

Altivar Regenerative Unit

User Manual

11/2016



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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Safety Information



Important Information

NOTICE

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



The addition of this symbol to a Danger 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 an imminently hazardous situation which, if not avoided, **results in** death or serious injury.

▲ WARNING

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

▲ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can 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 regenerative unit to be used in association with a drive for three-phase synchronous and 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. Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.

Product Related Information

Read and understand these instructions before performing any procedure with this regenerative unit.

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. Do not touch. Use only electrically insulated tools.
- 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.
 - Place a Do Not Turn On label on all power switches.
 - Lock all power switches in the open position.
 - Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800 Vdc. Measure the voltage on the DC bus between the DC bus terminals (PA+, PC-) using a properly rated voltmeter to verify that the voltage is <42 Vdc
 - If the DC bus capacitors do not discharge properly, contact your local Schneider Electric representative. Do not repair or operate the product.
- Install and close all covers before applying voltage.

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

WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Carefully install the wiring in accordance with the EMC requirements.
- 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.

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.

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.

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.

About the Book



At a Glance

Document Scope

The purpose of this document is to provide information about:

- Mechanical and electrical data related to the Regenerative Unit,
- Installation and wiring of the unit,
- Displayed information by the LED on the unit,
- Troubleshooting and Maintenance.

Validity Note

This document is valid for the Altivar Regenerative Unit intended to be used with Altivar drives range.

Original instructions and information given in this manual 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.

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

The characteristics that are presented in this manual 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 manual 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.

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	Reference Number
Altivar Regenerative Unit Manual	NVE88423 (English)
Altivar Regenerative Unit Sizing Tool	NVE94856 (English)
ATV320 Installation Manual	NVE41289 (English), NVE41290 (French), NVE41291 (German), NVE41292 (Spanish), NVE41293 (Italian), NVE41294 (Chinese)
ATV320 Programming Manual	NVE41295 (English), NVE41296 (French), NVE41297 (German), NVE41298 (Spanish), NVE41299 (Italian), NVE41300 (Chinese)
ATV930, ATV950 Installation Manual	NHA80932 (English), NHA80933 (French), NHA80934 (German), NHA80935 (Spanish), NHA80936 (Italian), NHA80937 (Chinese)
ATV900 Programming Manual	NHA80757 (English), NHA80758 (French), NHA80759 (German), NHA80760 (Spanish), NHA80761 (Italian), NHA80762 (Chinese)
ATV340 Installation Manual	NVE61069 (English), NVE61071 (French), NVE61074 (German), NVE61075 (Spanish), NVE61078 (Italian), NVE61079 (Chinese)
ATV340 Programming Manual	NVE61643 (English), NVE61644 (French), NVE61645 (German), NVE61647 (Spanish), NVE61648 (Italian), NVE61649 (Chinese)

You can download these technical publications and other technical information from our website at <http://download.schneider-electric.com>

Standards and 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 ISO 13849-1 & 2 Safety of machinery - Safety related parts of control systems.
- IEC 60204-1: Safety of machinery - Electrical equipment of machines – Part 1: General requirements

Chapter 1

Introduction

What is in This Chapter?

This chapter contains the following sections:

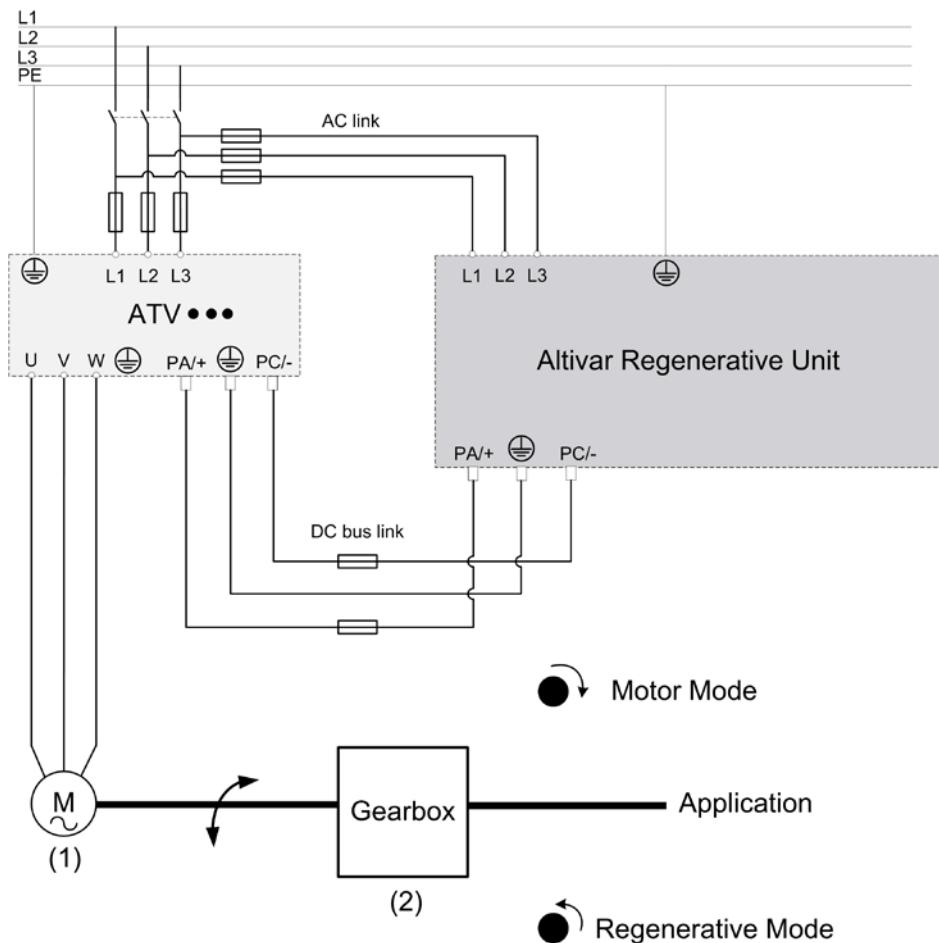
Topic	Page
Sizing of the Altivar Regenerative Unit	12
Steps for Setting-Up the Regenerative Unit	13
Altivar Regenerative Unit Overview	14

Sizing of the Altivar Regenerative Unit

Sizing Diagram

To determine the number and the size of Altivar Regenerative Units you need, refer to the [Altivar Regenerative Unit Sizing Tool \(NVE94856\)](#).

Generic diagram for Altivar regenerative unit used with Altivar drives:

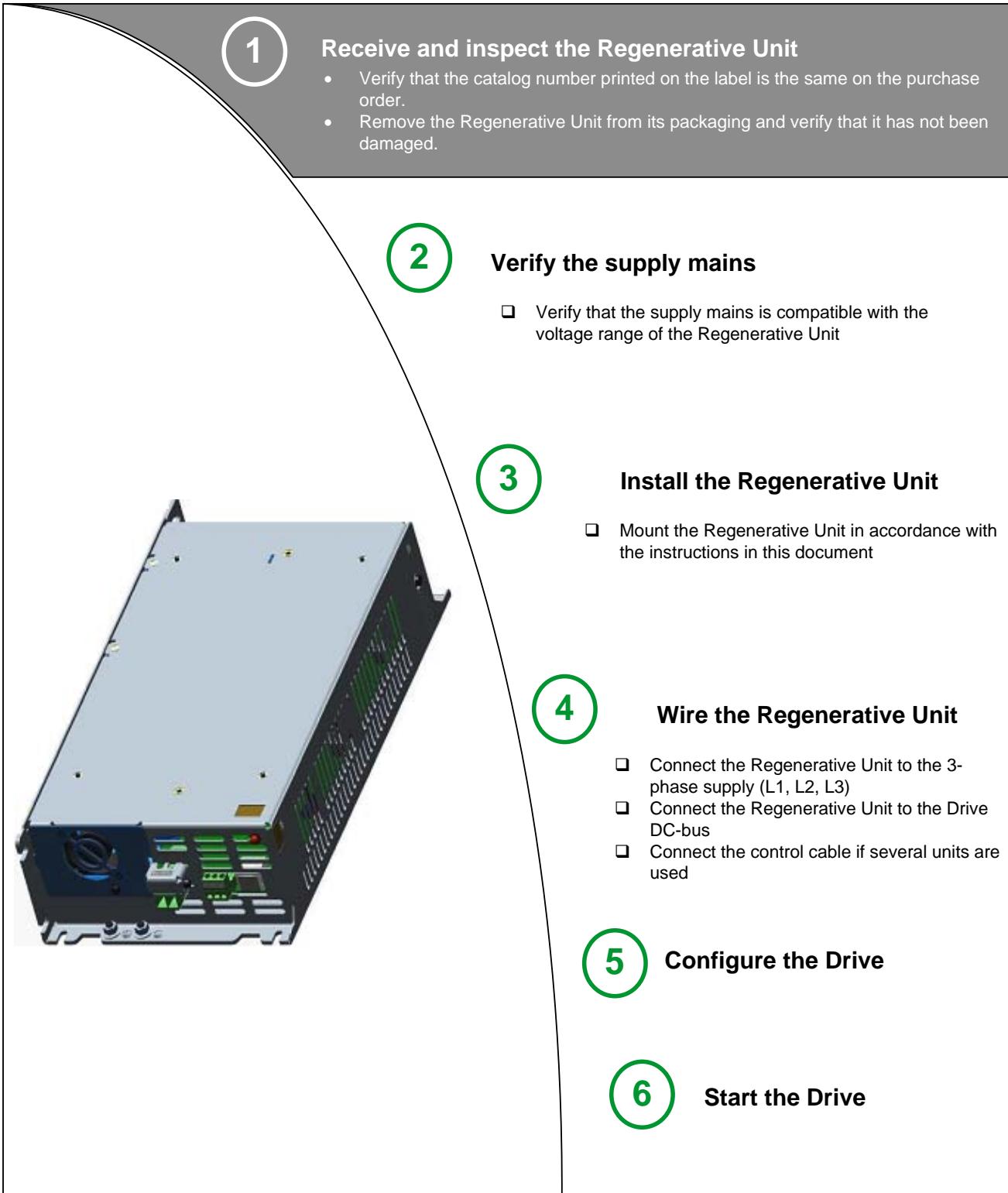


(1): Motor characteristics:

