

# Altivar Process ATV930C11, C13N4, C16N4

## Braking Module Installation Manual (supplied with the Product)

06/2019



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The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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## Important Information

### NOTICE

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.

### **DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

### **WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

### **CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

### **NOTICE**

**NOTICE** 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**

- 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.
- The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Many components of the product, including the printed circuit boards, operate with mains voltage.
- Only use properly rated, electrically insulated tools and measuring equipment.
- Do not touch unshielded components or terminals with voltage present.
- Motors can generate voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.
- Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.
- Before performing work on the drive system:
  - Disconnect all power, including external control power that may be present. Take into account that the circuit breaker or main switch does not de-energize all circuits.
  - Place a **Do Not Turn On** label on all power switches related to the drive system.
  - Lock all power switches in the open position.
  - Wait 15 minutes to allow the DC bus capacitors to discharge.
  - Follow the instructions given in the chapter "Verifying the Absence of Voltage" in the installation manual of the product.
- Before applying voltage to the drive system:
  - Verify that the work has been completed and that the entire installation cannot cause hazards.
  - If the mains input terminals and the motor output terminals have been grounded and short-circuited, remove 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.**

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.**

A specific application note [NHA80973](#) is available on hoisting machines and can be downloaded on [se.com](#).

Drive systems 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.**

## WARNING

### LOSS OF CONTROL

- 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.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines (1).
- Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.

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

(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.

The temperature of the products described in this manual may exceed 80 °C (176 °F) during operation.

## WARNING

### HOT SURFACES

- Ensure that any contact with hot surfaces is avoided.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the product has sufficiently cooled down before handling it.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

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

## *NOTICE*

### DESTRUCTION DUE TO INCORRECT MAINS VOLTAGE

Before switching on and configuring the product, verify that it is approved for the mains voltage.

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

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# About the Book

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## At a Glance

### Document Scope

The purpose of this document is:

- to give you mechanical and electrical information related to the braking module option,
- to show you how to install and wire this option.

### Validity Note

Original instructions and information given in the present document have been written in English (before optional translation).

**NOTE:** The products listed in the document are not all available at the time of publication of this document online. The data, illustrations and product specifications listed in the guide will be completed and updated as the product availabilities evolve. Updates to the guide will be available for download once products are released on the market.

This documentation is valid for the Altivar Process drive.

The technical characteristics of the devices described in the present document also appear online. To access the information online:

Step	Action
1	Go to the Schneider Electric home page <a href="http://www.schneider-electric.com">www.schneider-electric.com</a> .
2	In the <b>Search</b> box type the reference of a product or the name of a product range. <ul style="list-style-type: none"><li>● Do not include blank spaces in the reference or product range.</li><li>● To get information on grouping similar modules, use asterisks (*).</li></ul>
3	If you entered a reference, go to the <b>Product Datasheets</b> search results and click on the reference that interests you. If you entered the name of a product range, go to the <b>Product Ranges</b> search results and click on the product range that interests you.
4	If more than one reference appears in the <b>Products</b> search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the datasheet.
6	To save or print a datasheet as a .pdf file, click <b>Download XXX product datasheet</b> .

The characteristics that are presented 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.schneider-electric.com](http://www.schneider-electric.com).

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

- The whole catalog for detailed characteristics and selection guides,
- The CAD files to help design your installation, available in over 20 different file formats,
- All software and firmware to maintain your installation up to date,
- A large quantity of White Papers, Environment documents, Application solutions, Specifications... to gain a better understanding of our electrical systems and equipment or automation,
- And finally all the User Guides related to your drive, listed below:

Title of Documentation	Catalog Number
Catalog: Variable speed drives Altivar Process ATV900	<a href="#">DIA2ED2150601EN</a> (English), <a href="#">DIA2ED2150601FR</a> (French)
ATV600/ATV900 Getting Started - Video	FAQ <a href="#">FA364431</a> (English) 
ATV930, ATV950 Getting Started	<a href="#">NHA61578</a> (English), <a href="#">NHA61579</a> (French), <a href="#">NHA61580</a> (German), <a href="#">NHA61581</a> (Spanish), <a href="#">NHA61724</a> (Italian), <a href="#">NHA61582</a> (Chinese), <a href="#">NHA61578PT</a> (Portuguese), <a href="#">NHA61578TR</a> (Turkish)
ATV900 Getting Started Annex (SCCR)	<a href="#">NHA61583</a> (English)
ATV930, ATV950 Installation manual	<a href="#">NHA80932</a> (English), <a href="#">NHA80933</a> (French), <a href="#">NHA80934</a> (German), <a href="#">NHA80935</a> (Spanish), <a href="#">NHA80936</a> (Italian), <a href="#">NHA80937</a> (Chinese), <a href="#">NHA80932PT</a> (Portuguese), <a href="#">NHA80932TR</a> (Turkish)
ATV600F, ATV900F Installation Instruction sheet	<a href="#">NVE57369</a> (English)
ATV900 Programming manual	<a href="#">NHA80757</a> (English), <a href="#">NHA80758</a> (French), <a href="#">NHA80759</a> (German), <a href="#">NHA80760</a> (Spanish), <a href="#">NHA80761</a> (Italian), <a href="#">NHA80762</a> (Chinese), <a href="#">NHA80757PT</a> (Portuguese), <a href="#">NHA80757TR</a> (Turkish)
ATV900 Embedded Modbus Serial Link manual	<a href="#">NHA80939</a> (English)
ATV900 Embedded Ethernet manual	<a href="#">NHA80940</a> (English)
ATV900 PROFIBUS DP manual (VW3A3607)	<a href="#">NHA80941</a> (English)
ATV900 DeviceNet manual (VW3A3609)	<a href="#">NHA80942</a> (English)
ATV900 PROFINET manual (VW3A3627)	<a href="#">NHA80943</a> (English)
ATV900 CANopen manual (VW3A3608, 618, 628)	<a href="#">NHA80945</a> (English)
ATV900 EtherCAT manual (VW3A3601)	<a href="#">NHA80946</a> (English)
ATV900 POWERLINK manual (VW3A3619)	<a href="#">PHA99693</a> (English)
ATV900 Communication Parameters addresses	<a href="#">NHA80944</a> (English)
ATV900 Embedded Safety Function manual	<a href="#">NHA80947</a> (English)
ATV900 Safety Module Manual (VW3A3802) Upcoming commercialization	<a href="#">NVE64209</a> (English), <a href="#">NVE64210</a> (French), <a href="#">NVE64211</a> (German), <a href="#">NVE64212</a> (Spanish), <a href="#">NVE64213</a> (Italian), <a href="#">NVE64214</a> (Chinese)
Drive Systems ATV960 handbook	<a href="#">NHA37115</a> (English), <a href="#">NHA37114</a> (German)
Drive Systems ATV980 handbook	<a href="#">NHA37117</a> (English), <a href="#">NHA37116</a> (German)
Drive Systems ATV990 handbook Multidrive Systems	<a href="#">NHA37145</a> (English), <a href="#">NHA37143</a> (German)
ATV991, ATV992 Supply units, Programming manual	<a href="#">QGH33275</a> (English)
Drive Systems Installation manual	<a href="#">NHA37118</a> (German), <a href="#">NHA37119</a> (English), <a href="#">NHA37121</a> (French), <a href="#">NHA37122</a> (Spanish), <a href="#">NHA37123</a> (Italian), <a href="#">NHA37124</a> (Dutch), <a href="#">NHA37126</a> (Polish), <a href="#">NHA37127</a> (Portuguese), <a href="#">NHA37129</a> (Turkish), <a href="#">NHA37130</a> (Chinese)

Title of Documentation	Catalog Number
SoMove: FDT	<a href="#">SoMove FDT</a> (English, French, German, Spanish, Italian, Chinese)
ATV900: DTM	<a href="#">ATV9xx DTM Library EN</a> (English - to be installed first), <a href="#">ATV9xx DTM Lang FR</a> (French), <a href="#">ATV9xx DTM Lang DE</a> (German), <a href="#">ATV9xx DTM Lang SP</a> (Spanish), <a href="#">ATV9xx DTM Lang IT</a> (Italian), <a href="#">ATV9xx DTM Lang CN</a> (Chinese)
ATV61-71 to ATV600-900 Migration Manual	<a href="#">EAV64336</a> (English)
Altivar Application Note for Hoisting (coming soon)	<a href="#">NHA80973</a> (English)

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

### Electronic Product Data sheet

Scan the QR code in front of the drive to get the product data sheet.

### 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.

Also see the glossary at the end of this manual.

### Contact Us

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92500 Rueil-Malmaison

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# Chapter 1

## Introduction

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### What Is in This Chapter?

