabinet to the final position.</p>	<p>The load bearing of each lifting must not be less than 20 tons of load capacity.</p>	 <p><math>\alpha</math>: angle <math>\geq 30^\circ</math> 1: lifting equipment</p>
<p>Remove the lifting lugs and take out the lifting belts, then reassemble the screws on the base frame.</p>		



### Cooling Fan Lifting

Mounting steps	Key points	Illustration
<p>Move the assembled cooling fan on the forklift.</p>	<p>The distance must be 3 cm±10% between each outer side of forklift arm and the side edge of the fan.</p>	
<p>Transport the cooling fan to the cabinet using the forklift, forklift arms facing the front of the cabinet.</p>	<p>Keep the forklift front ends at least 10 cm from the cabinet.</p>	
<p>Lift the forklift arms to the same height as the cabinet top; stop the forklift, and then the worker on the cabinet top may move the cooling fan to the top of the cabinet.</p> <p><b>NOTE:</b> Take appropriate measure to secure the position of the worker in compliance with your national and local safety regulations.</p>	<ol style="list-style-type: none"> <li>1. The lifting height of the forklift arms shall be at the same level of the cabinet top.</li> <li>2. The worker can move the cooling fan only after the forklift has stopped.</li> </ol>	
<p>See cooling fan installation procedure Cooling Fan Installation, page 55</p>		

# Mechanical Installation

## General Notes on Installation

### Overview of Installation

Conductive foreign objects may cause parasitic voltage.

#### **DANGER**

##### **ELECTRIC SHOCK AND/OR UNANTICIPATED EQUIPMENT OPERATION**

- Keep foreign objects such as chips, screws or wire clippings from getting into the product.
- Verify correct seat of seals and cable entries in order to avoid deposits and humidity.

**Failure to follow these instructions will result in death or serious injury.**

### Dimensions

Refer to the general layout drawing shipped with the drive for information on:

- Cabinet dimensions
- Maintenance space
- Foundation plan

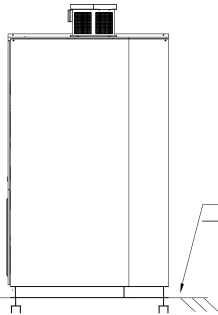
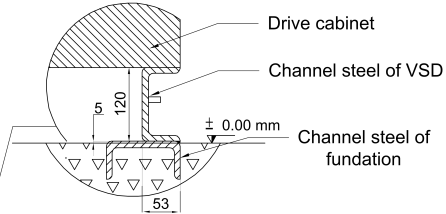
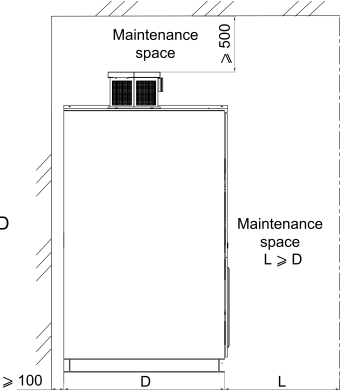
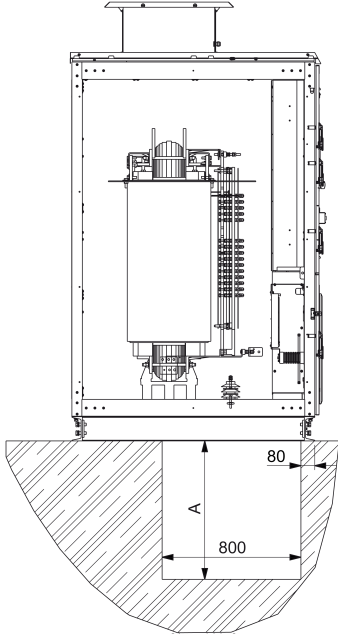
### Foundation Requirements

Before installation, the foundation for positioning must be prepared by the user. The floor must be made of non-flammable material, with smooth and non-abrasive surface, protected against humidity diffusion, level, and able to support the cabinet.

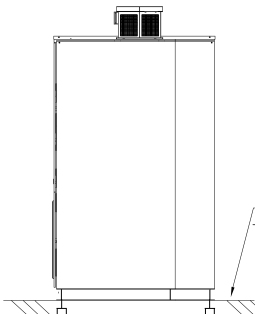
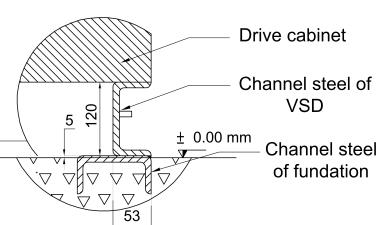
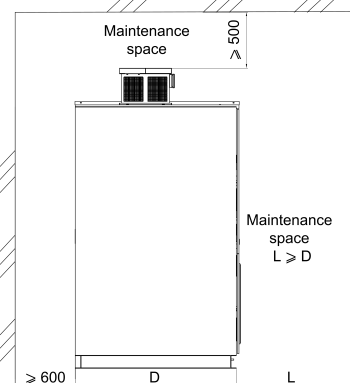
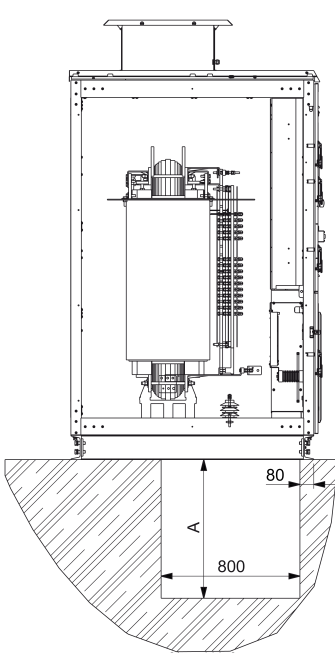
The suggestions for the foundation depend on your configuration.

**NOTE:** Cable trench has to be prepared for bottom-in cable connection.

**Front access:**

<p>1</p>	<p>The embedded channel steel must be 5 mm higher than the ground. In order to increase the stress area, the length of the embedded channel steel must be 400 mm longer than the base of the ATV6000 (200 mm longer for left and right sides respectively), the quality of the embedded channel steel installation must be guaranteed.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>Right side</b></p>  </div> <div style="text-align: center;"> <p><b>Detail of foundation</b></p>  </div> <div style="text-align: center;"> <p><b>Left Side</b></p>  </div> </div> <p>Figures 4-1 Foundation plan</p>
<p>2</p>	<p>Cable ducts should be of non-flammable material and of a non-abrasive surface. All cable entries and exits should be protected against dust, humidity, and animals entering into the drive. Suitable fire protection measures should be applied to prevent fire from the drive.</p>
<p>3</p>	<p><b>Cable trench considerations</b></p> <p>Standard design of ATV6000 is for cable entry from bottom (cable entry from top is available as option). Therefore a corresponding cable trench has to be prepared for appropriate cable connection.</p> <div style="text-align: center;">  </div> <p>A) The depth of cable trench is depending on the required bending radius of the used cable type and cross section.</p>

**Front & Rear access:**

<p>1</p>	<p>Depending on the model, the drive may require a 600 mm rear access for maintenance.</p> <p>The embedded channel steel must be 5 mm higher than the ground. In order to increase the stress area, the length of the embedded channel steel must be 400 mm longer than the base of the ATV6000 (200 mm longer for left and right sides respectively), the quality of the embedded channel steel installation must be guaranteed.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>Right side</b></p>  </div> <div style="text-align: center;"> <p><b>Detail of foundation</b></p>  </div> <div style="text-align: center;"> <p><b>Left Side</b></p>  </div> </div> <p>Figures 4-2 Foundation plan</p>
<p>2</p>	<p>Cable ducts should be of non-flammable material and of a non-abrasive surface. All cable entries and exits should be protected against dust, humidity, and animals entering into the drive. Suitable fire protection measures should be applied to prevent fire from the drive.</p>
<p>3</p>	<p>Cable trench considerations</p> <p>Standard design of ATV6000 is for cable entry from bottom (cable entry from top is available as option).</p> <p>Therefore a corresponding cable trench has to be prepared for appropriate cable connection.</p> <div style="text-align: center;">  </div> <p>A) The depth of cable trench is depending on the required bending radius of the used cable type and cross section.</p>

## Cabinet Top

It is not allowed to install any foreign device on the top of the cabinet.

## Cabinets Fixed

Verify the drive cabinets are reliably fixed, one of the two methods below must be followed.

- The base of ATV6000 must be connected to the embedded channel steel by spot - welding.
- Match the cabinet base with specially designed fixing holes by which VSD cabinet is fixed on the ground.

Floor fixings are not supplied. Anchor bolts or screws and nuts of size M14 are recommended.

**NOTE:** For fixing holes, refer to the Foundation Plan, also available in the Handbook Manual QGH83255 (English).

## Cabinet Installation

Typical ATV6000 consists of two cases:

- Front access drive with transformer and control cabinet + power cell cabinet
- Front & Rear access drive with transformer cabinet + control cabinet + power cell cabinet

The ATV6000 is disassembled into different parts according to cabinets:



Figure 4-3 Front view of ATV6000

1. Transformer and control cabinet
2. Power cell cabinet

### Note of Integrated Transportation

ATV6000 is designed as integrated transportation for the 145, 245, 335 types of power cells. Power cell is fastened on its rail by front and back screws for easy and quick installation.



Figure 4-4 Back view of power cell cabinet

- 1. Power cell
- 2. Bearing beam
- 3. Fastening screws

For front access before mounting against a wall, the fastening screws at the rear of the power cell cabinet must be removed (the fastening screws must be kept for future transportation of the cabinet.).

Procedure:

Step	Action
1	Open the doors on the back side of the power cell cabinet;
2	Remove the fastening screws, refer to the following illustration (Rear view A or B);
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Rear view A (1 fixation screw for each power cell)</p> </div> <div style="text-align: center;"> <p>Rear view B (2 fastening screws for each power cell)</p> </div> </div> <ul style="list-style-type: none"> <li>1. Power cell</li> <li>2. Bearing beam</li> <li>3. fastening screws</li> </ul>
3	Close the back side doors after confirming that the product is well-grounded.

## Cabinet Combination

Before fixing the cabinets on the base by anchor bolts, the cabinets need to be combined.