- Motor rated power
- Motor efficiency

(2): Gearbox efficiency

Steps for Setting-Up the Regenerative Unit

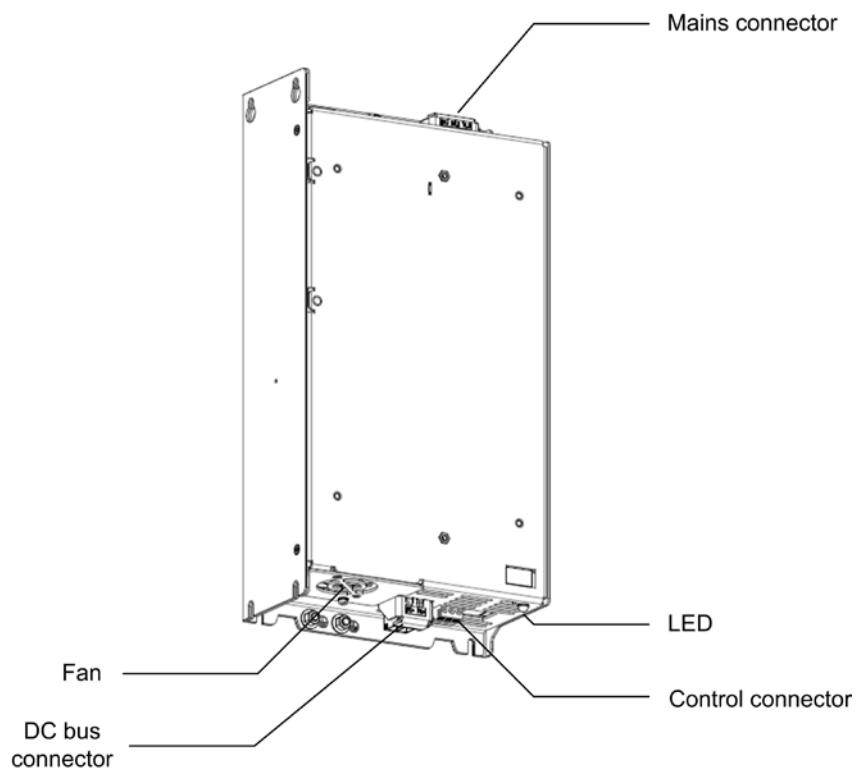


Altivar Regenerative Unit Overview

Frame Size

Frame size ATVRU75N4	Frame size ATVRD15N4
3-phase 380 / 500 Vac, 2.2...7.5 kW	3-phase 380 / 500 Vac, 11...15 kW

General Description



Chapter 2

Technical Data

What is in This Chapter?

This chapter contains the following sections:

Topic	Page
Environmental Conditions	16
Dimensions and Weights	17
Electrical Ratings	19
Derating Curves	20
Fuses	21

Environmental Conditions

Withstand to harsh environments

- Chemical class 3C3 conforming to IEC/EN 60721
- Mechanical class 3S2 conforming to IEC/EN 60721

Temperature Conditions

Ambient air temperature

For	Temperature		Comments
Long term storage	°C	-25...55	According to class 1K4 of IEC60721-3-1
	°F	-13...131	
Storage and transportation	°C	-40...70	According to class 2K4 of IEC60721-3-2
	°F	-40...158	
Operation	°C	-10...50	Without derating (For vertical mounting only)
	°F	14...122	
	°C	50...60	With derating
	°F	122...140	

Relative Humidity

5...95% without condensation or dripping water.

Operating Altitude

Operating altitude		Derating
m	Up to 1000	Without
ft	Up to 3280	
m	1000...2000	Braking power must be reduced by 1% every 100 m (328 ft) over 1000 m (3280 ft)
ft	3280...6560	
m	2000...3000	Braking power must be reduced by 1% every 100 m (328 ft) over 1000 m (3280 ft). Direct use on corner grounded mains power supply is not allowed.
ft	6560...9840	

Pollution Degree and Degree of Protection

Regenerative Unit	Pollution Degree	Degree of Protection
ATVRU75N4	2	IP20
ATVRD15N4	2	IP20

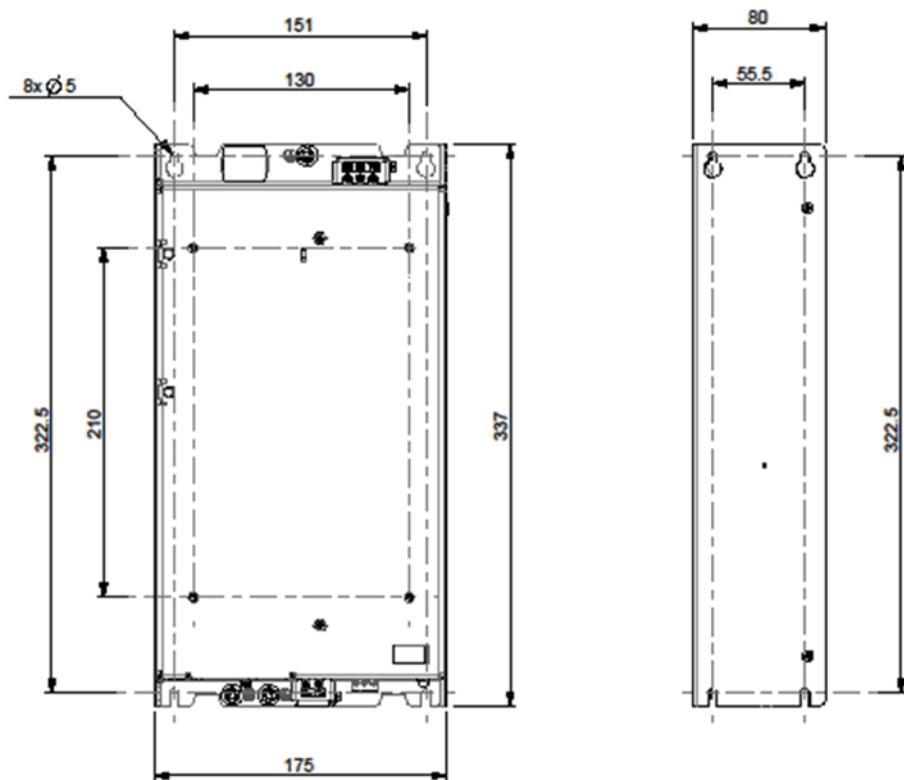
Dimensions and Weights

About The Drawings

All drawings CAD files can be downloaded from www.schneider-electric.com

ATVRU75N4

Dimensions

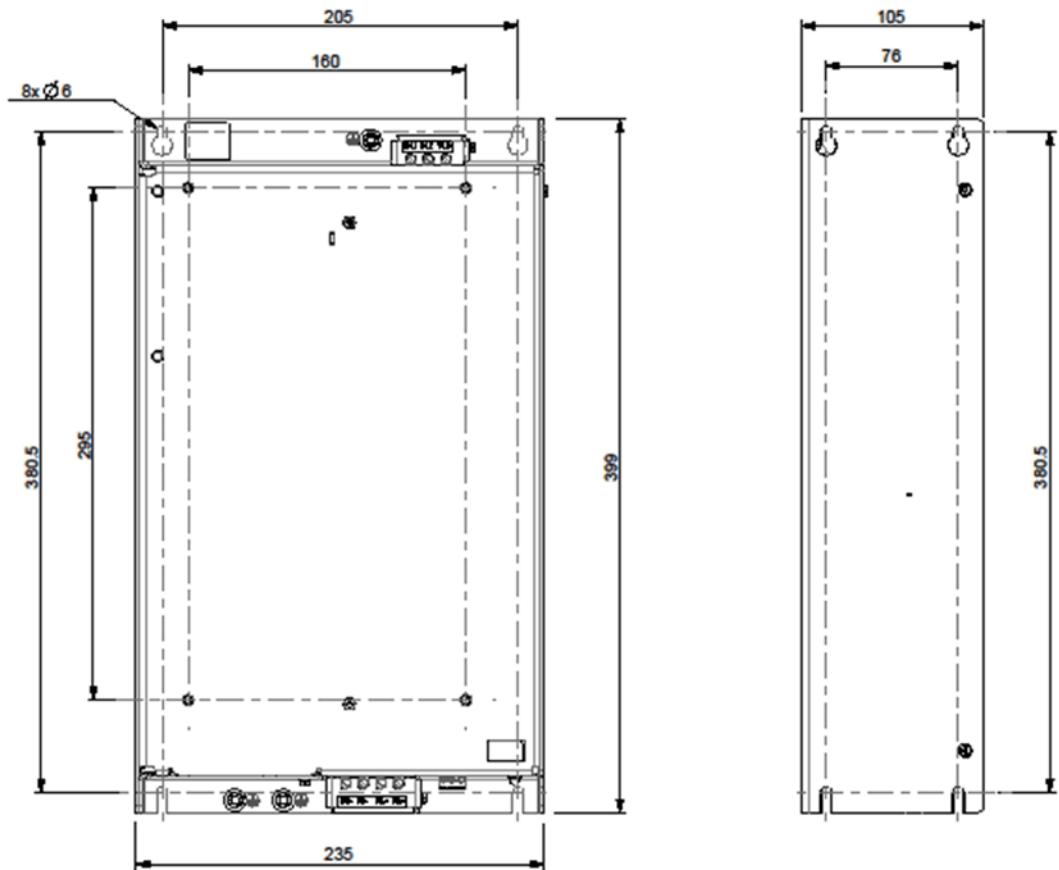


Weight

Catalog Number	Weight in kg (lb)
ATVRU75N4	6.0 (13.23)

ATVRD15N4

Dimensions



Weights

Catalog Number	Weight in kg (lb)
ATVRD15N4	11.5 (24.25)

Electrical Ratings

Mains Operating Voltage

Mains side	Value	Accuracy
Minimum	380 Vac	-15 %
Maximum	500 Vac	+ 10 %
Frequency	45...65 Hz	-
Maximum voltage unbalance	3%	

DC-bus Operating Voltage

DC-bus side	Value
Minimum	300 Vdc
Operating voltage	456...778 Vdc
Maximum	880 Vdc

Operating Power and Currents

Continuous Operation

Ratings		Altivar Regenerative Unit			
		ATVRU75N4		ATVRD15N4	
		380 Vac	500 Vac	380 Vac	500 Vac
DC	DC-bus Input Power (kW)	6.8	6.8	13.5	13.5
	RMS Current (A)	16.5	14.5	31.8	27.9
AC	RMS Current (A)	13.4	11.9	25.9	23.2

Transient Operation for 60s

Ratings		Altivar Regenerative Unit			
		ATVRU75N4		ATVRD15N4	
		380 Vac	500 Vac	380 Vac	500 Vac
DC	DC-bus Input Power (kW)	10.2	10.2	20.3	20.3
	RMS Current (A)	22.9	19.1	43.1	36.3
AC	RMS Current (A)	18.4	15.4	36.5	29.7

Derating Curves

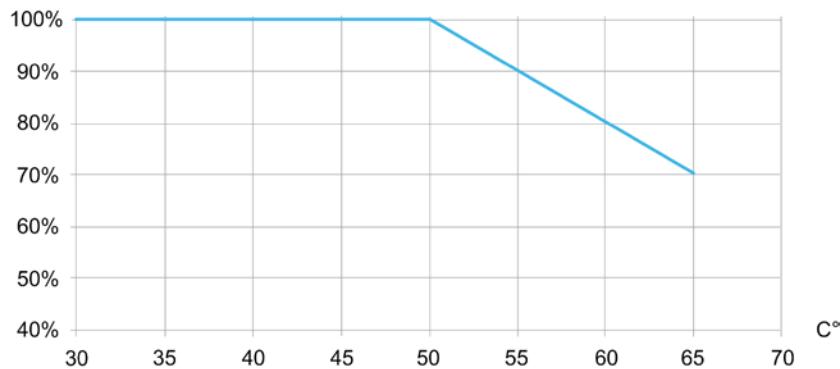
Description

Derating curve of the operating power of the regenerative unit is a function of the ambient temperature.

