

Altivar 32

Variable speed drives
for synchronous and asynchronous motors

Installation manual

03/2010



S1A28686

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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.

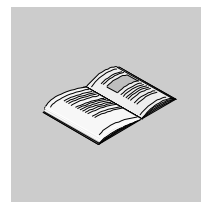
When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

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.

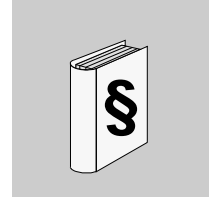
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Safety Information



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 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 an imminently hazardous situation, which, if not avoided, **will result** in death or serious injury.

WARNING

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

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result** in equipment damage.

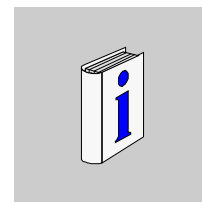
PLEASE NOTE

The word "drive" as used in this manual refers to the controller portion of the adjustable speed drive as defined by NEC.

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 product.

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About the book



At a Glance

Document Scope

The purpose of this document is:

- to give you mechanical and electrical information related to the ATV32 drive,
- to show you how to install and wire this drive.

Validity Note

This documentation is valid for the Altivar 32 drive.

Related Documents

Title of Documentation	Reference Number
ATV32 Quick Start	S1A41715
ATV32 Programming manual	S1A28692
ATV32 Modbus manual	S1A28698
ATV32 CANopen manual	S1A28699
ATV32 Communication parameters	S1A44568
ATV32 Atex manual	S1A45605
ATV32 Safety manual	S1A45606
ATV32 other option manuals: see www.schneider-electric.com .	

You can download the latest versions of these technical publications and other technical information from our website at www.schneider-electric.com.

Introduction

1

What's in this Chapter?

This chapter contains the following topics:

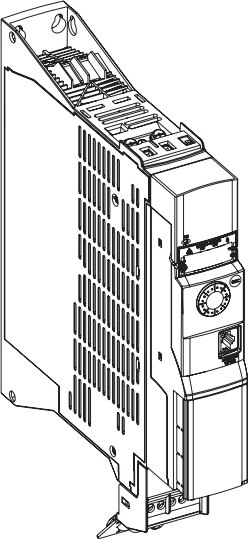
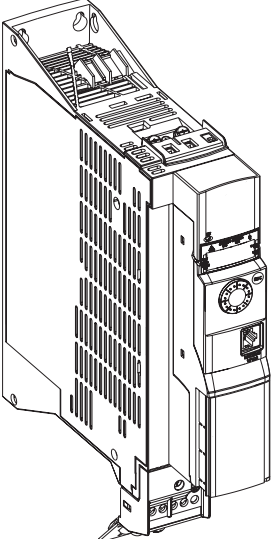
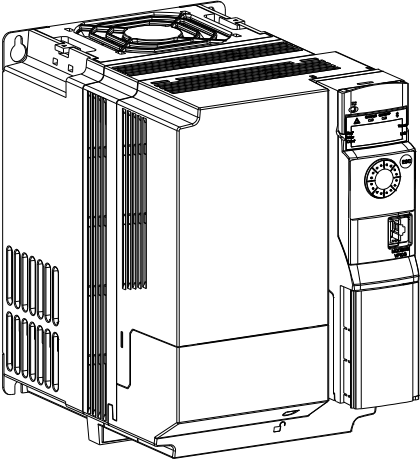
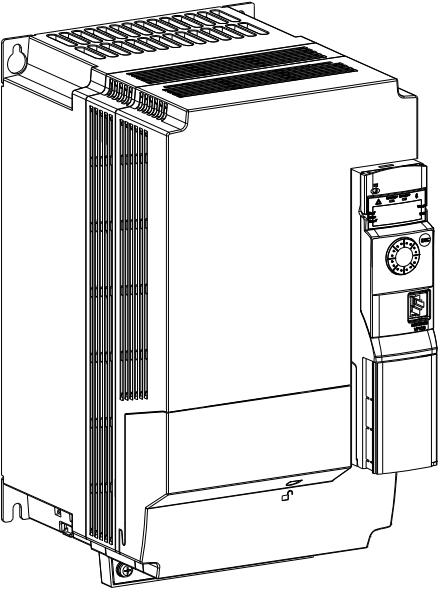
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Device overview

The range

The ATV32 product family consists of four drive sizes, A, B, C and D ideally suited to implement compact, high-performance drive solutions for a wide range of power requirements.