**⚡ ⚠ DANGER**

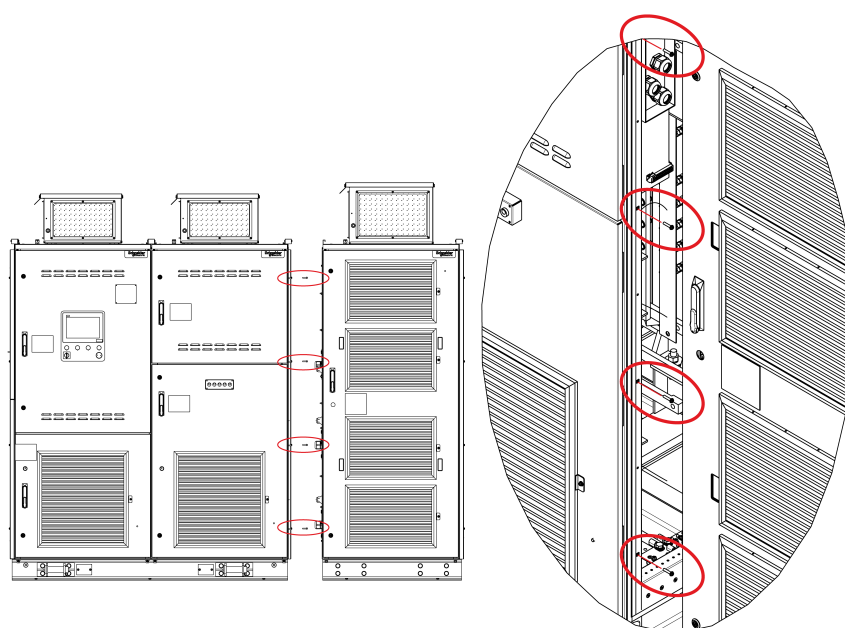
**ELECTRIC SHOCK CAUSED BY INSUFFICIENT GROUNDING**

- Join all cabinets by means of the bolts provided with the drive system as shown in the figures below.
- Fasten the bolts with the tightening torques specified in this document.

**Failure to follow these instructions will result in death or serious injury.**

The connection between transformer cabinet and power cell cabinet must be precisely adjacent to help ensuring that the doors can easily be opened and closed:

**Between transformer cabinet and power cell cabinet:**



8 M6 bolts are fixed to the cabinet (4 M6 bolts at the front of cabinet, 4 M6 bolts at the back of cabinet), according to the tightening torque given in the table 5-1, page 61.

- Units must be bolted or welded to the channel steel embedded in the concrete.
- Verify that the electrical resistance of the channel steel embedded in the concrete is equal to or less than 1 Ohm.

## Instructions for cabinet combination

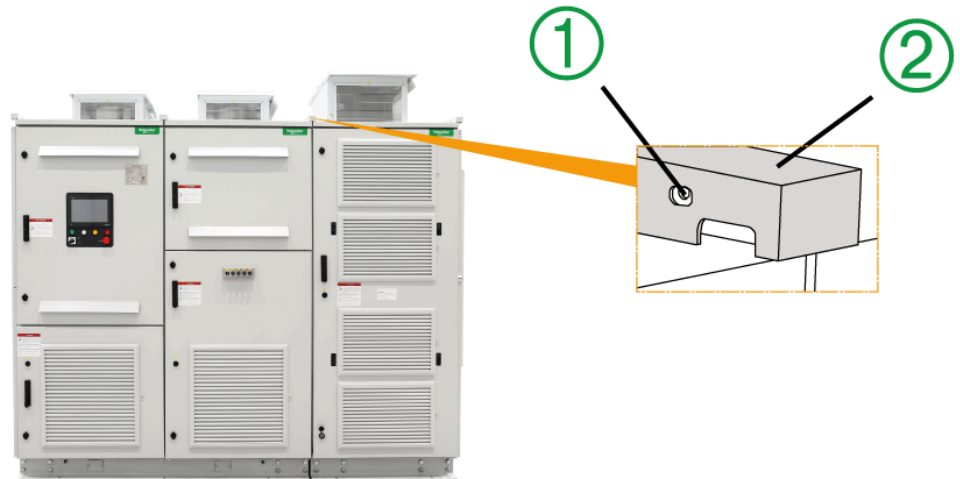


Figure 4-6

1 Screw

2 Cabinet cover plate

Step	Action
1	Place the cabinet cover plate on top of the cabinet to cover the gap.
2	Use the M6*16 screws (contained in spare parts box) to fasten the cabinet cover plate, according to the tightening torque given in the table 5-1, page 61.



## Power Cell Installation

### Power Cell Inspection (Before Installing):

Conduct a careful inspection before installing power cells:

Step	Action
1	Confirm that the technical label of power cell is consistent with the nameplate of the drive.
2	Confirm that each power cell is referring to the same drawing number.

### Markings Specification

<b>NOTICE</b>	
<b>IMPROPER CONNECTION AND LAYOUT</b>	
<ul style="list-style-type: none"> <li>The head of the optical fiber and its socket must be clean and fixed. Never pull or bend it. Bending radius no less than 50 mm.</li> <li>The Color of the optical fiber heads and sockets must be the same.</li> </ul>	
<b>Failure to follow these instructions can result in equipment damage.</b>	

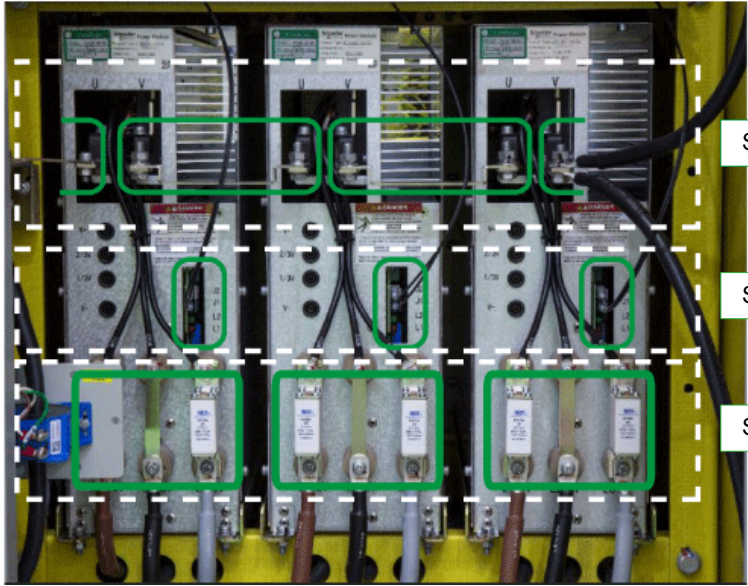
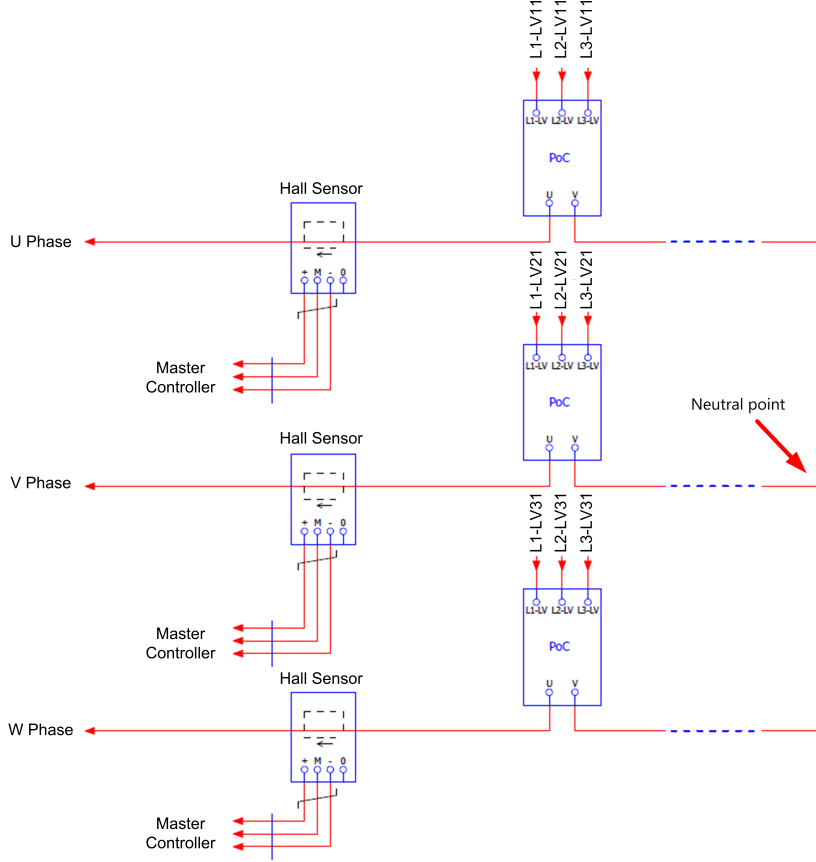
Step	Action
1	Each power cell is marked with a part reference, for example:APVa1, APVa2..., APVb1, APVb2..., APVc1, APVc2..., which indicates the location of the cell in the system: e.g. APVa1 is the marking of the first cell of L1/A phase.
2	Each power cell has 2 fuses, 2 optical fiber sockets (J1, J2) and 3 input terminals. Each terminal is marked with L1-LV, L2-LV, L3-LV, which indicates the input terminals of each phase.

### Power Cell Installation

<b>⚠️⚠️ DANGER</b>	
<b>HAZARD OF FIRE OR ELECTRIC SHOCK</b>	
Tightening torques must comply with the specifications provided in this document	
<b>Failure to follow these instructions will result in death or serious injury.</b>	

For drives using power cells type 510 and 710, the power cells are delivered separately and must be installed on site.