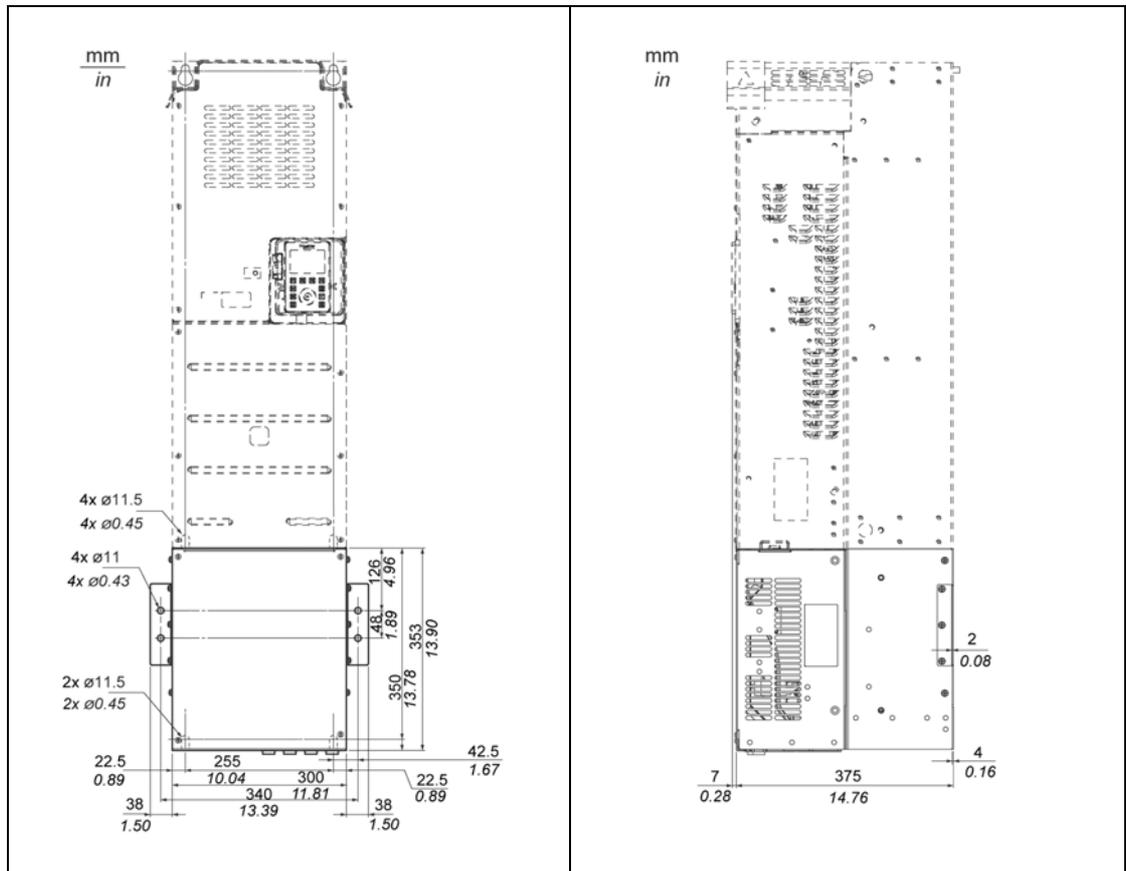
This chapter contains the following topics:

Topic	Page
Braking Module Overview	14
Preliminary Instructions	16

## Braking Module Overview

### Dimensions

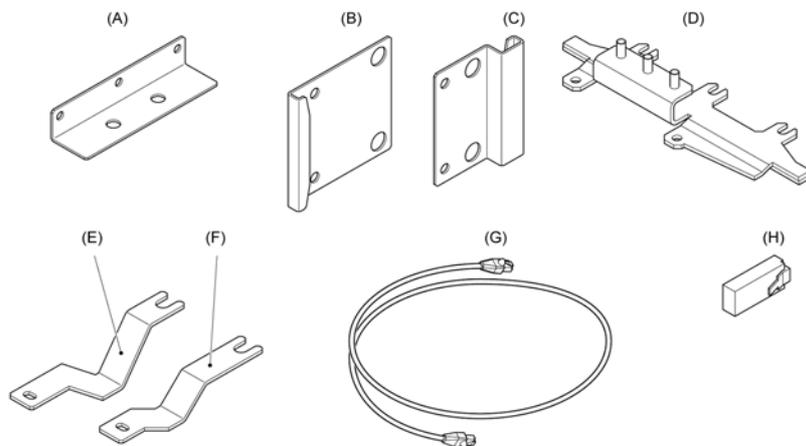
The figures below show the dimensions of the braking module delivered with the drive.



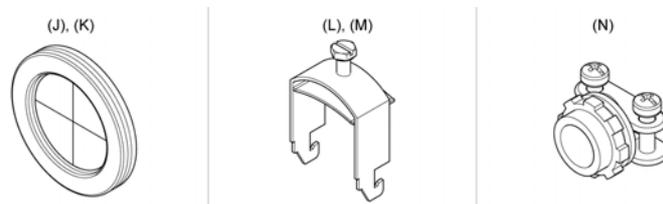
## Accessories

Refer to the installation Instructions (*see page 21*).

This braking module is composed of the unit and following accessories. Unpack a parcel and check to make sure the contents.



- Part (A): Braking module support (x2)
- Part (B): Hanging metal drive (x2)
- Part (C): Hanging metal braking module (x2)
- Part (D): Grounding bar with gasket
- Part (E): DC bar for PA
- Part (F): DC bar for PC
- Part (G): Interconnection cable
- Part (H): Termination plug



- Part (J): Cable grommets Large (x4)
- Part (K): Cable grommets Small (x5)
- Part (L): Cable clamps Large (x4)
- Part (M): Cable clamps Small (x4)
- Part (N): Cable clamps ROMEX 6 (x4)
- Screw for connecting braking module: M8x16 bolt (x8), M8 nut (x5), and M6x14 screw (x8)

## Preliminary Instructions

### Inspecting the product

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.

Step	Action
1	Verify that the catalog number printed on the nameplate ( <i>see Altivar Process, Variable Speed Drives ATV930, ATV950, Installation Manual</i> ) corresponds to the purchase order.
2	Before performing any installation work, inspect the product for visible damage.

To help protect the braking module option before installation, handle and store the device in its packaging. Ensure that the ambient conditions are acceptable.