Vertical Mounting Derating

For vertical mounting see page [26](#).

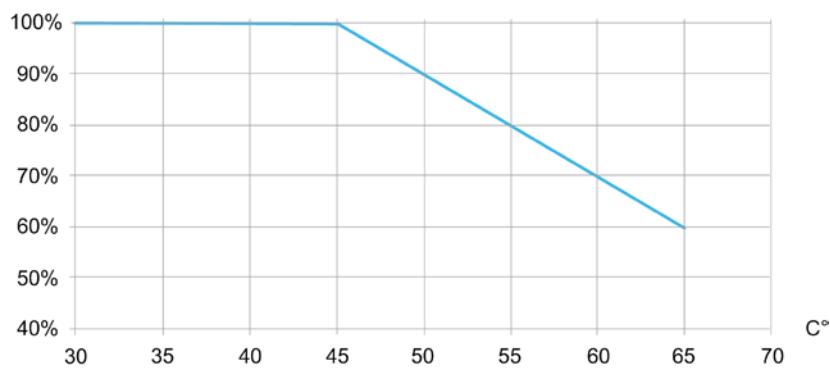
Percentage of the rated power depending on the ambient temperature



Horizontal Mounting Derating

For horizontal mounting see page [29](#).

Percentage of the rated power depending on the temperature



Fuses

Fuse Selection Table

Maximum braking power on DC bus (kW)	DC fuses ratings		Regenerative unit
	Minimum current rating (A)	Max I ² t (A ² .s)	
0.33	3	300	ATVRU75N4
0.50	5	300	
0.68	6	300	
1.0	7	300	
1.4	9	300	
2.0	14	300	
2.7	17	300	
3.6	21	685	
5.0	24	685	
6.8	30	1100	
9.9	40	1900	
13.5	40	3100	ATVRD15N4
NOTE: Protection fuses on the DC lines must be selected in the semiconductors protection class.			

Mains Protections

In rated conditions for each regenerative unit the protections below can be used:

- ATVRU75N4: circuit breaker GV2L32 or three fuses 40A, 600V class J.
- ATVRD15N4: circuit breaker GV2L50 or three fuses 70A, 600V class J.

Short Circuit Current Ratings

The maximum AC mains SCCR of the Regenerative Unit is 100 kA. In association with a drive whose AC mains SCCR is lower than this value, the drive value will apply.

Chapter 3

Regenerative Unit Mounting

What is in This Chapter?

This chapter contains the following sections:

Topic	Page
Initial Steps	<u>23</u>
Mounting Conditions	<u>24</u>
Vertical Flat Mounting	<u>26</u>
Side by Side Mounting	<u>28</u>
Horizontal Flat Mounting	<u>29</u>
Mounting	<u>30</u>

Initial Steps

Handling and Storage

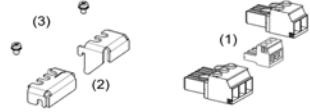
To help protect the Regenerative Unit before installation, handle and store the device in its packaging. Ensure that the ambient conditions are acceptable

Check the Delivery of the Regenerative Unit

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



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

Step	Action
1	Remove the regenerative unit from the packaging and verify that it has not been damaged
2	Verify that the catalog number printed on the nameplate corresponds to the purchase order.
3	Check that the following parts are in the packaging: <ul style="list-style-type: none">• Danger labels kit in different languages• Altivar regenerative unit instruction sheet• Hazardous substance list• Plug parts (1)• Wiring traps (2)• Screws (3)  

Mounting Conditions

Before You Begin

Conductive foreign objects, dust or liquids or damaged parts may cause parasitic voltage.



DANGER

ELECTRIC SHOCK OR UNANTICIPATED EQUIPMENT OPERATION

- Do not use damaged products.
- 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.

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.

Power Drive Systems (PDS) can generate strong local electrical and magnetic fields. This can cause interference in electromagnetically sensitive devices.



WARNING

ELECTROMAGNETIC FIELDS

- Keep persons with electronic medical implants, such as pacemakers, away from the equipment.
- Do not place electromagnetically sensitive devices in the vicinity of the equipment.

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

Attaching a Label with Safety Instructions

A label kit is provided with the regenerative unit.

Step	Action
1	Observe the safety regulations in the targeted country
2	Select the label with the suitable language for the targeted country
3	Attach the label to the front of the device and make sure that it is visible. Below is the English version  A photograph of a red rectangular label. At the top left is a yellow lightning bolt symbol, and at the top right is a yellow exclamation mark symbol. Below these symbols, the word "DANGER" is printed in large white capital letters. Underneath "DANGER", the text "ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH." is printed in smaller white capital letters. At the bottom of the label, there is a small note: "To service, remove all power, wait 15 minutes".

General Mounting Instructions

- The use of washers is required with all mounting screws.
- Tighten the fixation screws
- Do not mount the device close to heat sources.
- Avoid environmental effects like high temperatures and high humidity as well as dust, dirt and conductive gases.
- Adhere to the minimum installation distances for required cooling.
- Do not mount the device on flammable materials.
- Install the unit on solid, vibration-free support.

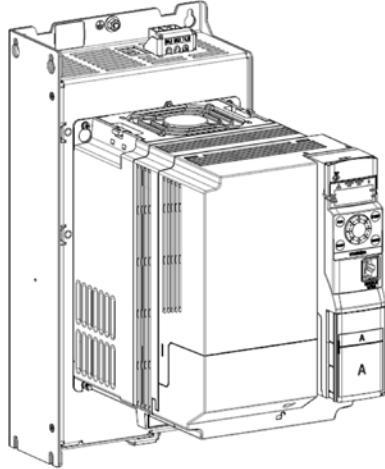
Vertical Flat Mounting

Mechanical Drive Association

For this mounting, regenerative unit can accept a footprint mounting of ATV320 drives.

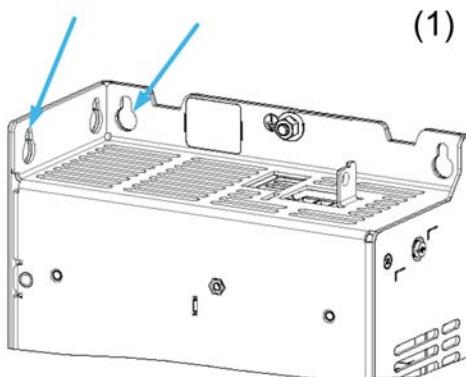
The associations without derating are:

Regenerative Unit	ATV320			
	ATV320U55N4B	ATV320U75N4B	ATV320D11N4B	ATV320D15N4B
ATVRU75N4	X	X	-	-
ATVRD15N4	-	-	X	X