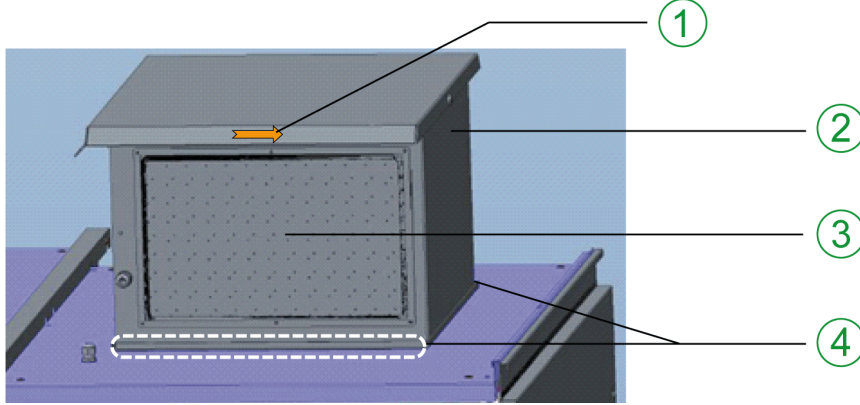
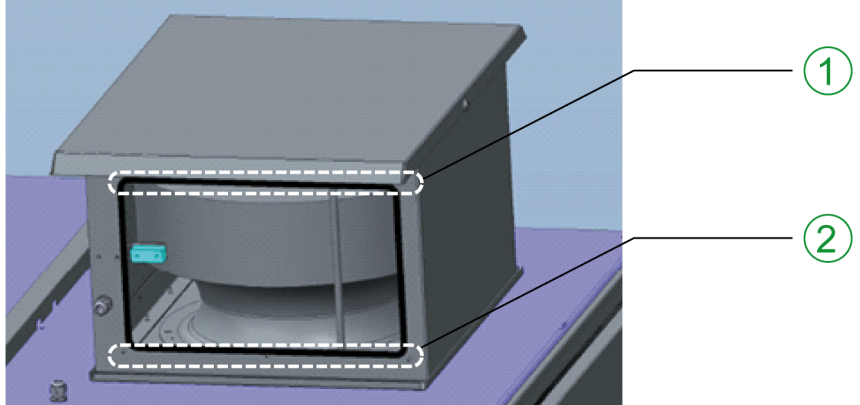
Step	Action
1	Install power cells (510 or 710 type, if the current is above 320 A) by sliding them into the cabinet channels, verify that the power cells are correctly positioned.
2	Input power wiring connection: Connect the input terminals (L1-LV, L2-LV...) and input fuses, according to the tightening torque given in the table 5-1, page 61. See the drawing in step 4 below.
3	Connection between the power cells: Connect the terminal V with terminal U between two adjacent power cells using a copper bar, according to the tightening torque given in the table 5-1, page 61. The cells of the same phase are connected in series. See the drawing in step 4 below.
4	Communication wirings connection used to connect the power cell and master controller: Insert the optical fiber cables.

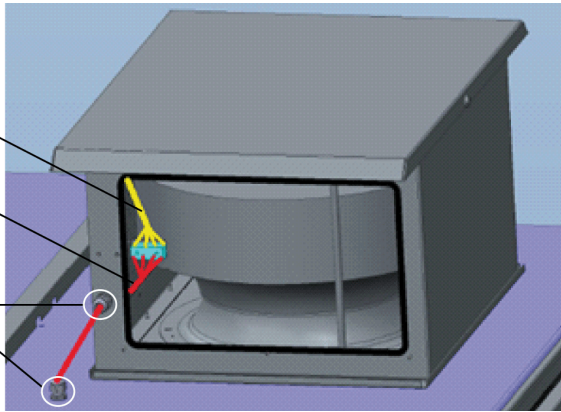
Step	Action
	 <p data-bbox="1326 331 1433 360">Step 3</p> <p data-bbox="1326 483 1433 512">Step 4</p> <p data-bbox="1326 613 1433 642">Step 2</p> <p data-bbox="603 790 1129 819">Figure 4-7 configuration drawing of installed power cells.</p>
5	<p data-bbox="603 835 1422 909">Connection between the neutral points: The output terminal V of each cell at the end of every phase is connected at neutral point using cables or a copper bar, according to the tightening torque given in the table 5-1, page 61. See the drawing as below step 6.</p>
6	<p data-bbox="603 931 1422 1005">Connection of output cables: Connect the terminal U of the cells which is the first one in each phase with output cables, the hall sensor should be mounted with a cable/copper bar passing through it.</p> <p data-bbox="647 1010 1347 1039"><b>NOTE:</b> Plug the connectors of hall sensor to the Master controller terminal.</p>  <p data-bbox="603 1279 671 1308">U Phase</p> <p data-bbox="603 1518 671 1547">V Phase</p> <p data-bbox="603 1765 671 1794">W Phase</p> <p data-bbox="746 1406 815 1435">Master Controller</p> <p data-bbox="746 1675 815 1704">Master Controller</p> <p data-bbox="746 1877 815 1906">Master Controller</p> <p data-bbox="879 1227 963 1256">Hall Sensor</p> <p data-bbox="879 1473 963 1503">Hall Sensor</p> <p data-bbox="879 1720 963 1749">Hall Sensor</p> <p data-bbox="1134 1048 1203 1077">L1-LV11</p> <p data-bbox="1134 1077 1203 1106">L2-LV11</p> <p data-bbox="1134 1106 1203 1135">L3-LV11</p> <p data-bbox="1134 1135 1203 1164">L1-LV21</p> <p data-bbox="1134 1164 1203 1193">L2-LV21</p> <p data-bbox="1134 1193 1203 1223">L3-LV21</p> <p data-bbox="1134 1223 1203 1252">L1-LV31</p> <p data-bbox="1134 1252 1203 1281">L2-LV31</p> <p data-bbox="1134 1281 1203 1310">L3-LV31</p> <p data-bbox="1134 1310 1203 1339">L1-LV</p> <p data-bbox="1134 1339 1203 1368">L2-LV</p> <p data-bbox="1134 1368 1203 1397">L3-LV</p> <p data-bbox="1134 1397 1203 1426">L1-LV</p> <p data-bbox="1134 1426 1203 1456">L2-LV</p> <p data-bbox="1134 1456 1203 1485">L3-LV</p> <p data-bbox="1134 1485 1203 1514">L1-LV</p> <p data-bbox="1134 1514 1203 1543">L2-LV</p> <p data-bbox="1134 1543 1203 1572">L3-LV</p> <p data-bbox="1134 1572 1203 1601">L1-LV</p> <p data-bbox="1134 1601 1203 1630">L2-LV</p> <p data-bbox="1134 1630 1203 1659">L3-LV</p> <p data-bbox="1134 1659 1203 1688">L1-LV</p> <p data-bbox="1134 1688 1203 1718">L2-LV</p> <p data-bbox="1134 1718 1203 1747">L3-LV</p> <p data-bbox="1134 1747 1203 1776">L1-LV</p> <p data-bbox="1134 1776 1203 1805">L2-LV</p> <p data-bbox="1134 1805 1203 1834">L3-LV</p> <p data-bbox="1134 1834 1203 1863">L1-LV</p> <p data-bbox="1134 1863 1203 1892">L2-LV</p> <p data-bbox="1134 1892 1203 1921">L3-LV</p> <p data-bbox="1294 1442 1394 1471">Neutral point</p>
<p data-bbox="544 1944 1198 1973"><b>NOTE:</b> For details refer to the drawing delivered in the drive package.</p>	

# Cooling Fan Installation

## Cooling Fan Installation

For convenience during transportation, cooling fans are packed individually. Carefully distinguish power cell cabinet cooling fans and transformer cabinet cooling fans according to drawings and labels before installing cooling fans.

<p>1</p>	<p>Mount the fan and fan housing on the top of cabinet. The face with yellow arrow should be faced towards front side of cabinet.</p> <p>Use 5 M8 bolts (contained in the spare parts box) to fasten the fan housing, according to the tightening torque given in the table 5-1, page 61.</p>  <p>1. The yellow arrow represents direction of fan rotation</p> <p>2. Fan and fan housing.</p> <p>3. Front dust filter.</p> <p>4. 3 M8 bolts (2 M8 for rear side)</p>
<p>2</p>	<p>Remove the front dust filter (6 M4 nuts) from fan housing and keep it.</p>  <p>1. 3 M4 bolts.</p> <p>2. 3 M4 bolts.</p>
<p>3</p>	<p>Connect fan wire with terminal and power wire with terminal through PG gland (the wirings according to the drawings in the drive package).</p>

<p>①</p> <p>②</p> <p>③</p>	
	<p>1. Fan wire.</p> <p>2. Power wire.</p> <p>3. PG gland.</p> <p><b>NOTE:</b> The red power fan cable is inside the cabinet (on the top).</p>
4	Install the front dust filter with 6 M4 nuts.
5	Mount the fan cover for each fan if provided. (Option for air duct)

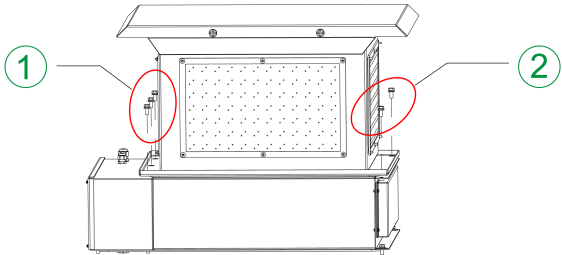
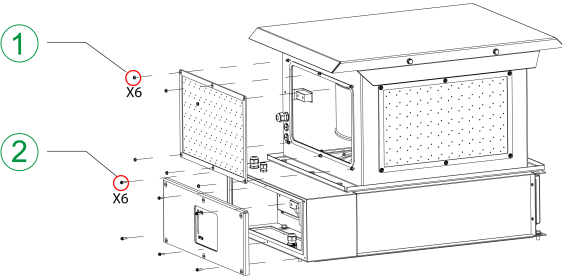
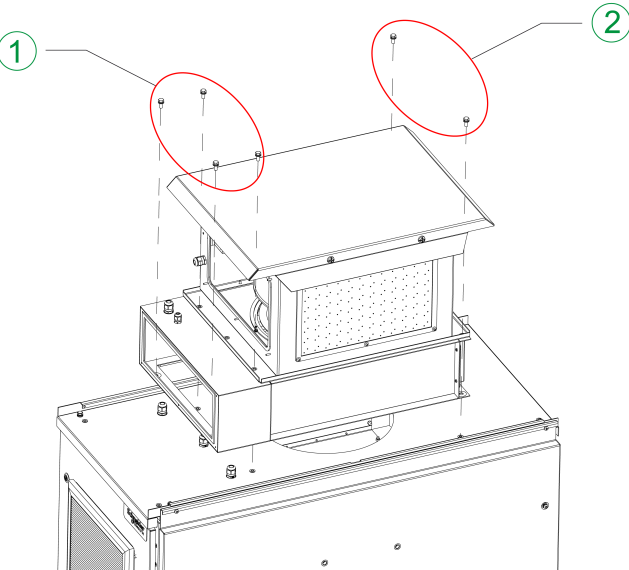
Fan Type	Size (mm)	Weight in kg (lb)
400	580*745*330	15 (33.1)
450	580*745*394	11 (24.2)
500	620*803*408	22 (48.5)
560	750*933*435	31 (68.3)

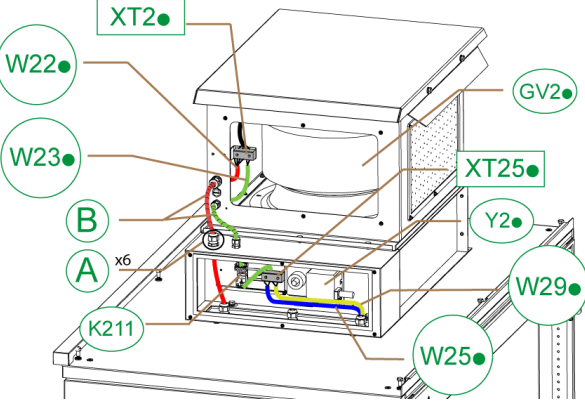

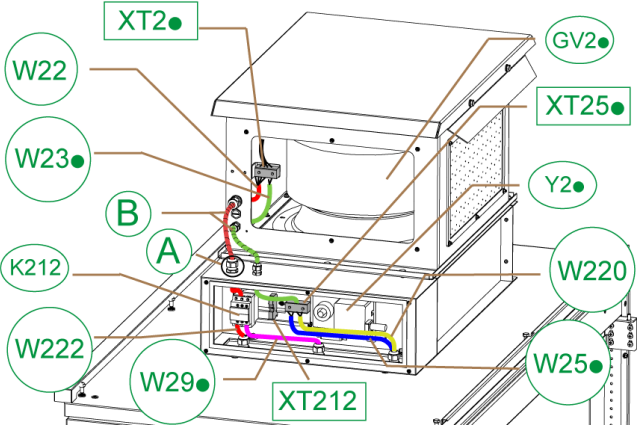
**NOTE:** the service life of cooling fan will be reduced if the working temperature is more than 40°C (104°F). This information can be provided by Schneider Services depending on the local environment conditions.