### Handling

### WARNING

#### INCORRECT HANDLING

- Handle the braking module by two people or more.
- Handle and store the product in its original packaging.
- Do not handle and store the product if the packaging is damaged or appears to be damaged.
- Take all measures required to avoid damage to the product and other hazards when handling or opening the packaging.

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

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## Chapter 2

### Technical Data

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#### Main specifications

Type form	Braking Module
Delivered with drive	ATV930C11N4 ATV930C13N4 ATV930C16N4
Threshold voltage (default) <sup>(1)</sup>	780 V
Maximum DC bus voltage	820 V
Maximum braking power at threshold voltage (continuous power)	220 kW
Minimum allowable resistor	1.9 $\Omega$
Calorific values	688 W
Cooling method	Forced air cooled
Monitoring functions	Overheat protection, short-circuit protection, overload protection
Degree of protection (IEC60529)	IP20
Enclosure rating (UL50)	Type1
Operation environment	Operating temperature: <ul style="list-style-type: none"><li>• Drive operating temperature should be restricted to -15 to 50° C when using the braking module option</li><li>• In accordance with the drive for other environment</li></ul>
Storage temperature	-25 to 70° C
Mounting position	Lower side of drive (directly connected to drive)
Weight	Approx. 23 kg (50.71 lb)
<b>NOTE:</b> To brake using the braking module, refer to the programming manual ( <i>see page 10</i> ).	
<sup>(1)</sup> : Threshold voltage can be adjusted using the drive parameter <b>[Braking level] V b r</b> .	



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## Chapter 3

### Installation and wiring

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This chapter explains installation of the braking module, how to remove the covers, how to connect with the drive and wire to braking resistor.

#### What Is in This Chapter?

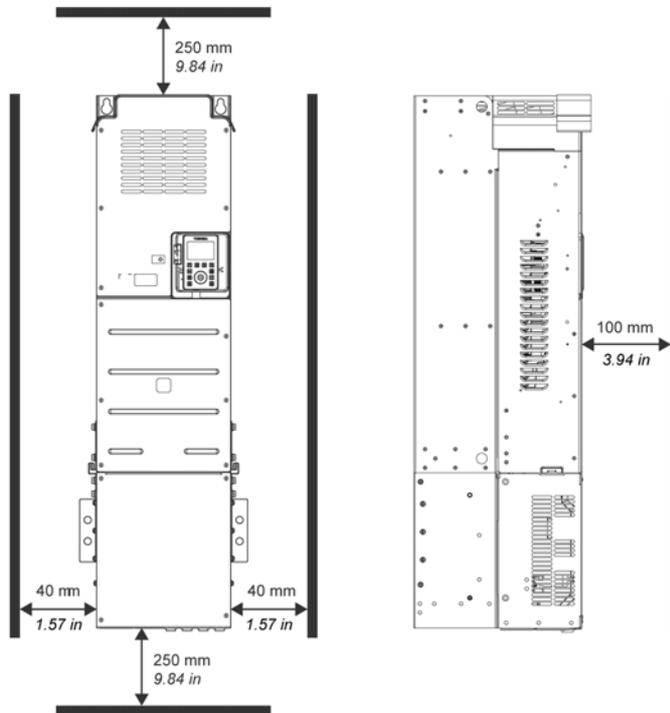
This chapter contains the following topics:

Topic	Page
Mounting Conditions	20
Braking Module Mounting	21
Wiring Instructions	27

## Mounting Conditions

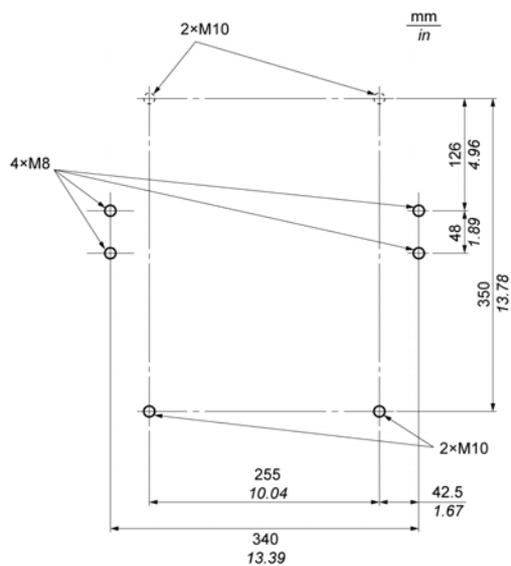
### Clearances

Install the braking module on the drive in a well-ventilated indoor place and mount in vertical position. The following figure presents the minimum clearances for mounting.



### Mounting Holes

The following figure presents the sizing of the holes and their positioning.