Four sizes

<div><p>Size A ATV32H0●●M2, H0●●N4, HU1●N4</p><ul style="list-style-type: none">● Single phase 240 V from 0.18 kW to 0.75 kW (1/4 HP to 1 HP)● Three-phase 400 V from 0.37 kW to 1.5 kW (1/2 HP to 2 HP)</div> <div></div>	<div><p>Size B ATV32HU●●M2, U22N4, U30N4, U40N4</p><ul style="list-style-type: none">● Single phase 240 V from 1.1 kW to 2.2 kW (1 1/2 HP to 3 HP)● Three-phase 400 V from 2.2 kW to 4 kW (3 HP to 5 HP)</div> <div></div>
<div><p>Size C ATV32HU55N4, U75N4</p><ul style="list-style-type: none">● Three-phase 400 V 5.5 kW and 7.5 kW (7 1/2 HP and 10 HP)</div> <div></div>	<div><p>Size D ATV32HD11N4, D15N4</p><ul style="list-style-type: none">● Three-phase 400 V 11 kW and 15 kW (15 HP and 20 HP)</div> <div></div>

Reference description

	ATV	32	H	018	M2
Product designation ATV - Altivar					
Product range					
Mounting base H - Heatsink product P - Baseplate product					
Drive rating 018 - 0.18 kW (1/4 HP) 037 - 0.37 kW (1/2 HP) 055 - 0.55 kW (3/4 HP) 075 - 0.75 kW (1 HP) U11 - 1.1 kW (1 ^{1/2} HP) U15 - 1.5 kW (2 HP) U22 - 2.2 kW (3 HP) U30 - 3 kW U40 - 4 kW (5 HP) U55 - 5.5 kW (7 ^{1/2} HP) U75 - 7.5 kW (10 HP) D11 - 11 kW (15 HP) D15 - 15 kW (20 HP)					
Power supply voltage M2 - 240 V range Single phase N4 - 400 V range three-phase					

Before you begin



What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Safety instructions	10

Safety instructions

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

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive, including the printed circuit boards, operate at the line voltage. **DO NOT TOUCH.** Use only electrically insulated tools.
- **DO NOT** touch unshielded components or terminal strip screw connections with voltage present.
- **DO NOT** short across terminals PA/+ and PC/– or across the DC bus capacitors.
- Before servicing the drive:
 - Disconnect all power, including external control power that may be present.
 - Place a “DO NOT TURN ON” label on all power disconnects.
 - Lock all power disconnects in the open position.
 - **WAIT 15 MINUTES** to allow the DC bus capacitors to discharge.
 - Measure the voltage of the DC bus between the PA/+ and PC/– terminals to ensure that the voltage is less than 42 Vdc.
 - If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive.
- Install and close all covers before applying power or starting and stopping the drive.

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

DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand the programming manual before operating the drive.
- Any changes made to the parameter settings must be performed by qualified personnel.

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

WARNING

DAMAGED DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

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

WARNING

LOSS OF CONTROL

- The designer of any wiring scheme must consider the potential failure modes of control channels and, for certain critical control functions, provide a means to achieve a safe state during and after a channel failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control channels must be provided for critical control functions.
- System control channels may include links carried out by the communication. Consideration must be given to the implications of unanticipated transmission delays or failures of the link¹.

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

1. For 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.”

CAUTION

INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the drive, ensure that the line voltage is compatible with the supply voltage range shown on the drive nameplate. The drive may be damaged if the line voltage is not compatible.

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

CAUTION

RISK OF DERATED PERFORMANCE DUE TO CAPACITOR AGING

The product capacitor performances after a long time storage above 2 years can be degraded. In that case, before using the product , apply the following procedure:

- Use a variable AC supply connected between L1 and L2 (even for ATV32●●●N4 references).
- Increase AC supply voltage to have:
 - 25% of rated voltage during 30 min
 - 50% of rated voltage during 30 min
 - 75% of rated voltage during 30 min
 - 100% of rated voltage during 30 min

Failure to follow these instructions can result in equipment damage.