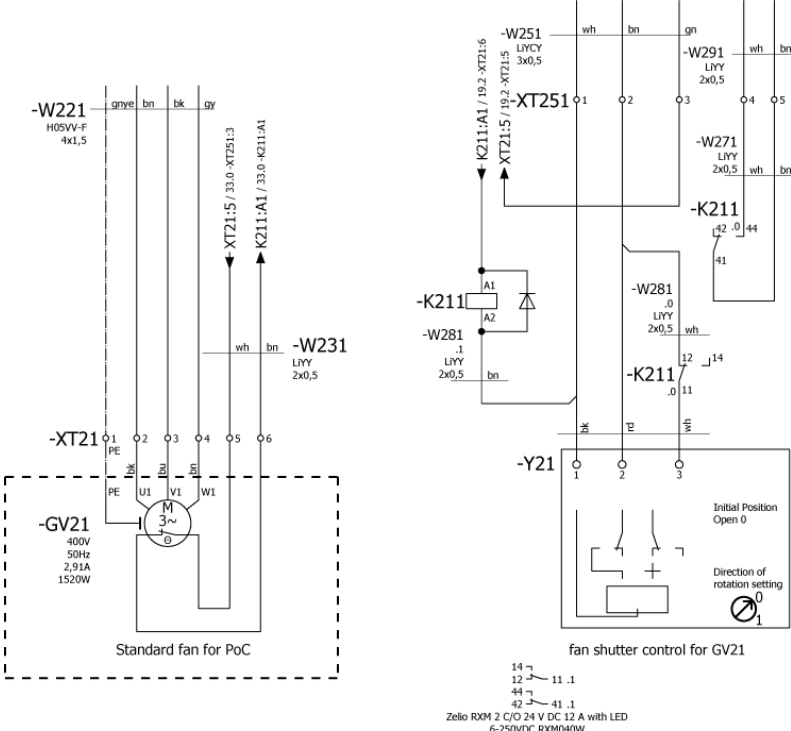
# Fan Shutter Installation

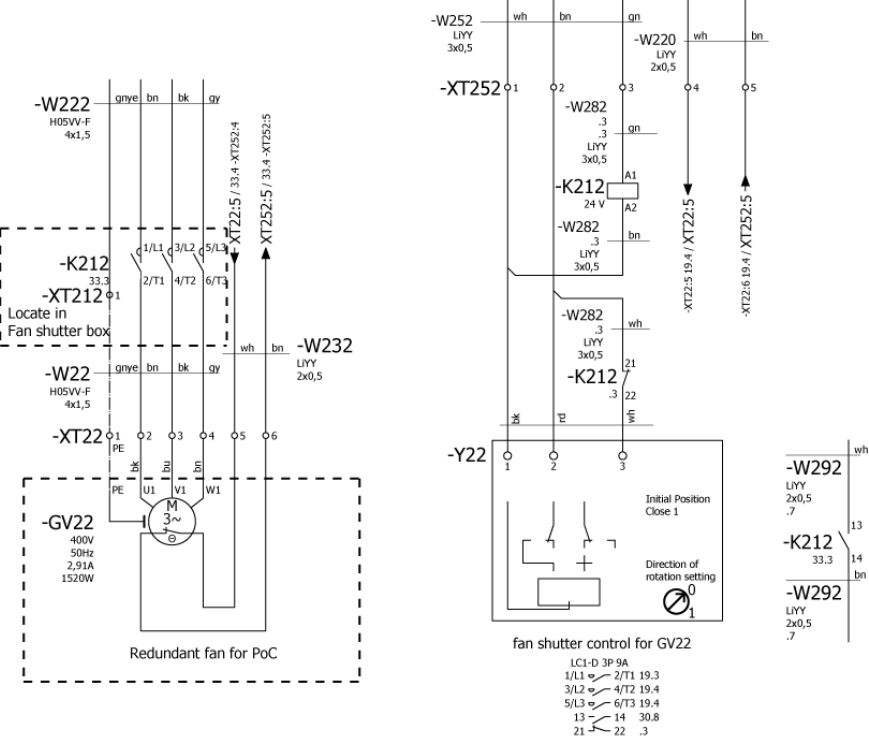
## Procedure

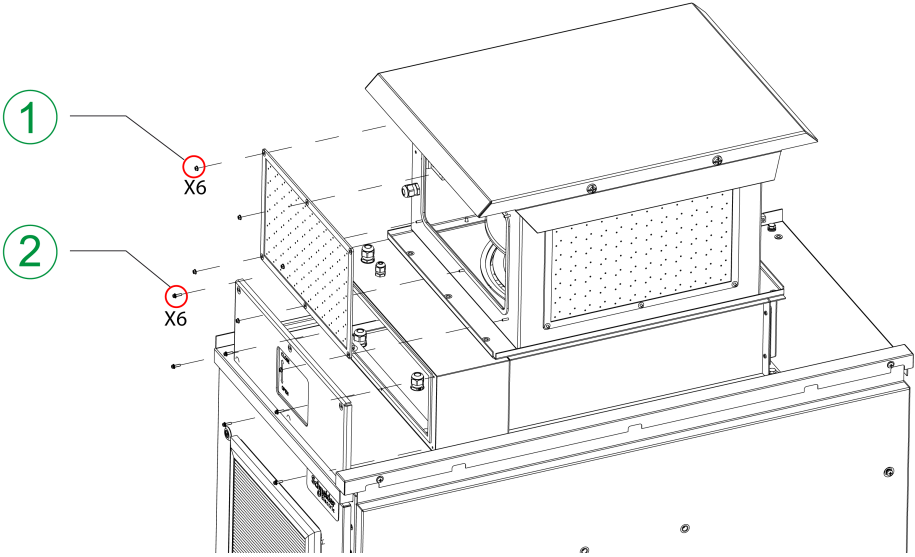
For convenience during transportation, fan shutter are packed individually.

Step	Action
1	<p>Assemble the fan and fan shutter, (5 M8 bolts) according to the tightening torque given in the the table 5-1, page 61.</p>  <p>1. 3 M8 bolts for front side 2. 2 M8 bolts for rear side</p>
2	<p>Remove the front cover of fan, and front cover of fan shutter.</p>  <p>1: 6 M4 nuts for fan cover 2: 6 M5 bolts for fan shutter cover</p>
3	<p>Put the fan group into the correct position and fix it according to the tightening torque given in the the table 5-1, page 61.</p>  <p>1. 4 M8 bolts for front side 2. 2 M8 bolts for rear side</p>

Type 1 — Wiring without contactor	Type 2 — Wiring with contactor
For more details and full overview refer to the schematics delivered with your product.	
 <p><b>Note:</b> before wiring, check the fan shutter position , page 60.</p> <p><b>A:</b> PG gland  <b>B:</b> Protection tube for the cable.</p>  <p>Must be added in external (bonding with power cable on roof)</p> <p><b>GV2•:</b> Fan motor  <b>XT2•:</b> Fan terminal block  <b>W22•:</b> Fan power cable  <b>W23•:</b> Fan feedback cable  <b>W25•:</b> Fan shutter power cable  <b>W29•:</b>Fan feedback cable  <b>XT25•:</b> Fan shutter terminal block  <b>K211:</b> Relay  <b>Y2•:</b> Fan shutter controller</p>	 <p><b>Note:</b> before wiring, check the fan shutter position , page 60.</p> <p><b>A:</b> PG gland  <b>B:</b> Protection tube for the cable.          Must be added in external (bonding with power cable on roof)</p> <p><b>GV2•:</b> Fan motor  <b>XT2•:</b> Fan terminal block  <b>W22 &amp; W 222:</b> Fan power cable  <b>W23•:</b> Fan feedback cable  <b>W25•:</b> Fan shutter power cable  <b>W29•:</b> Contactor feedback cable  <b>W220:</b> Fan feedback cable  <b>XT25•:</b> Fan shutter terminal block  <b>XT212:</b> Terminal (Option)  <b>K212:</b> Contactor  <b>Y2•:</b> Fan shutter controller</p>

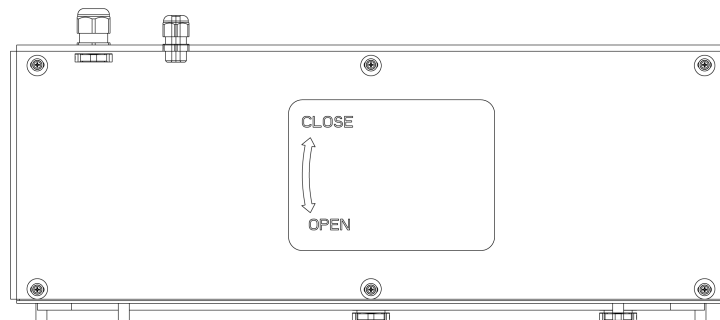
Step	Action
<p><b>4: Type 1</b></p>	<p>Connect and fasten cables with PG gland:</p> <ul style="list-style-type: none"> <li>Connect cable W22•/W23• to terminal XT2• according to the tightening torque 0.6...0.8Nm.</li> <li>Connect cable W25•/W29• to terminal XT25• according to the tightening torque 0.6...0.8Nm.</li> </ul>  <p>Standard fan for PoC</p> <p>fan shutter control for GV21</p> <p>Zelio RXM 2 C/O 24 V DC 12 A with LED 6-250VDC RXM040W</p>

<p><b>4: Type 2</b></p>	<p>Connect and fasten cables with PG gland:</p> <ul style="list-style-type: none"> <li>Connect cable W22/W23• to terminal XT2• according to the tightening torque 0.6...0.8Nm.</li> <li>Connect cable W25•/W220 to terminal XT25• according to the tightening torque 0.6...0.8Nm.</li> </ul>  <p>Redundant fan for PoC</p> <p>fan shutter control for GV22</p> <p>LCI-D 3P 9A 1/L1 to 2/T1 19.3 3/L2 to 4/T2 19.4 5/L3 to 6/T3 19.4 13 to 14 30.8 21 to 22 3</p>
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Step	Action
5	<p data-bbox="293 174 1385 203">Assemble the front cover of fan and fan shutter according to the tightening torque given in the the table 5-1, page 61.</p>  <p data-bbox="293 786 533 813">1: 6 M4 nuts for fan cover</p> <p data-bbox="293 831 608 857">2: 6 M5 bolts for fan shutter cover</p>

## Fan Shutter Open/Close Position

Position of fan shutter can be checked through the window.