## Braking Module Mounting

### Preparation

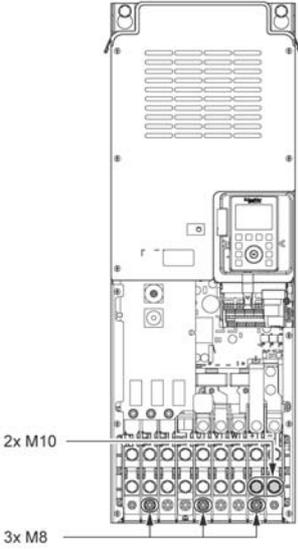
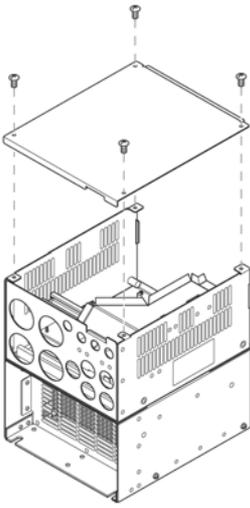
### **NOTICE**

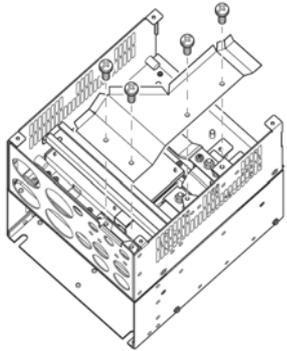
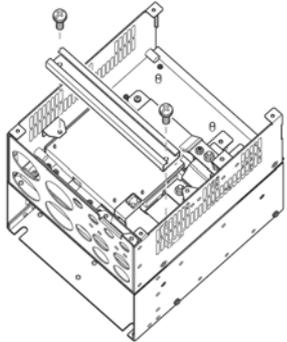
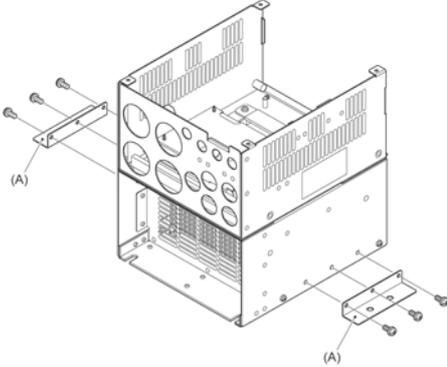
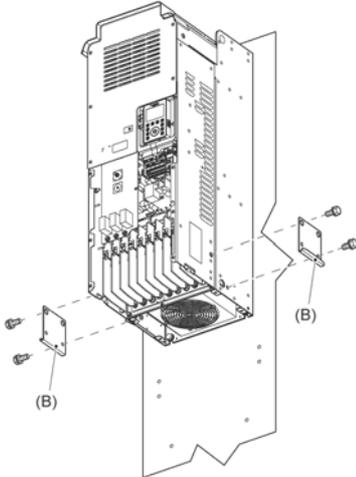
#### **DESTRUCTION DUE TO INCORRECT MOUNTING**

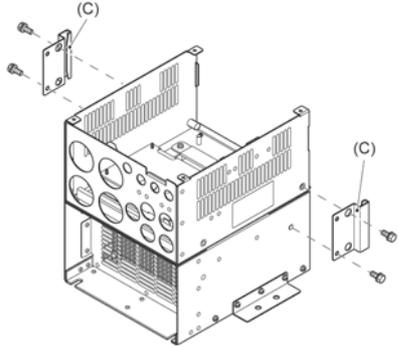
Strictly follow the procedures described below.

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

The table below describes the preliminary steps before mounting the braking module.

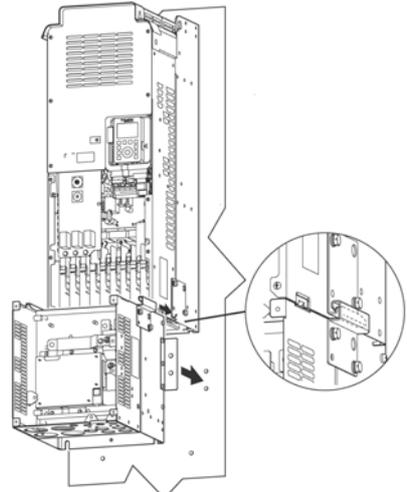
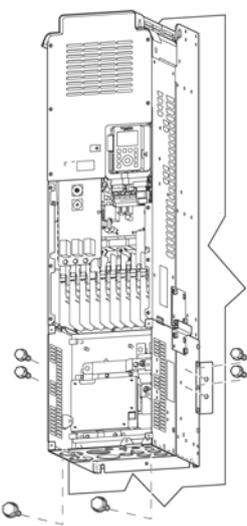
Step	Action	Figure
1	Install the drive according the drive manual (see <i>Altivar Process, Variable Speed Drives ATV930, ATV950, Installation Manual</i> ).	–
2	Unscrew the 6 screws attaching the bottom cover of the drive and remove it.	
3	Remove the terminal cover from the drive.	–
4	Remove the cable duct from the drive.	–
5	Remove the 3 nuts M8 from the bottom grounding bar.	
6	Remove the 2 bolts M10 from the power block.	
7	Remove the front cover from the braking module.	

Step	Action	Figure
8	Remove the cable duct from the braking module.	
9	Remove the upper cable rail from the braking module.	
10	Install the 2 braking module supports (A) on the braking module. Tighten the 6 screws M6 to 4.4 N·m (38.94 lbf.in).	
11	Install the 2 hanging metal brackets (B) on the drive. Tighten the 4 screws M8 to 7.3 N·m (64.61 lbf.in).	