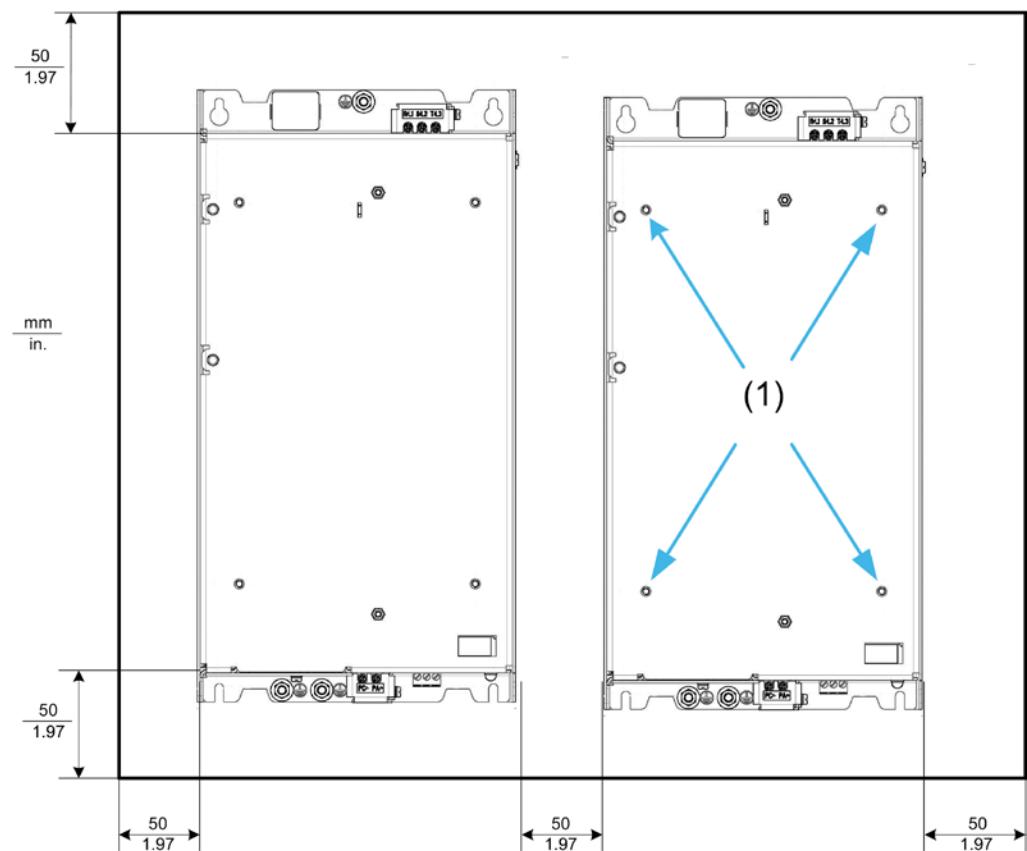


Mounting

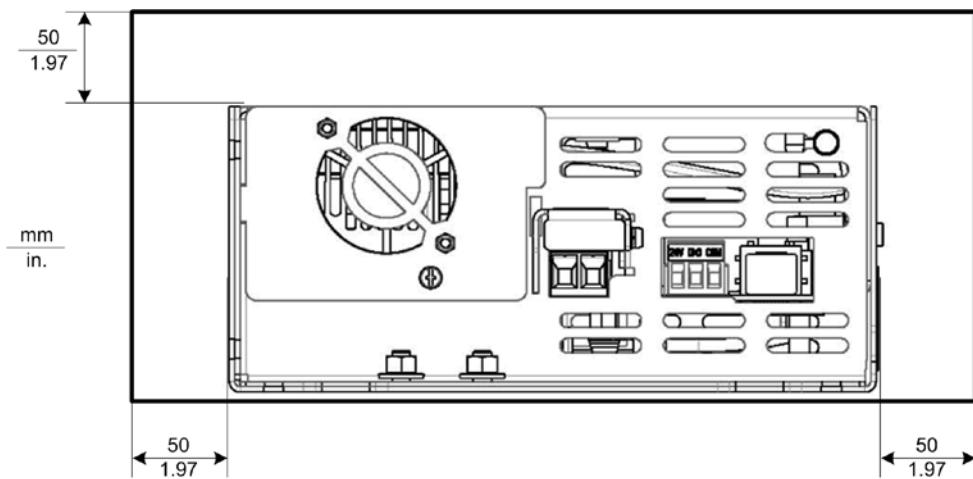
The regenerative unit is hanged on its support (see (1)). The natural convection of the air flow is in the same direction as the forced cooling air flow of the fan.



These pictures show dimensions for enclosure mounting:



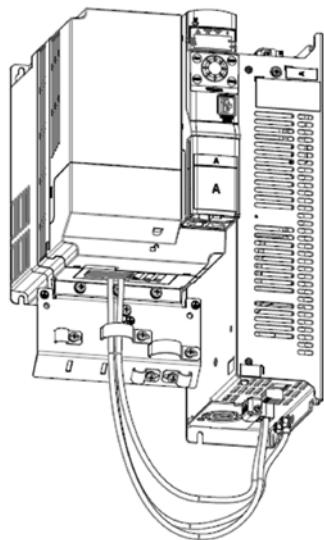
(1): Fixing holes for ATV320



Side by Side Mounting

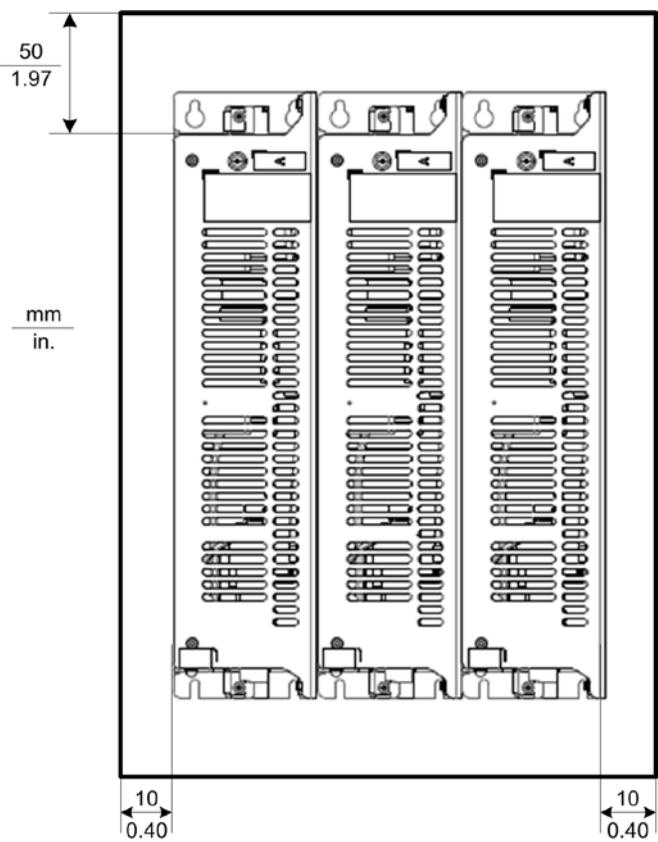
Drive Association

The regenerative unit is hanged on its support. It can be mounted side by side with other regenerative unit(s), or with Altivar:



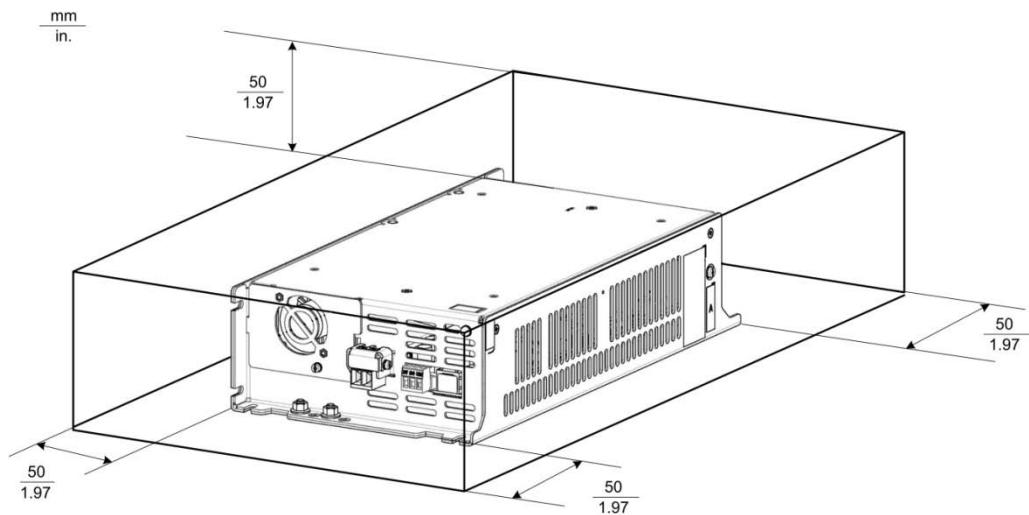
Mounting

This picture shows dimensions for enclosure mounting:



Horizontal Flat Mounting

The regenerative unit is mounted horizontally. The forced cooling air of the fan is orthogonal to the natural convection air flow. A derating shall be applied to the regenerative unit



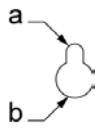
Mounting

Mounting Holes and Screws

Fixation by screws is required for all regenerative unit ratings:

- Number of holes: use the 4 mounting holes.

Top hole



Frame Size	Top Holes a mm (in.)	Top Holes B (if any) mm (in.)	Bottom holes mm (in.)	Recommended Screws
ATVRU75N4	5 (0.2)	10 (0.4)	5 (0.2)	M4
ATVRD15N4	6 (0.24)	11 (0.43)	6 (0.24)	M5

Chapter 4

Regenerative Unit Wiring

What is in This Chapter?

This chapter contains the following sections:

Topic	Page
Wiring Instructions	32
Wiring the Power Part	36
Wiring the Control Part	37
Ground Cables	36
Plugging Instructions	38
Generic Wiring	41
Regenerative Units and Drive	42
Drives and Regenerative Unit	44
Wiring Blocks	46

Wiring Instructions

General Instructions

⚠ WARNING	
UNANTICIPATED EQUIPMENT OPERATION	
<ul style="list-style-type: none">• Carefully install the wiring in accordance with the EMC requirements.• Perform a comprehensive commissioning test.	
Failure to follow these instructions can result in death, serious injury, or equipment damage.	

⚠ ! DANGER	
HAZARD OF FIRE OR ELECTRIC SHOCK	
<ul style="list-style-type: none">• Wire cross sections and tightening torques must comply with the specifications provided in this document• Do not use multi-conductor cables without cable plugs for any connection with a voltage higher than 25 Vac.	
Failure to follow these instructions will result in death or serious injury.	

The product has a leakage current greater than 3.5 mA. If the protective ground connection is interrupted, a hazardous touch current may flow if the product is touched.

⚠ ! DANGER	
ELECTRIC SHOCK CAUSED BY HIGH LEAKAGE CURRENT	
<ul style="list-style-type: none">• 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.	
Failure to follow these instructions will result in death or serious injury.	

Power and Circuit Protection

Where local and national codes require upstream protection with a residual current device, use a type ASi device.

Choose a suitable model integrating:

- High frequency current filtering,
- A time delay that helps to prevent a triggering of the upstream device caused by the load from stray capacitance on power-on. The time delay is not available for 30 mA device; in this case, choose devices with immunity against nuisance triggering.

Due to high leakage current in standard operation, we recommend to choose at least a 300 mA device. If the installation requires a residual current device less than 300 mA, it can be possible to use a device lower than 300 mA by removing the screws according to the instructions given in the installation manual of the drive product

If the installation includes several drives, provide one residual current device per drive.

Equipment Grounding

NOTICE

DESTRUCTION DUE TO INCORRECT WIRING

Before switching on and configuring the product, verify that it is properly wired.

Failure to follow these instructions can result in equipment damage.

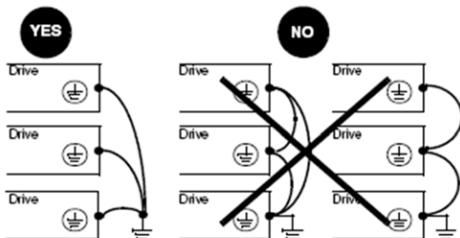
DANGER

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.

- Ensure that the resistance to ground is 1 Ohm or less.
- When grounding several regenerative units, you must connect each one directly, as shown in the above figure?
- Do not loop ground cables or connect them in series.



Operation on an IT or Corner Grounded System

Definition

IT system: Isolated or impedance grounded neutral. Use a permanent insulation monitoring device compatible with nonlinear loads, such as an XM200 type or equivalent.

Corner grounded system: System with one phase grounded.

Operation

NOTICE

RISK OF DAMAGE TO THE REGENERATIVE UNIT

If the regenerative unit is used on an IT or corner grounded system, the built-in EMC filter must be disconnected as described in this manual.

Failure to follow these instructions can result in equipment damage.

Disconnecting the Built-in EMC Filter

Filter Disconnection

! 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.