# Electrical Installation

## Overview of Installation

### Overview

 **DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

- Read and understand the instructions in "Safety Information" chapter before performing any procedure in this chapter.
- When the electrical installation is completed, the mains and auxiliary power supply to the drive must not be switched on without the approval of the commissioning personnel.

**Failure to follow these instructions will result in death or serious injury.**

- **Tightening torque settings (table 5-1)**

Torque Setting Table				
Bolt dimension	Mechanical assembly		Electric connection	
	N·m	lbf·in	N·m	lbf·in
M3	0.8	7.1	0.5	4.4
M4	1.2	10.6	1.2	10.6
M5	3.3	29.2	2.6	23
M6	5.5	48.7	4.4	38.9
M8	13.5	119.5	10.8	95.6
M10	27	238.9	19.6	173.5
M12	45	398.2	37.2	329.2
M16	130	1150.4	/	/
M20	250	2212.4	/	/

**NOTE:**

- 1lbf.in = 0.113 N.m
- 1 N.m = 8.85 lbf.in
- The maximum deviation of the torque applied should be no more than ± 10%.

# Grounding Connection

## Overview

⚡ ⚠ **DANGER**

**ELECTRIC SHOCK CAUSED BY INSUFFICIENT GROUNDING**

- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of the entire drive system.
- Ground the drive system before applying voltage.
- The cross section of the protective ground conductor must comply with the applicable standards.
- Do not use conduits as protective ground conductors; use a protective ground conductor inside the conduit.
- Do not consider cable shields to be protective ground conductors.

**Failure to follow these instructions will result in death or serious injury.**

In the transformer cabinet, two PE bars for grounding are available as shown below. For each PE bar, there are 8 M10 terminals and 12 M6 terminals for customer connection.



1 Left PE Bar

2 Right PE Bar

## Protective Grounding (ground cable provided by customer)

**Left PE bar:** Connect to ground electrode (customer side) by ground cable.

Use a M10 bolt to fasten the ground cable, according to the tightening torque given in the table 5-1, page 61.

### Cross-Section:

The cross-section of the ground cable and the ground connection must be in compliance with national and local electrical codes. In addition, it needs to be meet minimum short circuit current 31.5kA/150ms:

- Cross-section of ground cable: at least half of mains cable with a minimum cross-section of ground cable of **50 mm<sup>2</sup>**.

## Power Cable Shields Grounding

Cable shields must be connected to the PE bars.

### Left PE bar:

- Connect the screen ends of the shield of mains cable

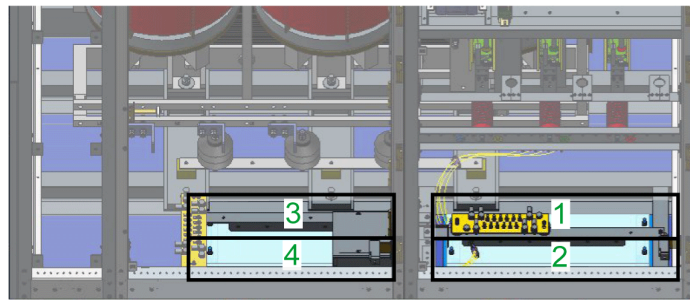
### Right PE bar:

- Connect the screen ends of the shield of motor cable

## External Power cabling

### Overview

On the baseplate of transformer and control cabinet, there are four dismountable aluminum plates for easy onsite installation.

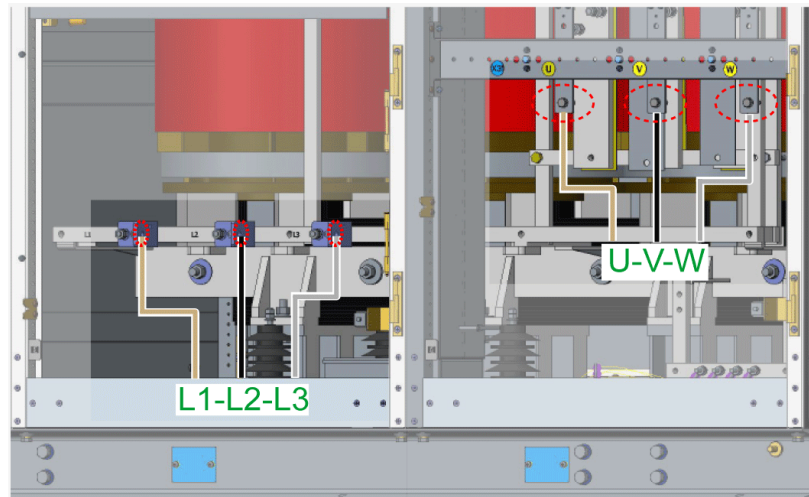


4 dismountable aluminum plates

Step	Action
1	Remove the dismountable aluminum plate (4 M10 nuts) from the cabinet and keep them.
2	Drill proper size hole to fit diameter of cable gland corresponding to the cable.
3	Install suitable cable glands to achieve the corresponding degree of protection and to help avoid to damage the insulation of the cables.
4	Pass the cables through the aluminum plate.
5	Install the aluminum plate (4 M10 nuts).

**NOTE:** Fireproofing mud or epoxy resin is needed to seal the holes. The fireproofing mud and epoxy resin are not provided..

## Mains cables and motor cables wiring



**L1-L2-L3** Mains cables wiring

**U-V-W** Motor cables wiring

Use a M10 bolt to fasten the mains and motor cables, according to the tightening torque given in the table 5-1, page 61.

## Cable preparation

Conductive foreign objects in the product may cause parasitic voltage.

**⚠️⚠️ DANGER**

**ELECTRIC SHOCK AND/OR UNANTICIPATED EQUIPMENT OPERATION**

- Keep foreign objects such as screws or wire clippings or any other type of residue from getting into the cabinet.
- Verify correct seat of seals and cable entries in order to avoid deposits and humidity.

**Failure to follow these instructions will result in death or serious injury.**

### Cable lugs:

Mount cable lugs suitable for M10 bolts. Cables must be terminated with lugs according to the specification of the cable manufacturer. Connect the cables to their corresponding busbars:

- The mains cable wires to **L1/L2/L3** copper bar
- The motor cables to **U/V/W** copper bar

### Table section for mains/motor cables

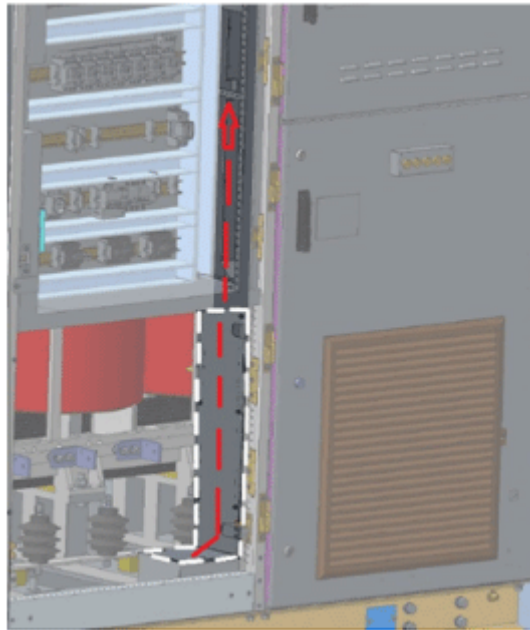
Drive nominal continuous current	Minimum cross section for mains cable (3 core, armoured)		Minimum cross section for motor Cable (3 core, armoured)	
	mm <sup>2</sup>	AWG	mm <sup>2</sup>	AWG
100 A	95	000	25	4
170 A	95	000	35	2
205 A	95	000	50	0
255 A	95	000	70	00
305 A	95	000	95	000
345 A	120	0000	120	0000
410 A	185	350MCM	185	350MCM
510 A	240	500MCM	240	500MCM
700 A	120*2	2*0000	120*2	2*0000
780 A	150*2	2*300MCM	150*2	2*300MCM
885 A	185*2	2*350MCM	185*2	2*350MCM
1025 A	240*2	2*500MCM	240*2	2*500MCM
1045 A	120*3	3*0000	/	/
1175 A	150*3	3*300MCM	/	/

**Note:**

- The cross sections in the table are based on underground cabling at 20°C ambient temperature and for normal duty overload. If you have deviating conditions, the cross section must be recalculated accordingly
- For the mains cable side, the maximum short circuit capability is 31.5kA/150ms.
- Recommended cable type is Cu/XLPE/SC/SWA/PVC from Nexans brand.

## Auxiliary Power cabling

### Cable Routing



### Determining the cable length

Determine the required length of a cable between the point of entry and the connection point inside the cabinet. Cut the cable to the required length before connection to avoid excess cable to be stored in the cable ducts. In order to open the cabinet doors more easily, an additional 15 to 20cm should be added to the swivel frame cable length.

### How to Mount Auxiliary Power Cable

#### Bottom entry

Step	Action
1	Remove the cover (M6 bolts) above the cable duct to facilitate cable routing.
2	Drill a proper hole from dismountable aluminum plate (refer to " <b>External Power cabling</b> " part).
3	Pass the cables through the aluminum plate.
4	Connect and tie the wires.
5	Install the cover with M6 bolts according to the tightening torque given in the table 5-1, page 61.