Steps for setting up

3

What's in this Chapter?

This chapter contains the following topics:

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Steps for setting up

INSTALLATION

1. Check the delivery of the drive

- ☐ Check that the part number printed on the label is the same as that on the purchase order.
- ☐ Remove the Altivar from its packaging and check that it has not been damaged in transit.

2. Check the line voltage compatibility

- ☐ Check that the voltage range of the drive is compatible with the supply voltage (see page [21](#)).

3. Mount the drive vertically

- ☐ Mount the drive in accordance with the instructions in this document (see page [26](#)).
- ☐ Install any options required (see option documentation).

4. Wire the drive (see page [29](#))

- ☐ Connect the line supply and the ground, after making sure that the power is off.
- ☐ Connect the motor, ensuring that its connections correspond to the voltage.
- ☐ Connect the control part.

PROGRAMMING

5. Please refer to the programming manual.

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



Technical data



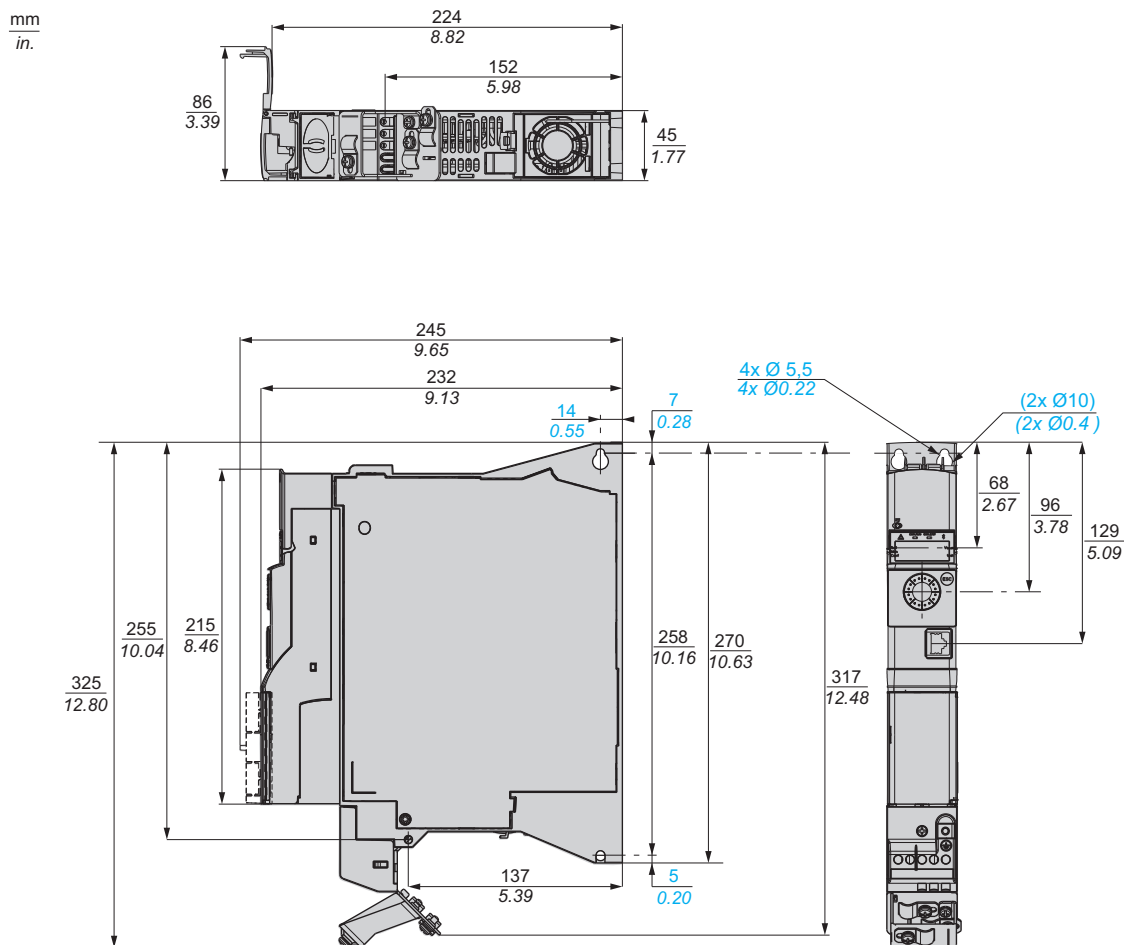
What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Mechanical data	15
Electrical data	21
Connection diagrams	22