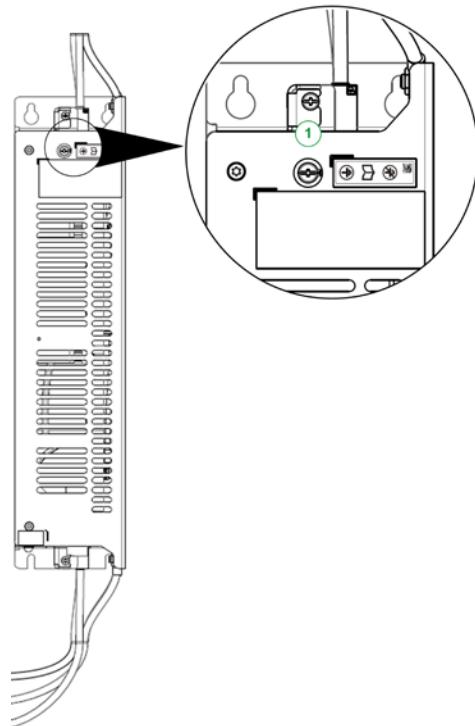
The regenerative unit has a built-in EMC filter. As a result they exhibit leakage current to ground. If the leakage current creates compatibility problems with your installation (residual current device or other), then you can reduce the leakage current by disconnecting the built-in filter as shown below. In the configuration the product does not meet the EMC requirements according to the standard IEC 61800-3.

Setting

Apply the following instructions to disconnect the built-in EMC filter.

Step	Action
1	Locate the disconnect built-in EMC screw as shown on detail ①
2	For operation without the built-in EMC filter, remove the screw from its location.

NOTE:



Wiring the Power Part

Before Wiring

Observe the following instructions before wiring:

- DC-bus link length between drive and regenerative unit or two units should not exceed 2 m (6.56 ft)
- Cables of DC-bus link (positive, negative and protective ground cables) have to be less than 5cm (2 in.) apart from each other

NOTE: It is recommended to use sheathed cable

Characteristics of the Power Part Terminals

Regenerative Unit	AC Terminals			DC Terminals		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum	Rated	Minimum	Maximum	Rated
	mm ² (AWG)	mm ² (AWG)	N.m (lb.in)	mm ² (AWG)	mm ² (AWG)	N.m (lb.in)
ATVRU75N4	2.5 (12)	4 (10)	0.8 (7)	2.5 (12)	4 (10)	0.8 (7)
ATVRD15N4	6 (8)	6 (8)	1.7 (15)	6 (8)	6 (8)	1.7 (15)

Functions of the Power Terminals

Terminal	Function
⊕	Ground terminal
R/L1 – S/L2 – T/L3	Power supply
PA/+	DC bus + polarity
PC/-	DC bus - polarity

Ground Cables

Ground cable cross sections of input and output ground cables are the same as those given for the input and output cables. Minimum cross section of protective ground cable is 10 mm² (AWG 8).

Tightening torque is 2.5 N.m.

Wiring the Control Part

Characteristics of the Control Part Terminals

Regenerative Unit	Control Terminals		
	Wire Cross Section		Tightening Torque
	Minimum	Maximum	Rated
	mm ² (AWG)	mm ² (AWG)	N.m (lb.in)
ATVRU75N4	0.5 (20)	1.5 (16)	0.5 (4.4)
ATVRD15N4	0.5 (20)	1.5 (16)	0.5 (4.4)

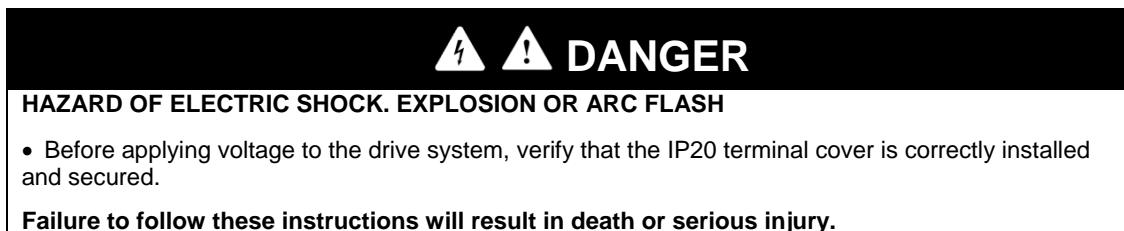
Functions of the Control Terminals

Terminal	Function	I/O Type	Electrical characteristics
24V	24 Vdc Power supply	O	<ul style="list-style-type: none">• Maximum current : 250mA• Tolerance : -15/+20%
DI/DQ	Digital Input / Digital Output	I/O	Only for paralleling of Altivar regenerative unit
COM	Digital I/O common	I/O	0V
NOTE: see page 42 for the wiring of the control terminal			

Plugging Instructions

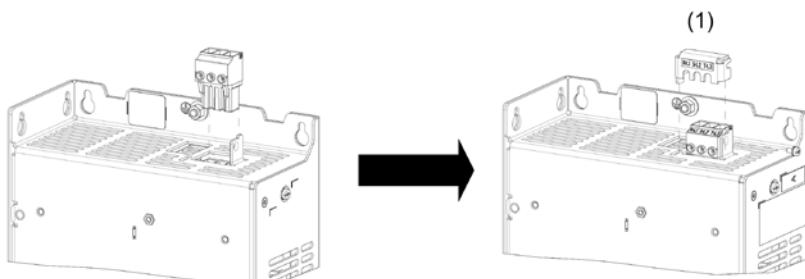
ATVRU75N4

The IP20 terminal cover (1), provided with the product, must be installed.



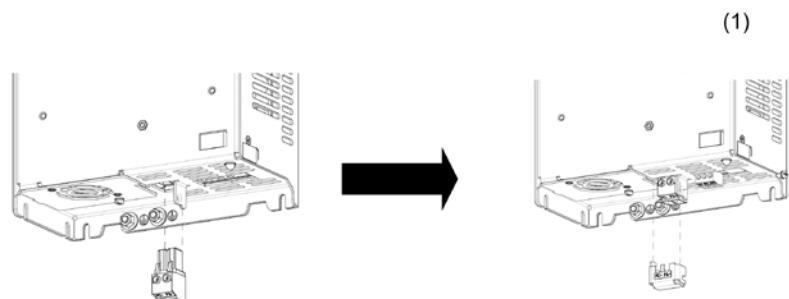
Mains Plugging

Terminal plug for mains is located at the top of the unit.

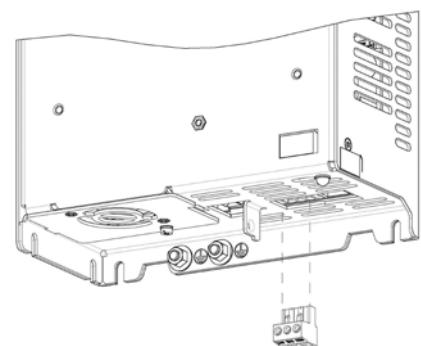


DC-bus Plugging

Terminal plugging for DC-bus is located at the bottom of the unit.



Control Terminal Plugging



The IP20 terminal cover (1), provided with the product, must be installed.

DANGER

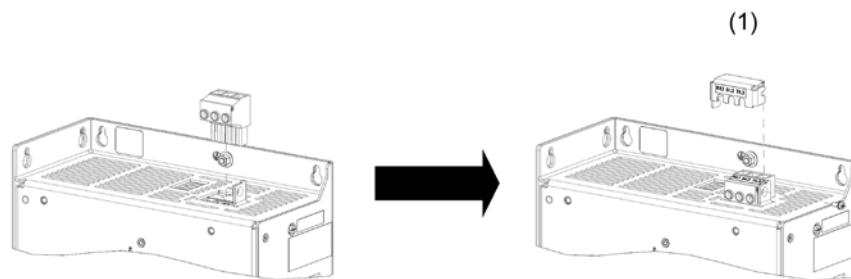
HAZARD OF ELECTRIC SHOCK. EXPLOSION OR ARC FLASH

- Before applying voltage to the drive system, verify that the IP20 terminal cover is correctly installed and secured.

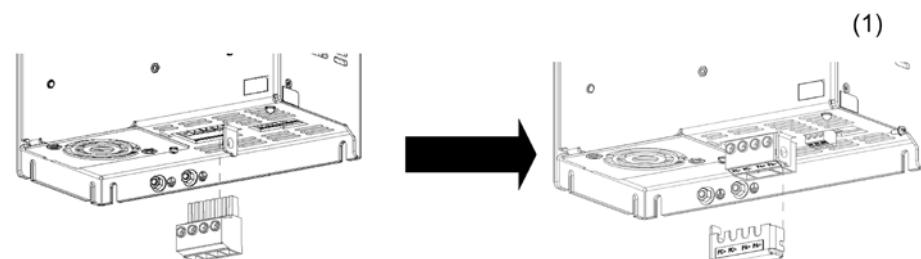
Failure to follow these instructions will result in death or serious injury.

Mains Plugging

Terminal plug for mains is located at the top of the unit.

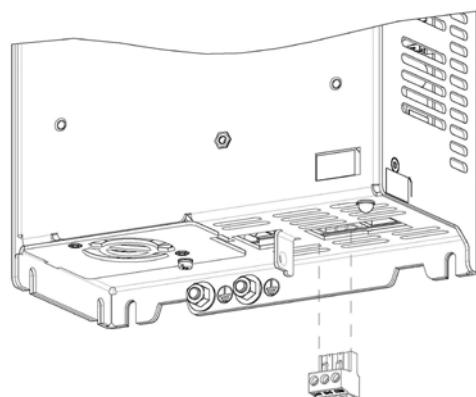


DC-bus Plugging



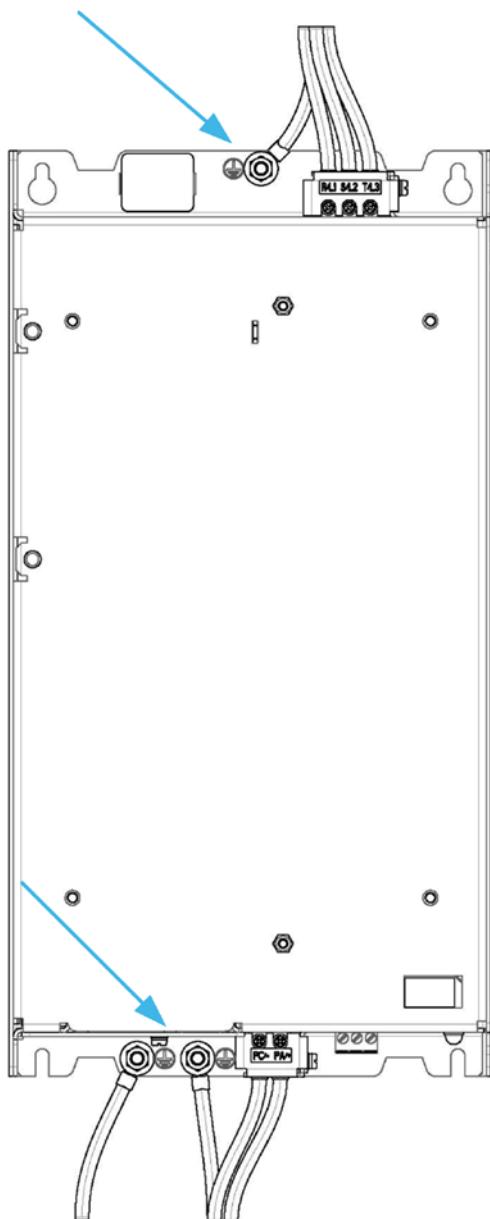
Control Terminal Plugging

Control terminal plug is located at the bottom of the unit:



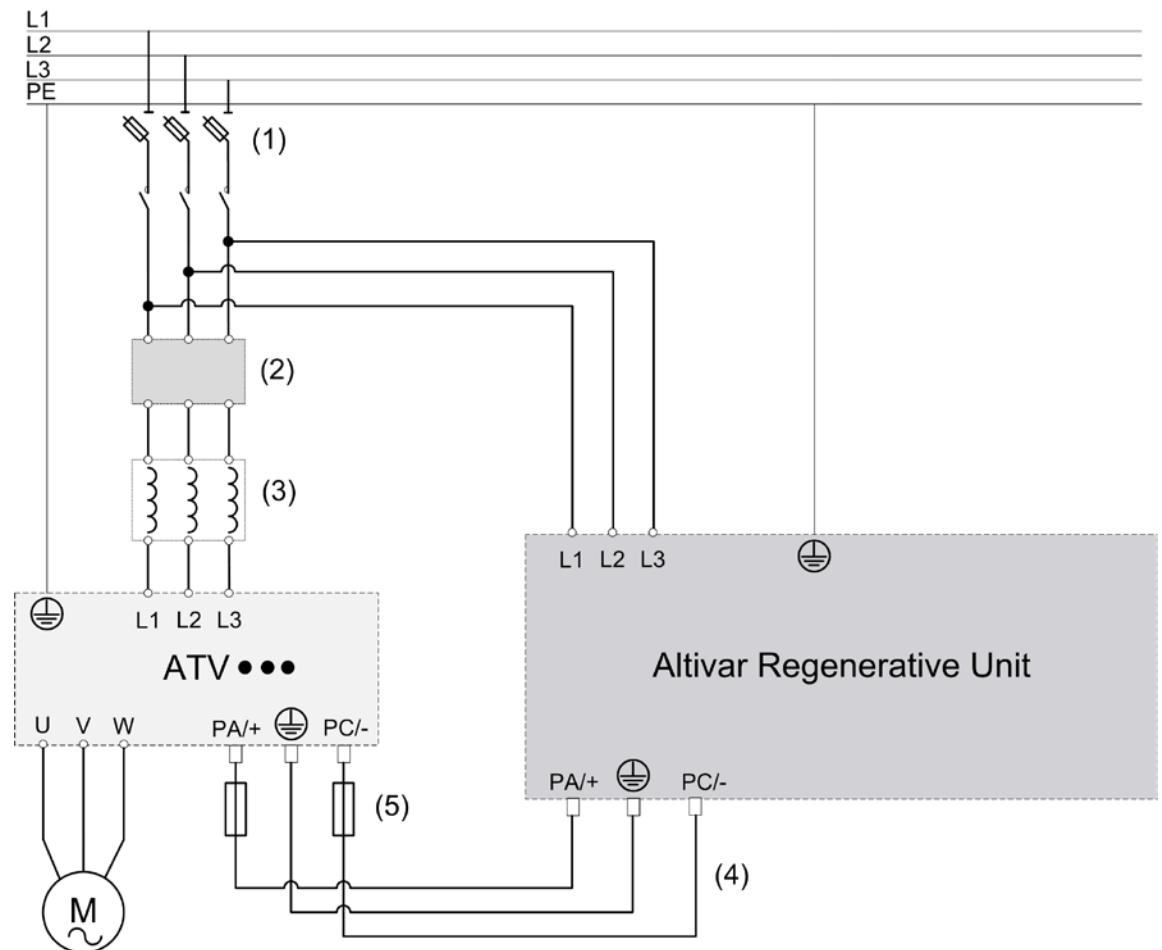
Protective Ground

Connect the protective ground cable at the top and bottom of the unit:



Generic Wiring

Drive and Regenerative Unit Wiring Diagram

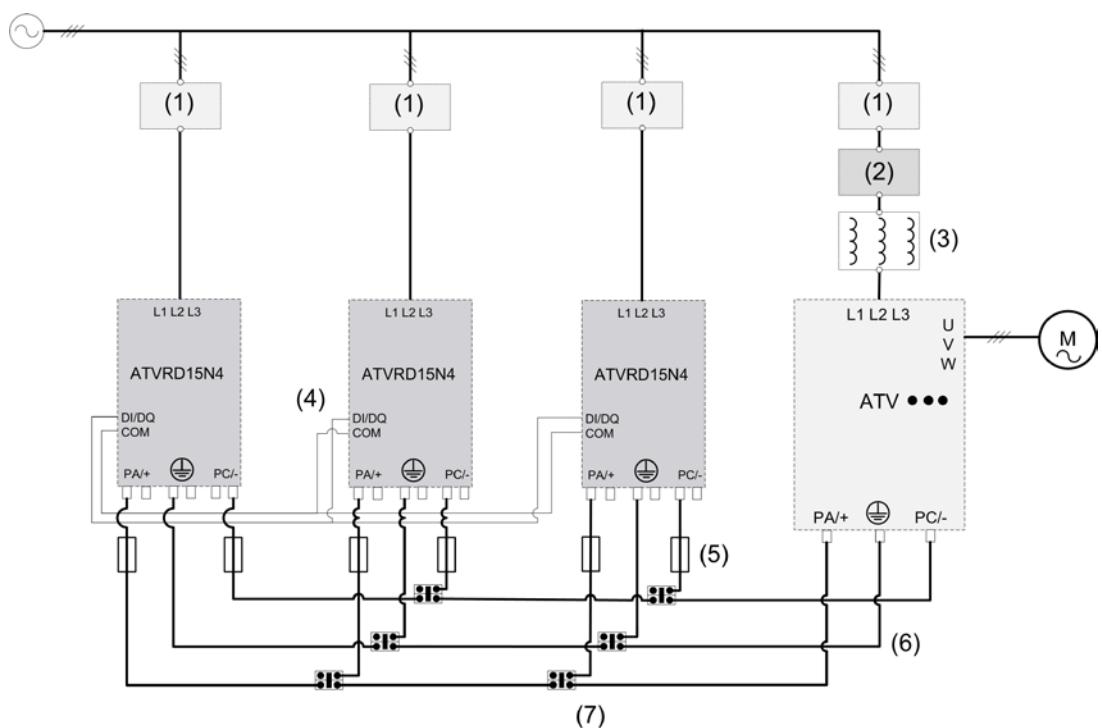


- (1): AC protection fuses
- (2): Optional additional EMC input Filter (see drive catalog)
- (3): Optional AC Choke (see drive catalog)
- (4): DC bus link
- (5): DC protection fuses

Regenerative Units and Drive

One Drive with One to Three Regenerative Units

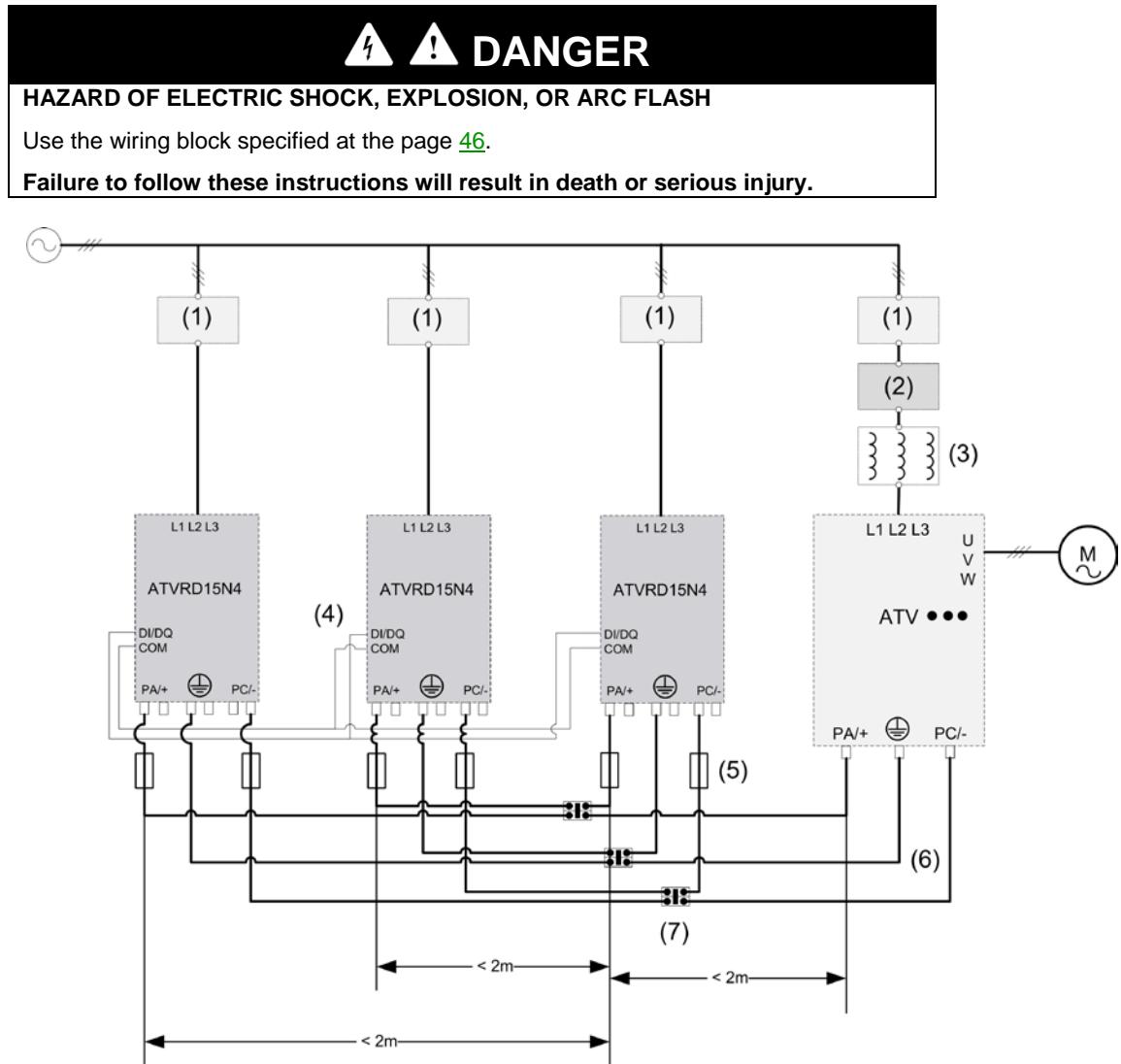
Using several regenerative units in parallel, the DC-bus connection between 2 regenerative units must not be wired directly on the second slot of the terminals (PA+/-, PC+/-) available on the regenerative units.