## Types of Power supplies

<b>⚠ ⚠ DANGER</b>		
<b>RISK OF ELECTRIC SHOCK</b>		
<ul style="list-style-type: none"> <li>• Use appropriate Residual Current Device (RCD) for auxiliary and control power supplies.</li> <li>• Use only Control Power Supply Overvoltage Category II.</li> </ul>		
<b>Failure to follow these instructions will result in death or serious injury.</b>		

### Type 1: 230 V Control and Auxiliary Power Supply

1	Control Power Supply - Terminal XT10 (provided by customer, available in option)	Offer provides the uninterruptible power for all the LV control circuits.
2	Auxiliary Power Supply - Terminal XT16 (provided by customer)	Powers all cubicle lamps of cabinets and auxiliary electric device.

### Type 2: 400 V Fan Power Supply

1	Fan Power Supply - Terminal XT13 (provided by customer, available in option)	Powers all fans of cabinets.
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**NOTE:** If internal fan power supply option is delivered, no need for external fan power supply.

## Power Supply Requirement for Customer

Type	Control Power Supply	Auxiliary Power Supply	Fan Power Supply
Voltage	100...240 Vac ± 10 % (47...63 Hz)	230 Vac ± 10 %	400 Vac ± 10 %,
Capability	1kVA	2kVA (depends on options)	See schematic (delivered with drive)
Wire Range	Single flexible conductor with ferrule with plastic sleeve: 0.25mm <sup>2</sup> -2.5mm <sup>2</sup> (23AWG - 13AWG).  Single flexible conductor with ferrule without plastic sleeve: 0.25mm <sup>2</sup> -4mm <sup>2</sup> (23AWG - 11AWG).		Single flexible conductor with ferrule: 1.5mm <sup>2</sup> -16mm <sup>2</sup> .

## Wiring

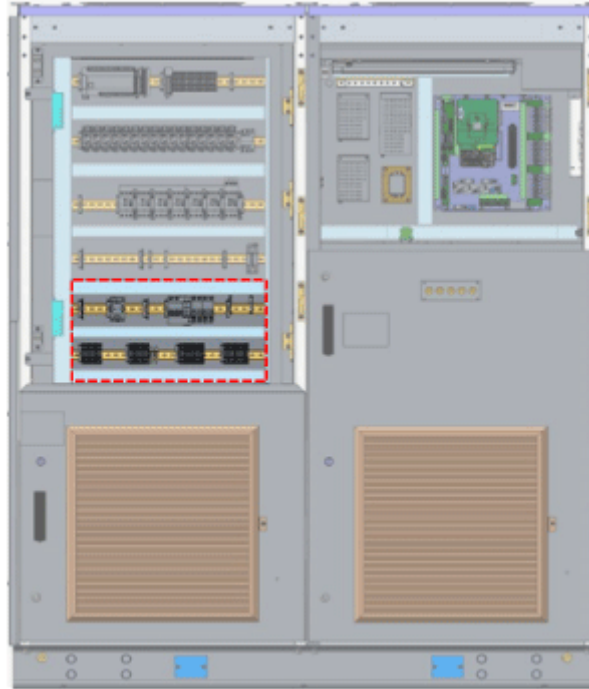
**NOTE:** Refer to the drawing that will be shipped with the drive.

## Control cabling

Control cables should not be laid in parallel to the power cables. If this cannot be avoided, a minimum distance of 30 cm must be maintained between control and power cables. Control and power cables should be crossed at an angle of 90°.

## Input / Output Connection

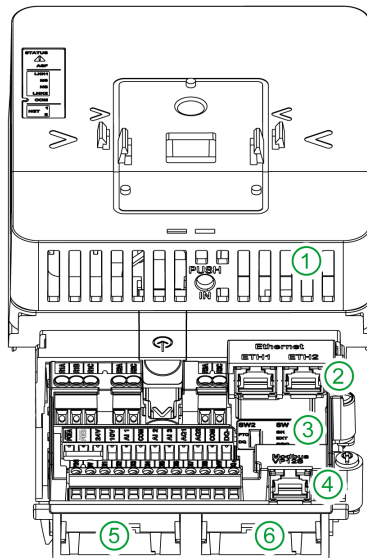
It is located in the low voltage cabinet of drive.



**NOTE:** Refer to the drawing that will be shipped with the drive.



## Communication (Control Block Ports)



### Legend

Marking	Description
①	Slot C, for internal communication
②	RJ45 port for Ethernet embedded
③	Sink-Ext-Source switch PTO-DQ switch
④	RJ45 port for Modbus embedded
⑤	Slot B, for encoder interface, and I/O module
⑥	Slot A, for fieldbus and I/O relay modules

## RJ45 Communication ports

The control block includes 3 RJ45 ports for customer side.

They allow to connect:

- A PC
  - Using a commissioning software (SoMove, SoMachine...), to configure and monitor the drive
  - To access the drive webserver
- A SCADA system
- A PLC system
- A Graphic Display terminal, using Modbus protocol
- A Modbus fieldbus

**NOTE:** Verify that RJ45 cable is not damaged prior to connecting it to the product otherwise the power supply of the control could be lost.

**NOTE:** Do not plug Ethernet cable in Modbus plug or vice versa.

## Control Terminals Electrical Data

### Characteristics of Terminals

**NOTE:**

- For a description of the terminal arrangement, refer to the Interface Diagram
- For factory setting I/O assignment, refer to the Programming manual.

Customer terminal strips	Terminal	Description	I/O Type	Electrical characteristics
XT11:30	R1A	NO contact of relay R1	O	<b>Output Relay 1</b> <ul style="list-style-type: none"> <li>• Minimum switching capacity: 5 mA for 24 Vdc</li> <li>• Maximum switching current on resistive load: (<math>\cos \varphi = 1</math>): 3 A for 250 Vac (OVC II) and 30 Vdc</li> <li>• Maximum switching current on inductive load: (<math>\cos \varphi = 0.4</math> and <math>L/R = 7</math> ms): 2 A for 250 Vac (OVC II) and 30 Vdc</li> <li>• Refresh time: 5 ms +/- 0.5 ms</li> <li>• Service life: 100,000 operations at maximum switching current</li> </ul>
XT11:31	R1B	NC contact of relay R1	O	
XT11:32	R1C	Common point contact of relay R1	O	
XT11:33	R2A	NO contact of relay R2	O	<b>Output Relay 2</b> <ul style="list-style-type: none"> <li>• Minimum switching capacity: 5 mA for 24 Vdc</li> <li>• Maximum switching current on resistive load: (<math>\cos \varphi = 1</math>): 5 A for 250 Vac and 30 Vdc</li> <li>• Maximum switching current on inductive load: (<math>\cos \varphi = 0.4</math> and <math>L/R = 7</math> ms): 2 A for 250 Vac and 30 Vdc</li> <li>• Refresh time: 5 ms +/- 0.5 ms</li> <li>• Service life: <ul style="list-style-type: none"> <li>◦ 100,000 operations at maximum switching power</li> <li>◦ 500,000 operations at 0.5 A for 30 Vdc</li> <li>◦ 1,000,000 operations at 0.5 A for 48 Vac</li> </ul> </li> </ul>
XT11:34	R2C	Common point contact of relay R2	O	
XT11:35	R3A	NO contact of relay R3	O	<b>Output Relay 3</b> <ul style="list-style-type: none"> <li>• Minimum switching capacity: 5 mA for 24 Vdc</li> <li>• Maximum switching current on resistive load: (<math>\cos \varphi = 1</math>): 5 A for 250 Vac and 30 Vdc</li> <li>• Maximum switching current on inductive load: (<math>\cos \varphi = 0.4</math> and <math>L/R = 7</math> ms): 2 A for 250 Vac and 30 Vdc</li> <li>• Refresh time: 5 ms +/- 0.5 ms</li> <li>• Service life: <ul style="list-style-type: none"> <li>◦ 100,000 operations at maximum switching power</li> <li>◦ 500,000 operations at 0.5 A for 30 Vdc</li> <li>◦ 1,000,000 operations at 0.5 A for 48 Vac</li> </ul> </li> </ul>
XT11:36	R3C	Common point contact of relay R3	O	
XT11:4	POE A	POE inputs	I	Power Output Enable POE inputs
XT11:5	POE B			
XT11:1	24V	Output supply for digital inputs and POE inputs	O	<ul style="list-style-type: none"> <li>• 24 Vdc</li> <li>• Tolerance: minimum 20.4 Vdc, maximum 27 Vdc</li> <li>• Current: maximum 200 mA for both 24 Vdc terminals</li> <li>• Terminal protected against overload and short-circuit</li> <li>• In Sink Ext position, this supply is powered by external PLC supply</li> </ul>
XT11:28	10V	Output supply for Analog input	O	Internal supply for the analog inputs <ul style="list-style-type: none"> <li>• 10.5 Vdc</li> <li>• Tolerance <math>\pm 5\%</math></li> <li>• Current: maximum 10 mA</li> <li>• Short circuit protected</li> </ul>
XT11:27	AI1	Analog inputs and sensor inputs	I	Software-configurable V/A : voltage or current analog input <ul style="list-style-type: none"> <li>• Voltage analog input 0...10 Vdc, impedance 31.5 k<math>\Omega</math>,</li> <li>• Current analog input X-Y mA by programming X and Y from 0...20 mA, with impedance 250 <math>\Omega</math></li> </ul>
XT11:25	AI2			
XT11:24	AI3			