Step	Action	Figure
12	Install the 2 hanging metal brackets (C) on the braking module. Tighten the 4 screws M8 to 7.3 N·m (64.61 lbf.in).	

### Mounting on Wall

The procedure below describes the steps to mount the braking module on the wall.

Step	Action	Figure
1	Engage both pairs of hanging metal brackets. <b>NOTE:</b> Handle the braking module by two people or more.	
2	Install the 4 screws M8 and the 2 screws M10	

## Connection to the Drive

Signal interference can cause unexpected responses of the drive.

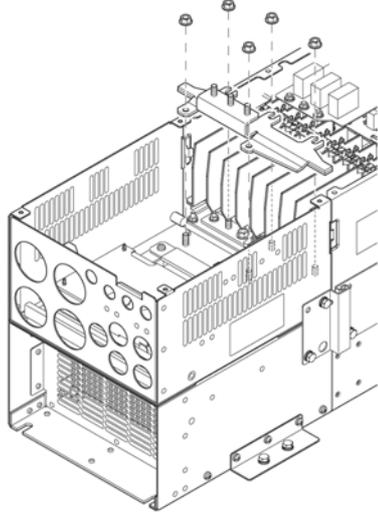
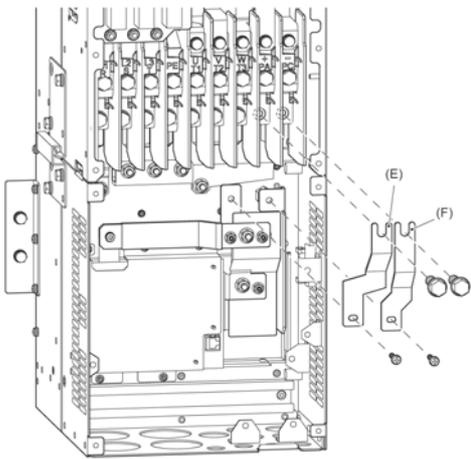
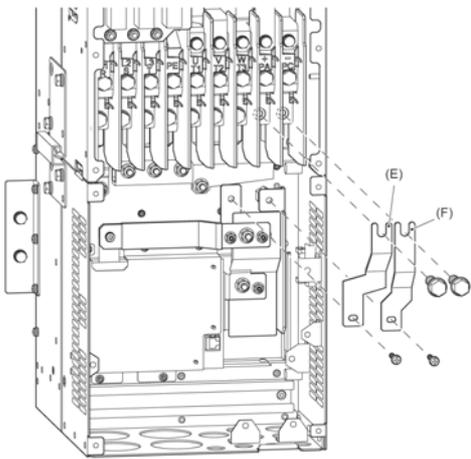
### **⚠ WARNING**

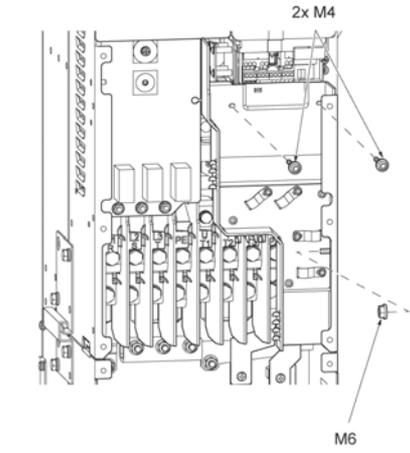
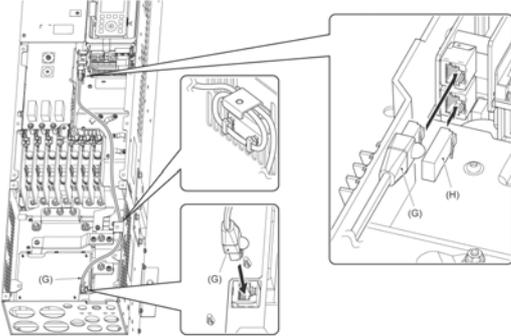
#### **SIGNAL AND EQUIPMENT INTERFERENCE**

Fix the interconnection cable in the unit according to the figure in the procedure below.

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

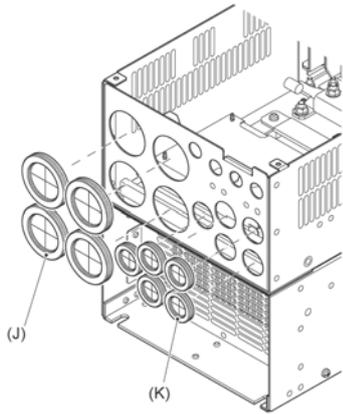
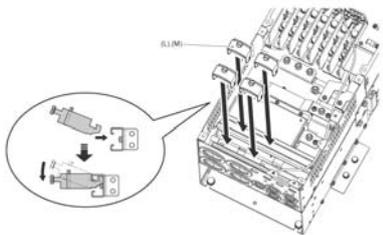
The procedure below describes the steps to connect the braking module to the drive.