- (1): AC protection fuses
- (2): Optional EMC filter (see drive catalog)
- (3): Optional choke (see drive catalog)
- (4): Control link between regenerative units
- (5): DC protection fuses
- (6): DC-bus link
- (7): Wiring block and bridge (see reference page [46](#))

One Drive with One to Three Regenerative Units Using Wiring Blocks

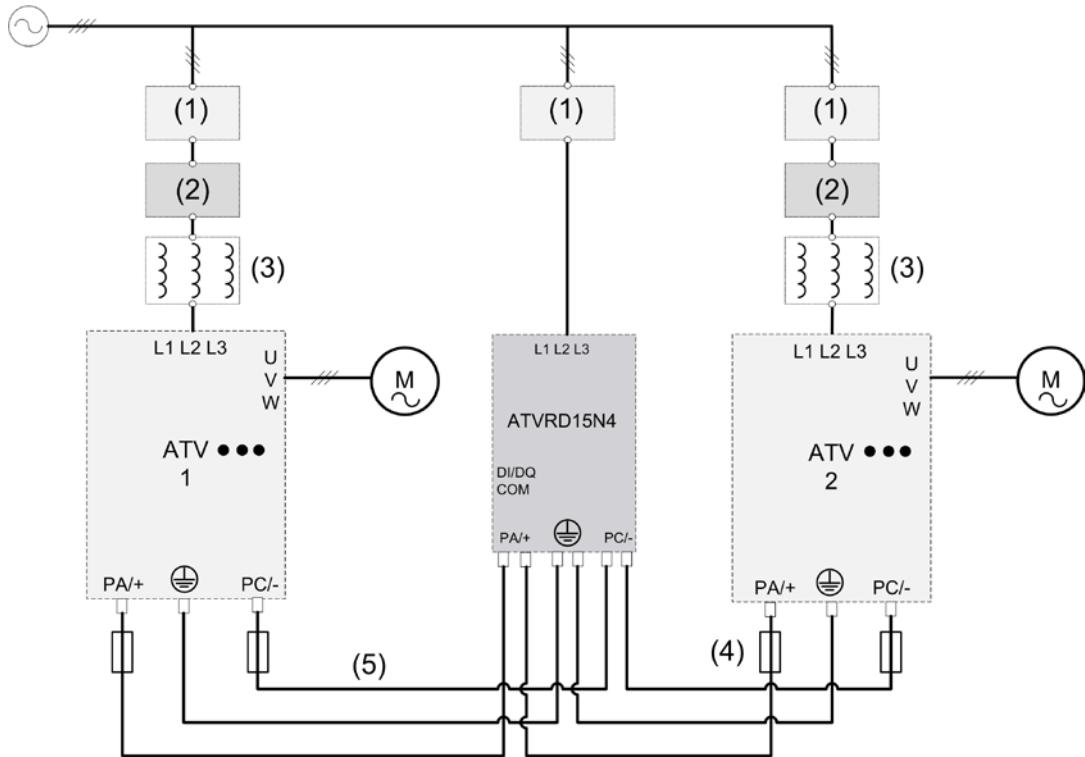
Using several regenerative units in parallel, the DC-bus connection between 2 regenerative units must not be wired directly on the second slot of the terminals (PA+/ PC-) available on the regenerative units.



- (1): AC protection fuses
- (2): Optional EMC filter (see drive catalog)
- (3): Optional choke (see drive catalog)
- (4): Control link between regenerative units
- (5): DC protection fuses
- (6): DC-bus link
- (7): Wiring block and bridge (see reference page [46](#))

Drives and Regenerative Unit

ATVRD15N4 Used With Two Drives



(1): AC protection fuses

(2): Optional EMC filter (see drive catalog)

(3): Optional choke (see drive catalog)

(4): DC protection fuses

(5): DC-bus link

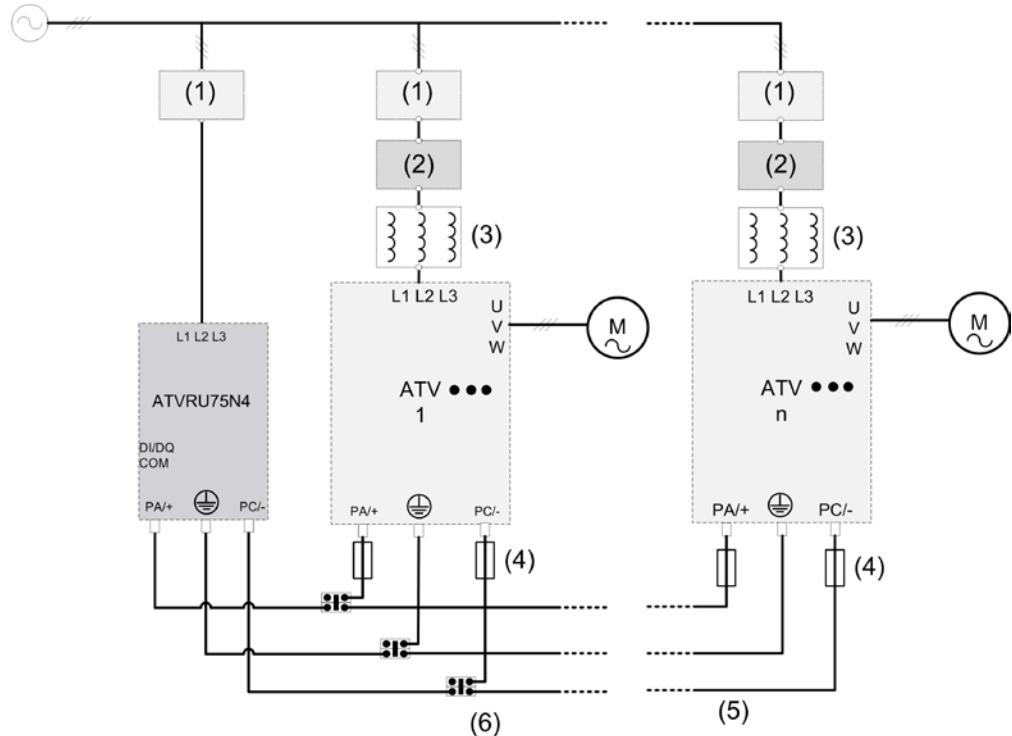
NOTE: In this case the total braking power of the two drives in the worst case of the application must be lower or equal to the rated power of ATVRD15N4

Drives DC fuses must be selected from table page [21](#) according to the maximum braking power of each drive

Association Table With DC Fuses

Drive Power Rating (kW)	Regenerative Unit 1			Regenerative Unit 2			Regenerative Unit 3		
	Catalog number	DC fuse		Catalog number	DC fuse		Catalog number	DC fuse	
		Rating (A)	I ² t (A ² .s)		Rating (A)	I ² t (A ² .s)		Rating (A)	I ² t (A ² .s)
18.5	ATVRD15N4	50	< 1900	ATVRU75N4	25	< 650	-	-	-
22	ATVRD15N4	60	< 3100	ATVRU75N4	30	< 1100	-	-	-
30	ATVRD15N4	60	< 3100	ATVRD15N4	60	< 3100	-	-	-
37	ATVRD15N4	60	< 3100	ATVRD15N4	60	< 3100	ATVRU75N4	30	< 1100
45	ATVRD15N4	60	< 3100	ATVRD15N4	60	< 3100	ATVRD15N4	60	< 3100

Multiple Drives with One Regenerative Unit Wiring



- (1): AC protection fuses
- (2): Optional EMC filter
- (3): Optional AC Choke
- (4): DC-bus protection fuses
- (5): DC-bus Link
- (6): Wiring block and bridge (see reference page [46](#))

The power rating of the regenerative unit must be greater or equal to the maximum regenerated power of the drives in the worst case of the application.

Drives and regenerative units have to be wired in the following order:

- Highest drive power close to the regenerative unit
- Then other drives sorted by power ratings

The drive must follow the instructions defined by the drives application note to share the same DC bus (wiring recommendations, DC fuses selection, use of line chokes...).

Wiring Blocks

References

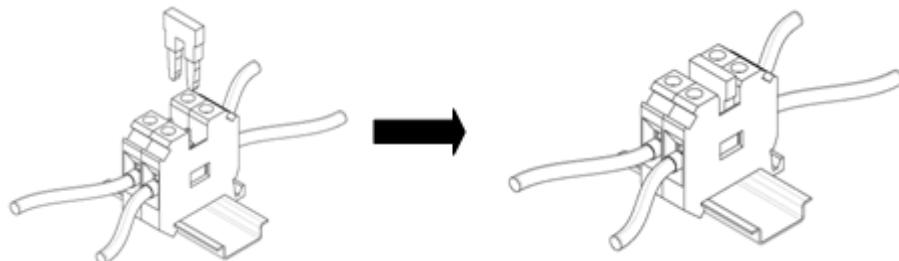
When using regenerative units in parallel it is recommended to use wiring blocks with bridge available on www.schneider-electric.com.

This table shows the wiring blocks with bridge according to the power rating.

Ratings	Terminal block – bridge catalog number		
	NSYTRV102 – NSYTRAL102	NSYTRV162 – NSYTRAL162	NSYTRV352 – NSYTRAL352
Maximum Power (kW)	22	30	37 and 45
Rated current (A)	51	66	84
Peak current (A)	68	88	112
Rated section (mm ²)	10	16	35

Plugging

Terminal block and bridge plugging:



Chapter 5

Checking Installation

What is in This Chapter?

This chapter contains the following sections:

Topic	Page
Before Switching On	48

Before Switching On

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.

If the power stage is disabled unintentionally, for example as a result of power outage, errors or functions, there is a possibility that the motor is no longer decelerated in a controlled way.