Customer terminal strips	Terminal	Description	I/O Type	Electrical characteristics
				<ul style="list-style-type: none"> <li>Maximum sampling time: 1 ms <math>\pm</math> 1 ms</li> <li>Resolution 12 bits</li> <li>Accuracy: <math>\pm</math> 0.6% for a temperature variation of 60°C (140°F)</li> <li>Linearity <math>\pm</math> 0.15% of maximum value</li> </ul> Software-configurable thermal sensors or Water level sensor <ul style="list-style-type: none"> <li><b>PT100</b> <ul style="list-style-type: none"> <li>1 or 3 thermal sensors mounted in series (configurable by software)</li> <li>Sensor current: 5 mA maximum</li> <li>Range -20...200°C (-4...392°F)</li> <li>Accuracy <math>\pm</math> 4°C (39°F) for a temperature variation of 60°C (140°F)</li> </ul> </li> <li><b>PT1000</b> <ul style="list-style-type: none"> <li>1 or 3 thermal sensors mounted in series (configurable by software)</li> <li>Sensor current: 1 mA</li> <li>Range -20...200°C (-4...392°F)</li> <li>Accuracy <math>\pm</math> 4°C (39°F) for a temperature variation of 60°C (140°F)</li> </ul> </li> <li><b>KTY84</b> <ul style="list-style-type: none"> <li>1 thermal sensor</li> <li>Sensor current: 1 mA</li> <li>Range -20...200°C (-4...392°F)</li> <li>Accuracy <math>\pm</math> 4°C (39°F) for a temperature variation of 60°C (140°F)</li> </ul> </li> <li><b>PTC</b> <ul style="list-style-type: none"> <li>6 sensors maximum mounted in series</li> <li>Sensor current: 1 mA</li> <li>Nominal value: &lt; 1.5 k<math>\Omega</math></li> <li>Overheat trigger threshold: 2.9 k<math>\Omega</math> <math>\pm</math> 0.2 k<math>\Omega</math></li> <li>Overheat reset threshold: 1.575 k<math>\Omega</math> <math>\pm</math> 0.75 k<math>\Omega</math></li> <li>Threshold for low impedance detection: 50 k<math>\Omega</math> -10 <math>\Omega</math>/+20 <math>\Omega</math></li> <li>Protected for low impedance &lt; 1000 <math>\Omega</math></li> </ul> </li> </ul>
XT11:26	COM	Analog I/O common	I/O	0 V for Analog outputs
XT11:25	AI2	Analog input	I	Voltage bipolar analog input -10...10 Vdc, impedance 31.5 k $\Omega$ <ul style="list-style-type: none"> <li>Maximum sampling time: 1 ms <math>\pm</math> 1 ms</li> <li>Resolution 12 bits</li> <li>Accuracy: <math>\pm</math> 0.6% for a temperature variation of 60°C (140°F)</li> <li>Linearity <math>\pm</math> 0.15% of maximum value</li> </ul>
XT11:22	AQ1	Analog output	O	AQ: Analog output software-configurable for voltage or current <ul style="list-style-type: none"> <li>Voltage analog output 0...10 Vdc, minimum. Minimum load impedance 470 <math>\Omega</math>,</li> <li>Current analog output X-Y mA by programming X and Y from 0...20 mA, maximum load impedance 500 <math>\Omega</math></li> <li>Maximum sampling time: 5 ms <math>\pm</math> 1 ms</li> <li>Resolution 10 bits</li> <li>Accuracy: <math>\pm</math> 1% for a temperature variation of 60°C (140°F)</li> <li>Linearity <math>\pm</math> 0.2%</li> </ul>
XT11:23	AQ2	Analog output	O	
XT11:21	COM	Digital and analog output Common	I/O	0 V for analog outputs and logic output
XT11:20	DQ-	Digital output	O	Digital output configurable by switch <ul style="list-style-type: none"> <li>Insulated</li> <li>Maximum voltage: 30 Vdc</li> <li>Maximum current: 100 mA</li> <li>Frequency range: 0...1 kHz</li> <li>Positive/Negative logic is managed by user external wiring.</li> </ul>
XT11:19	DQ+	Digital output	O	

Customer terminal strips	Terminal	Description	I/O Type	Electrical characteristics
XT11:19	DQ+	Pulse output	O	Pulse train output configurable by switch <ul style="list-style-type: none"> <li>• Open collector not insulated</li> <li>• Maximum voltage: 30 Vdc</li> <li>• Maximum current: 20 mA</li> <li>• Frequency range: 0...30 kHz</li> </ul>
XT11:7	P24	External input supply	I	External input supply +24 Vdc <ul style="list-style-type: none"> <li>• Tolerance: minimum 19 Vdc, maximum 30 Vdc</li> <li>• Maximum current: 0.8 A</li> </ul>
XT11:8	0V	0 V	I/O	0 V of P24
XT11:9	DI1	Digital inputs	I	8 programmable logic inputs 24 Vdc, comply with IEC/EN 61131-2 logic type 1 <ul style="list-style-type: none"> <li>• Positive logic (Source): State 0 if <math>\leq 5</math> Vdc or logic input not wired, state 1 if <math>\geq 11</math> Vdc</li> <li>• Negative logic (Sink): State 0 if <math>\geq 16</math> Vdc or logic input not wired, state 1 if <math>\leq 10</math> Vdc</li> <li>• Impedance 3.5 k<math>\Omega</math></li> <li>• Maximum voltage: 30 Vdc</li> <li>• Maximum sampling time: 2 ms <math>\pm</math> 0.5 ms</li> </ul> Multiple assignment makes it possible to configure several functions on one input (example: DI1 assigned to forward and preset speed 2, DI3 assigned to reverse and preset speed 3).
XT11:10	DI2			
XT11:11	DI3			
XT11:12	DI4			
XT11:13	DI5			
XT11:14	DI6			
XT11:15	DI7			
XT11:16	DI8			
XT11:15	DI7	Pulse inputs	I	Programmable Pulse input <ul style="list-style-type: none"> <li>• Comply with level 1 PLC, IEC 65A-68 standard</li> <li>• State 0 if <math>&lt; 0.6</math> Vdc, state 1 if <math>&gt; 2.5</math> Vdc</li> <li>• Pulse counter 0...30 kHz</li> <li>• Frequency range: 0...30 kHz</li> <li>• Cyclic ratio: 50 % <math>\pm</math> 10 %</li> <li>• Maximum input voltage 30 Vdc, <math>&lt; 10</math> mA</li> <li>• Maximum sampling time: 5 ms <math>\pm</math> 1 ms</li> </ul>
XT11:16	DI8			

## Inspection

This section generally describes the necessary inspection before ATV6000 is powered on. Besides, review the following steps:

Step	Description	✓
1	Verify that the site power supply meets the requirement of the medium voltage drive system. The rated input voltage of the medium voltage drive system must be compatible with grid voltage.	
2	The rated output voltage of the medium voltage drive system must be compatible with rated voltage of the motor which is marked on the motor nameplate.	
3	The control power supply (low voltage) must be compatible with rated voltage of control system.	
4	The rated power of the ATV6000 must be compatible with the power of motor.	
5	Verify that the ATV6000 is connected to ground securely, and its grounding resistance must be lower than 4 Ω. The control system with a separate ground bus-bar and its resistance must be lower than 1 Ω.	
6	Verify the insulation of all cables and terminals is not damaged.	
7	Verify all terminals, components mounting, and other parts are marked or labeled, or contact your local manufacturer representative.	
8	Verify that control power supply and main power supply are correctly connected and follow all local and national electrical code requirements as well as all other applicable regulations.	
9	Verify that all wiring is tightly and correctly connected.	
10	Verify whether the isolating switches in bypass cabinet (optional) are installed tightly and that the mechanical interlock of the isolation switches operate normally. Verify that isolation switches is well contacted.	
11	Verify that the input and output medium voltage cables are connected correctly.	
12	Verify that all electrical connections of the transformer are tight including input, output, and auxiliary windings (option).	
13	Verify that the temperature sensors are installed appropriately.	
14	Verify that cooling fans on the top of cabinet are connected correctly and tightly, and can rotate freely in the correct direction.	
15	Verify that all bolts used for connecting transformer input, output and auxiliary cables (option) are tightly connected.	
16	Verify that the optical fiber connections are correct (Colour and wire number), optical fiber and the fiber terminal connections are correct, fiber terminal and fiber connection must be clean with good connections. The fiber length must be correct so that there is no pulling or bending	
17	All cables must be fastened. PCBAs in the control box must be plugged into the right place. The boards and control boxes must be fastened tightly by screws.	
18	Verify that frequency setting signal is a 0(4) - 20 mA or 0-10 V source signal.	
19	Verify that the control wiring is separated from power wiring.	

**NOTE:** If any inspection result is abnormal, please contact your local manufacturer representative.

# Routine Maintenance

## Service and Maintenance

### Overview

#### **DANGER**

##### **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

Read and understand the instructions in “Safety Information” chapter before performing any procedure in this chapter.

**Failure to follow these instructions will result in death or serious injury.**

## Visual Inspection and Cleaning

### Inspection

The Variable Speed Drive (VSD) must be regularly inspected and cleaned in accordance to regulations and maintenance schedule. (note that antistatic cleaning equipment must be used, and chemical cleaners, alcohol, and other solvents should not be used.)

Step	Action	✓
1	Verify that VSD exterior and interior as well as the surrounding area are free of dust, sand, vermin, and insects. Electrical components such as wiring and circuit boards are prone to overheating and being inoperative due to accumulation of dust or moisture.	
2	Verify that VSD exterior and interior has not been affected by corrosive elements such as corrosive gases, salt, or other impurities that can damage electrical equipment, structural integrity of VSD or the insulation of cabling.	
3	Verify that there are no signs of over-heating of elements and components (circuit boards, wiring connections etc...), and that cooling fans are correctly mounted and functioning. Verify that filters are not damaged and free of dust and grime. If necessary, replace filters.	
4	Verify that cables are correctly and tightly fastened as well as all other screws, bolts, and wiring.	
5	Verify that the area is dry and free of condensation and at suitable relative air humidity level.	

## Wiring Inspection

- The Variable Speed Drive (VSD) is prone to vibration during running, which may lead to loss connection. It is essential to regularly check that plugs, sockets, screws, bolts, and cabling of the entire VSD and to ensure that connection or fastening are reliable.
- After being put into operation, thorough cleaning and insulation inspection of the transformer must be done at least once a year. Inspection and tightening of bolts, screws, and wiring must be conducted every 2 years.
- Staff responsible for operation and maintenance must regularly measure and record temperature and humidity. Pay particular attention to temperature of the transformer windings. End user to ensure electrical room's temperature remains below the maximum value according to drive's quotation (40 to 50° C).

## Grounding Cable for Maintenance (Option)

The Variable Speed Drive (VSD) can be equipped with grounding cable for maintenance. The grounding cable and stick is a 3 poles grounding and short circuiting device in accordance with IEC61230.

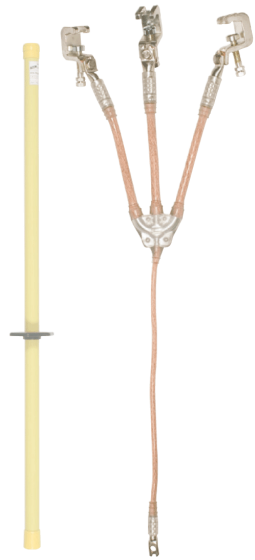


Figure 6-1

Grounding cable is used to:

- Help to prevent unintentional Power On during maintenance.
- Discharge the residual voltage of power supply system.