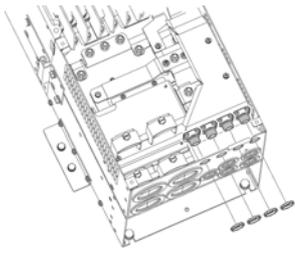
Step	Action	Figure
1	<p>Install the grounding bar (D) in the braking module option.</p> <p>Tighten the 5 screws M8 to 11.8 N·m (104.44 lbf.in).</p> <p><b>NOTE:</b> Reuse the 3 screws M8 that have been removed from the drive during the preparation procedure.</p>	
2	<p>Install the DC bar for PA (E) in the braking module.</p> <p>Tighten the screw M6 to 4.4 N·m (38.94 lbf.in).</p> <p>Tighten the screw M10 to 27 N·m (238.97 lbf.in).</p> <p><b>NOTE:</b> Reuse the screw M10 that has been removed from the drive during the preparation procedure</p>	
3	<p>Install the DC bar for PC (F) in the braking module.</p> <p>Tighten the screw M6 to 4.4 N·m (38.94 lbf.in).</p> <p>Tighten the screw M10 to 27 N·m (238.97 lbf.in).</p> <p><b>NOTE:</b> Reuse the screw M10 that has been removed from the drive during the preparation procedure</p>	

Step	Action	Figure
4	Install the cable duct on the drive. Tighten the 2 screws M4 to 1.3 N·m (11.51 lbf.in). Tighten the nut M6 to 4.4 N·m (38.94 lbf.in).	
5	Connect the interconnection cable (G) to the braking module. Make a ring and hang the interconnection cable (G) on the collars.	
6	Connect the interconnection cable (G) to the drive. Connect the terminal plug (H) to the drive.	

### Wiring Parts Mounting

The procedure below describes the steps to install the clamps and grommets onto the braking module.

Step	Action	Figure
1	Install the cable grommets (J) and (K) on the braking module.	
2	Install the cable clamps (L) or (M) in the braking module.	

Step	Action	Figure
3	Install the cable clamps ROMEX (N) on the braking module. Tighten the nuts to 1.5 N·m (13.28 lbf.in). Tighten the screws to 0.5 N·m (4.43 lbf.in).	
4	Refit the front cover on the braking module on completion of wiring. Tighten the 4 screws M5 to 2.6 N·m (23.01 lbf.in).	

**NOTE:** To brake using the braking module, refer to the programming manual ([see page 10](#)).

## Wiring Instructions

### General Instructions

The entire installation procedure must be performed without voltage present.

#### 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.**

Drive systems 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.**

Unsuitable settings or unsuitable data or unsuitable wiring may trigger unintended movements, trigger signals, damage parts and disable monitoring functions.

#### WARNING

##### UNANTICIPATED EQUIPMENT OPERATION

- Only start the system if there are no persons or obstructions in the zone of operation.
- Verify that a functioning emergency stop push-button is within reach of all persons involved in the operation.
- Do not operate the drive system with unknown settings or data.
- Verify that the wiring is appropriate for the settings.
- Never modify a parameter unless you fully understand the parameter and all effects of the modification.
- When commissioning, carefully run tests for all operating states, operating conditions and potential error situations.
- Anticipate movements in unintended directions or oscillation of the motor.

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

#### DANGER

##### HAZARD OF FIRE OR ELECTRIC SHOCK

- Wire cross sections and tightening torques must comply with the specifications provided in this document
- If you use flexible multi-wire cables for a connection with a voltage higher than 25 Vac, you must use ring type cable lugs or wire ferrules, depending on the connection.

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

**Selection table**

Following table shows the applicable drive, each minimum allowable resistance of a braking resistor and the wire size. Use the braking resistor with a resistance value greater than the minimum allowable resistance.

The table shows the applicable drive, each minimum allowable resistance of a braking resistor and the wire size. Use the braking resistor with a resistance value greater than the minimum allowable resistance.

Applicable Drive Type	Minimum allowable resistance	Wire size			
		Heavy Duty		Normal Duty	
		AWG (1)	mm <sup>2</sup> (2)	AWG (1)	mm <sup>2</sup> (2)
ATV930C11N4	1.9Ω	1/0	35	1/0	35
ATV930C13N4		1/0	50	1/0	50
ATV930C16N4		4/0	70	4/0	70

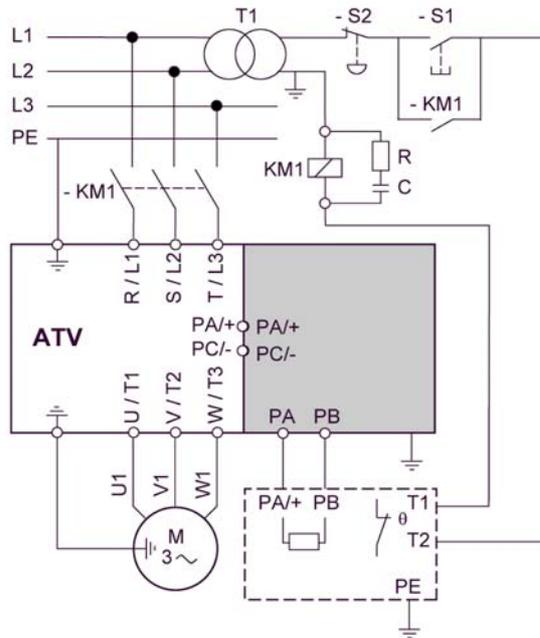
(1) This cable size is in conformity with UL508C.