WARNING

UNANTICIPATED EQUIPMENT OPERATION

Verify that movements without braking effect cannot cause injuries or equipment damage.

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

Mechanical Installation

Verify the mechanical installation of the entire regenerative unit:

Step	Verify that...	
1	The installation meets the specified distance requirements.	
2	All fastening screws are tightened using the specified tightening torque.	

Electrical Installation

Verify the electrical connections and the cabling:

Step	Verify that...	
1	All protective ground conductors are connected	
2	All fuses and circuit breaker have the correct rating.	
3	All wires are connected or insulated at the cable ends.	
4	All cables and connectors are properly connected and installed.	
5	Signal wires are properly connected.	
6	The required shield connections are EMC compliant.	
7	All measures for EMC compliance are taken.	

Covers and Seals

Verify that all devices are properly installed to meet the required degree of protection (see page [38](#)).

Setting on drive

Ensure that the following parameters are set as bellow:

- On ATV320, set **[DC-Bus chaining]** *Д С П* to **[Bus & Main]** *П Р*, *и*
NOTE: SCF3 error will be triggered by the drive if this setting is not correctly applied on the drive.
- On ATV320, ATV930 and ATV340, set **[Dec.Ramp Adapt]** *б р Р* to **[No]** *н о*

Chapter 6

Diagnostics and Troubleshooting

Overview

This part describes the various types of diagnostics and provides troubleshooting assistance.



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.

What is in This Chapter?

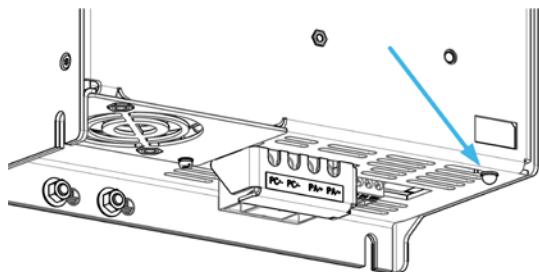
This chapter contains the following sections:

Topic	Page
LED Status	51
Error Description	52

LED Status

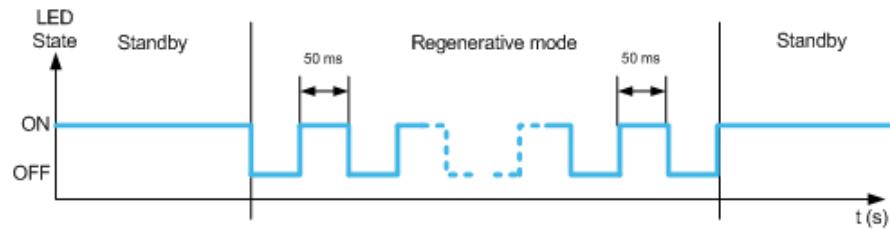
LED On the Altivar Regenerative Unit

The following diagram shows the LED on the Altivar regenerative unit.



Normal Operations

This diagram shows the LED states in normal operations.

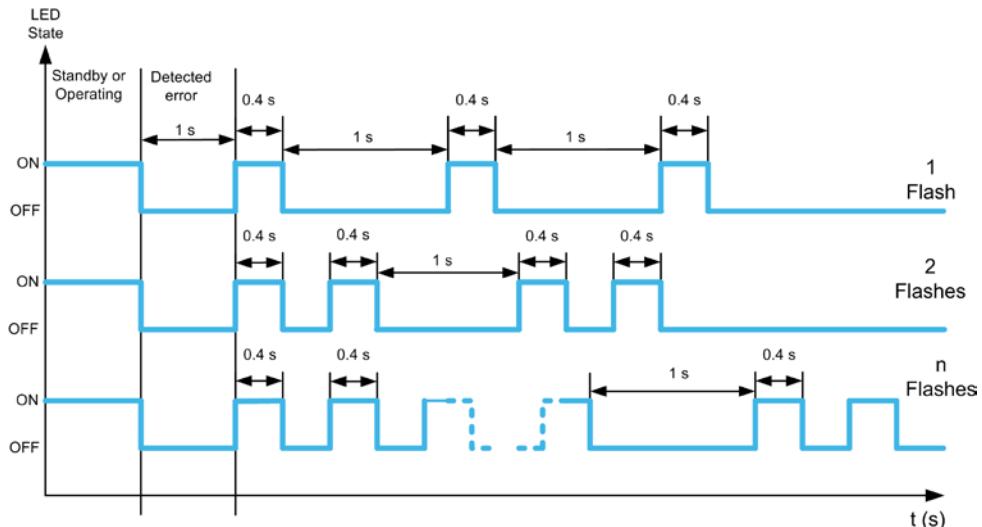


During normal operations, LED indicates several states.

LED Status	Regenerative Unit State	Description
OFF	Not operational	The regenerative unit is not operational.
Red on	Operational	The regenerative unit is in standby. It is ready to operate.
Red continuous flashing	Operating	The unit is in regenerative mode.

Error detection

This diagram shows the LED states if an error is detected.



Error Description

Error on the Regenerative Unit

When the Unit detects an error, there are several flashing modes according to the corresponding error.

LED Status	Error	Probable Cause	Remedy
1 flash	Input phase loss.	One of the 3 AC input phases is missing.	<ul style="list-style-type: none"> Verify the correct wiring of the AC input terminal of the regenerative unit. Verify the input AC protection (fuses or circuit breaker) <p>This error is cleared automatically after the cause has been removed.</p>
2 flashes	Under voltage.	The voltage on terminal + and – is less than 300 Vdc.	<ul style="list-style-type: none"> Verify the correct wiring of the regenerative unit DC terminals. Verify that power is applied on the drive linked to the DC bus. Verify the DC protection fuses. <p>This error is cleared automatically after the DC bus voltage becomes greater than 370 Vdc.</p>
3 flashes	Over temperature.	<ul style="list-style-type: none"> Internal heatsink has reached the maximum temperature. Excessive operation cycles have been performed. 	<ul style="list-style-type: none"> Verify that the regenerative unit cooling fan is running during regenerative operation. Verify that the ambient temperature conforms with the regenerated power according to the derating curves. Verify the sizing of the regenerative unit in normal and over load operations. <p>If this error is detected by the heatsink temperature, it will be cleared automatically if the internal temperature decreases.</p> <p>If this error is detected by excessive operating cycles:</p> <ul style="list-style-type: none"> Verify the sizing of the installation. <p>This detected error requires a power reset.</p>
4 flashes	Over voltage.	<ul style="list-style-type: none"> AC mains power supply voltage is greater than 500 Vac +10%. DC voltage becomes greater than the maximum allowed during operation because the maximum regenerative capability of the unit has been exceeded. 	<ul style="list-style-type: none"> Verify the mains supply. <p>The detected error requires a power reset.</p> <ul style="list-style-type: none"> Reduce the regenerative power on the drive or add another regenerative unit in. <p>This error is cleared automatically after the DC bus voltage has decreased.</p>
5 flashes	Over current.	<p>The maximum current has been reached.</p> <p>The probable causes are:</p> <ul style="list-style-type: none"> A short circuit on mains inputs. Internal short circuit. 	<ul style="list-style-type: none"> Verify mains input wiring, cables, protection (fuses and/or circuit breaker). Contact your local Schneider Electric representative. <p>This detected error requires a power reset.</p>
6 flashes	Internal error.	Internal error detected.	Verify if the error can be cleared with a power reset of the regenerative unit. If the error is still active contact your local Schneider Electric representative.

Error code on the drive

Error	Probable Cause	Remedy
[DC Bus Overvoltage] $\square b F$ on the drive product.	<ul style="list-style-type: none">• Sizing of the installation.• Internal 24 Vdc error if the control link is used.• Tripped DC fuses (PA/+ PC/-)	<ul style="list-style-type: none">• Verify the sizing of the installation.• In case of no voltage between P24 and COM contact your local Schneider Electric representative.• Verify the DC fuses

Chapter 7

Maintenance and Diagnostics

What is in This Chapter?

This chapter contains the following sections:

Topic	Page
Maintenance	<u>55</u>

Maintenance

Limitation of Warranty

The warranty does not apply if the product has been opened, except by Schneider Electric services.

Servicing

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.	

NOTICE
RISK OF DAMAGE TO THE REGENERATIVE UNIT
Perform the following activities
Failure to follow these instructions can result in equipment damage.

Environment	Part concerned	Action	Periodicity
Mechanical impact on the product	Housing – LED	Verify the visual aspect of the unit.	At least each year
Corrosion	Terminals – connector – screws	Inspect and clean if required	
Dust	Terminals – fans blowholes		
Cooling	Fan	Verify the fan operation Replace the fan	After 3 to 5 years, depending on the operating conditions
Vibration	Terminal connections	Verify tightening at recommended torque	At least each year

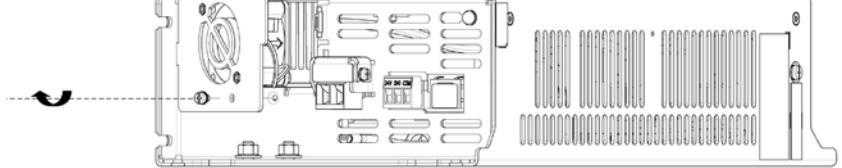
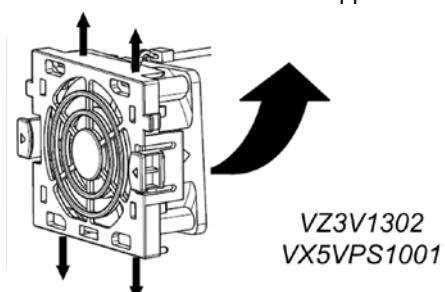
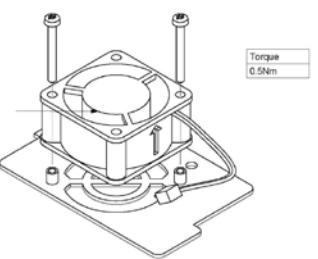
Spares and Repairs

Serviceable products. Please contact your Schneider Electric representative.

Fan Replacement

It is possible to order a new fan for the regenerative unit maintenance.

To replace the regenerative unit fan you have to:

Step	Action
1	<p>Order a fan on www.schneider-electric.com</p> <ul style="list-style-type: none">For ATVRU75N4: reference: VZ3V1302For ATVRD15N4: reference: VX5VPS1001
2	<p>Remove the fan from the regenerative unit:</p> 
3	<p>Remove the new fan from its support :</p>  <p>VZ3V1302 VX5VPS1001</p>
4	<p>Place the new fan on the regenerative unit fan support:</p> 
5	<p>Place the fan on its support in the regenerative unit:</p> 