## Cleaning and Replacement of Filters

Pollution or clogging of the filters of the cabinet doors can result in overtemperature.

### **NOTICE**

#### **OVERHEATING**

- Inspect and clean the filters at regular intervals.
- Adapt the intervals between maintenance to the environmental conditions.
- Replace the filters at the intervals specified in this manual.

**Failure to follow these instructions can result in equipment damage.**

## Location



Figure 6-2

1. Control and transformer cabinet
2. Power cell cabinet

## Uninstall Filters

Step	Action
1	Remove a M6 screw from the louvered panel.
2	Lift the louvered panel and draw it out.
3	Pull down the filter mat.
The process for filter mat replacement should be continuous, in case of foreign objects entering the drive.	

## Dimensions

The filter dimension depend on the capacity of the drive.

2 types of filters can be used on the power cell cabinet:

Model 1	
References	Description
VZ3V60001	ATV6000 Dust filter 345 x 395
VZ3V60002	ATV6000 Dust filter 545 x 395

2 types of filters can be used on the transformer cabinet:

Model 2	
References	Description
VZ3V60003	ATV6000 Dust filter 545 x 615
VZ3V60004	ATV6000 Dust filter 345 x 615



## Scheduled Servicing

**⚠ WARNING**

**INSUFFICIENT MAINTENANCE**

Verify that the maintenance activities described below are performed at the specified intervals.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Adherence to the environmental conditions must be ensured during operation of the drive. In addition, during maintenance, verify and, if appropriate, correct all factors that may have an impact on the environmental conditions.

Maintenance has to be performed only by qualified and certified Schneider-Electric service personnel.

Always consider all local and national electrical code requirements as well as all other applicable regulations for maintenance intervals and verification.

Task / Description	Interval* [years]																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b>Inspection **</b>																				
Input/output terminals tightness		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Remote/Local/Panel - Switch	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Transformer visual check	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fiber optic cables visual check	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Relay contacts						✓						✓						✓		
Power cell connections		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Transformer secondary windings connection		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Plug-in connections		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Master controller cooling fan		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Cubicle roof cooling fans		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Oxidation, corrosion, rust	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environmental conditions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UPS function (available as option)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Door gaskets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spare parts (storage/damage)				✓				✓				✓				✓				✓
Heat sink pollution (check and clean) ***	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Recorded faults analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Space heater (cubicle & motor)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Overload switch setting		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓

Task / Description	Interval* [years]																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Function of emergency stop button	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Function of door switches		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Completeness of walls and covers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Replace</b>																				
Door filter mats ***	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Master controller cooling fans ***				✓				✓				✓				✓				✓
Cubicle roof cooling fans ***				✓				✓				✓				✓				✓
PLC Backup battery				✓				✓				✓				✓				✓
UPS battery				✓				✓				✓				✓				✓
Power Cell												✓								
<b>Local service</b>																				
General cleaning ***	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Parameter/PLC-software backup				✓				✓				✓				✓				✓
Current symmetry measurement				✓				✓				✓				✓				✓
Capacitor reforming (if power cells on stock)				✓				✓				✓				✓				✓
Capacitor condition check				✓				✓				✓				✓				✓
Fiber optic cable measurement				✓				✓				✓				✓				✓
*) Maximum maintenance intervals from the date of commissioning. Reduce the intervals between maintenance to adapt maintenance to the environmental conditions, the operating conditions of the drive, and to any other factor that may influence the operation and/ or maintenance requirements of the drive. **) Recommended after each repair. ***) Depends on the environmental conditions																				

Shorter intervals must be considered while VSD under non-operational operating conditions. For drives which serve over 12 years, additional spare parts on site are highly recommended.

### Spares and Repairs

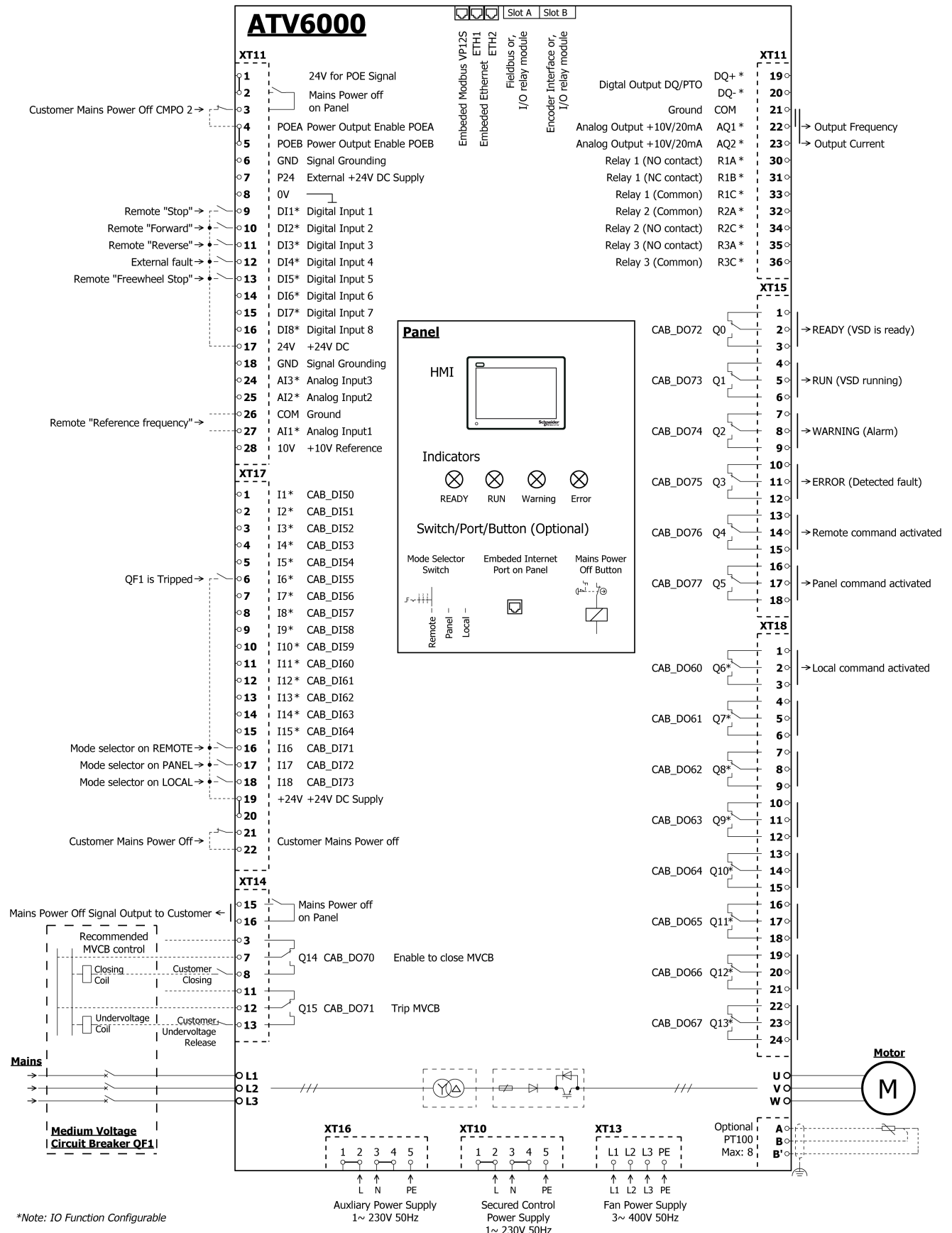
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# ATV6000 Drive System I/O Interface Diagram (standard configuration)

## I/O Interface Diagram (Standard Configuration)



# Operating Environment Maintenance of VSD

## Operating Environment Maintenance of Variable Speed Drive (VSD)

	Type of Cooling		
	Air-conditioning Cooling System	Air-water Cooling System	Air-duct Cooling System
Requirements for supporting facilities	The room must be well sealed, windows and doors must be closed. The emergency vents must have shutters that are kept closed.	A dehumidifier must be used (dehumidifier model shall be determined by the dehumidifier manufacturer). The room must be well sealed, windows and doors must be closed. The emergency vents must have shutters that are kept closed.	The air inlet must be larger than or equal to the dust filter area of VSD cabinet door. Dust filter must be used. Dehumidifier must be installed in the room.
Maintenance	The air conditioners shall be checked and maintained regularly. The VSD must keep running in dehumidifying mode during downtime.	The cooler shall be cleaned regularly, check the valve of waterway and duct filter, and air duct shall be checked and maintained to verify there's no damage. The dehumidifier should keep running after VSD has stopped running.	Air duct should be checked regularly. Seal the air inlet and outlet of the room when VSD stop running, and the dehumidifier should be working.
Preparation for power-on	The indoor humidity of VSD cabinet shall be less than 50% and the insulation resistance of the transformer shall be higher than 100MΩ. Under these conditions, it can powered on directly. If the indoor humidity is higher than 50% or the transformer insulation resistance is lower than 100MΩ, additional dehumidification and drying are required.		If the indoor humidity of VSD cabinet has been less than 50% for 48 hours without condensation and transformer insulation resistance is higher than 100MΩ, the VSD can powered on directly. If the indoor humidity is higher than 50% or the transformer insulation resistance is lower than 100MΩ, additional dehumidification and drying are required.
Running	Hygrometer must be installed in the room next to the drive to monitor indoor humidity. End user to ensure room's humidity stays below the maximum value according to drive's quotation (90 or 95%). If there is no leakage problem, a dehumidifier must be added in the room (If the temperature in VSD room is higher than 35 °C, air conditioning must be installed). The outlet of air conditioner should not be directed towards the drive to avoid condensation inside the cabinet.	Hygrometer must be installed in the room next to the drive to monitor indoor humidity. End user to ensure room's humidity stays below the maximum value according to drive's quotation (90 or 95%). If there is no leakage problem, a dehumidifier must be added in the room (If the temperature in VSD room is higher than 35 °C, then air conditioning must be installed), the dehumidifier should work during VSD running.	Hygrometer must be installed in the room next to the drive to monitor indoor humidity. End user to ensure room's humidity stays below the maximum value according to drive's quotation (90 or 95%). If condensation is present, it is necessary to shut down the system and start the dryer until the room humidity falls below 70%. If the humidity level reaches 70% but there is no condensation, the running frequency of VSD should be maintained at higher than 35Hz, until the indoor humidity falls below 70%.

**NOTE:** For users using **air-duct cooling system**: it is possible that there is conductive dust near the drive load, especially in the summer when the temperature and humidity are much higher in most countries. In order to help to protect VSD and help to ensure operation, It is advisable to modify the VSD room by using air conditioning cooling system or air-water cooling system.



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