(2) This cable size is in conformity with IEC60364-5-52.

**NOTE:** 600V HIV insulation wire (copper wire with the maximum allowable temperature 90° C of an insulator) must be connected to the drive for Input and Output cables when the braking module is mounted with 50° C ambient temperature.

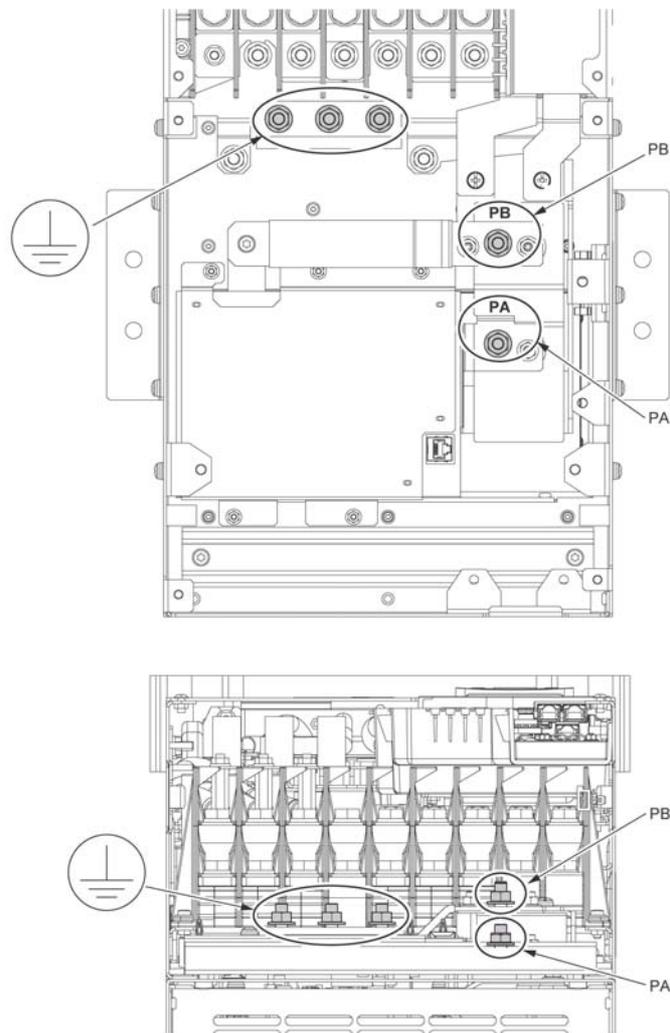
**Standard Connection Diagram**

The standard connection diagram is shown below.



## Terminals

The connecting terminals are shown below.



**NOTE:** Tightening torque of the M8 screws is 11.8 N.m (104.44 lbf.in)  
The width of the ring terminal should be 26 mm (1.02 in) or less.





## A

**AC**

Alternating Current

## D

**DC**

Direct Current

## E

**ELV**

Extra-Low Voltage. For more information: IEC 60449

**Error**

Discrepancy between a detected (computed, measured, or signaled) value or condition and the specified or theoretically correct value or condition.

## F

**Factory setting**

Factory settings when the product is shipped

**Fault**

Fault is an operating state. If the monitoring functions detect an error, a transition to this operating state is triggered, depending on the error class. A "Fault reset" is required to exit this operating state after the cause of the detected error has been removed. Further information can be found in the pertinent standards such as IEC 61800-7, ODVA Common Industrial Protocol (CIP).

**Fault reset**

A function used to restore the drive to an operational state after a detected error is cleared by removing the cause of the error so that the error is no longer active.

## G

**GP**

General-Purpose

## L

**L/R**

Time constant equal to the quotient of inductance value (L) over the resistance value (R).

## N

**NC contact**

Normally Closed contact

**NO contact**

Normally Open contact

## O

**OEM**

Original Equipment Manufacturer

**OVCII**

Overvoltage Category II, according IEC 61800-5-1

**P****PA/+**

DC bus terminal

**PC/-**

DC bus terminal

**PELV**

Protective Extra Low Voltage, low voltage with isolation. For more information: IEC 60364-4-41

**PLC**

Programmable logic controller

**Power stage**

The power stage controls the motor. The power stage generates current for controlling the motor.

**PTC**

Positive Temperature Coefficient. PTC thermistor probes integrated in the motor to measure its temperature

**R****REACH**

Registration, Evaluation, Authorisation and restriction of Chemicals regulation

**RoHS**

Restriction of Hazardous Substances

**S****SCPD**

Short-Circuit Protective Device

**STO**

Safe Torque Off: No power that could cause torque or force is supplied to the motor

**T****TVS Diode**

Transient Voltage Suppression Diode

**V****VHP**

Very High Horse Power (> 800 kW)

**W****Warning**

If the term is used outside the context of safety instructions, a warning alerts to a potential problem that was detected by a monitoring function. A warning does not cause a transition of the operating state.