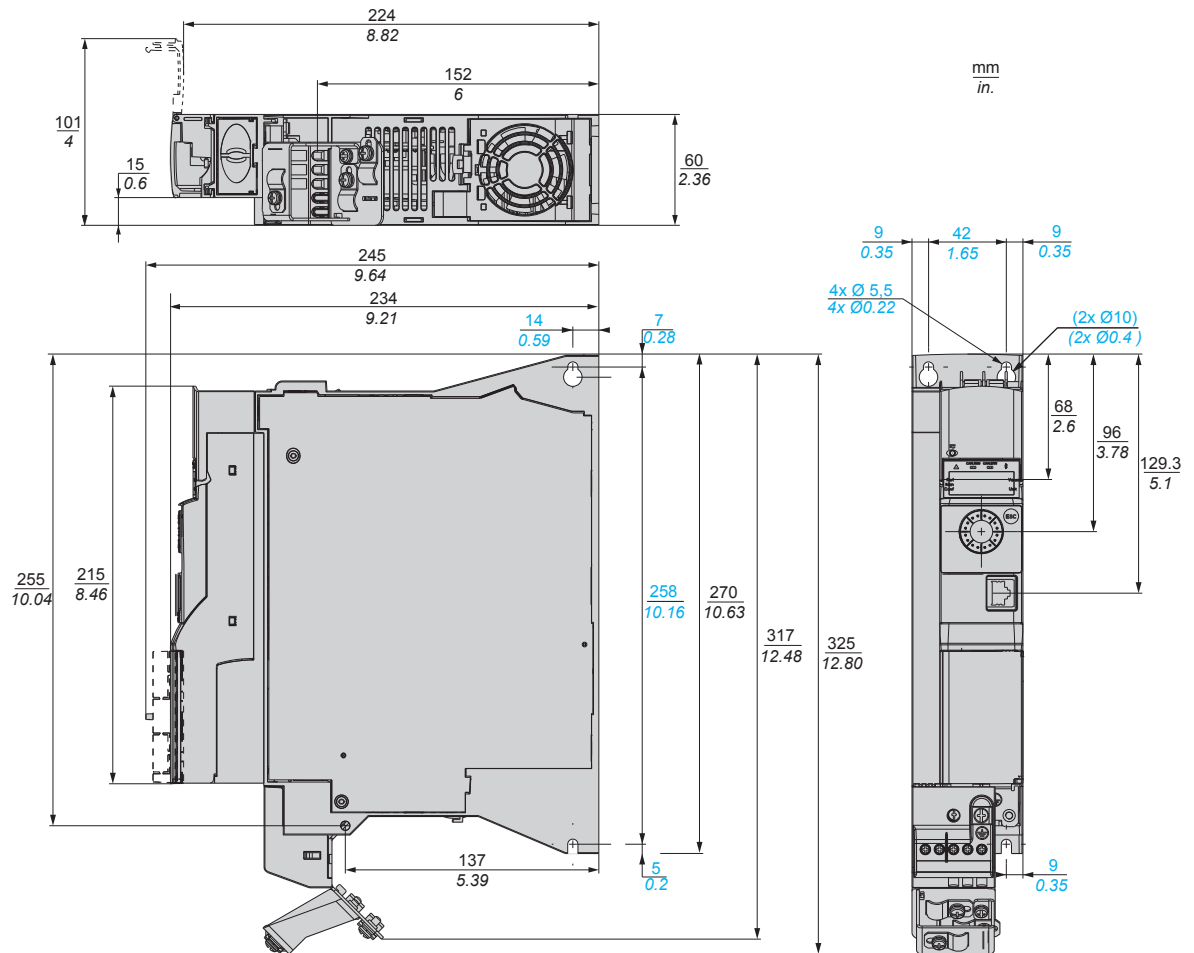
Mechanical data

ATV32H0●●M2, H0●●N4, HU1●N4 - size A - dimensions and weights



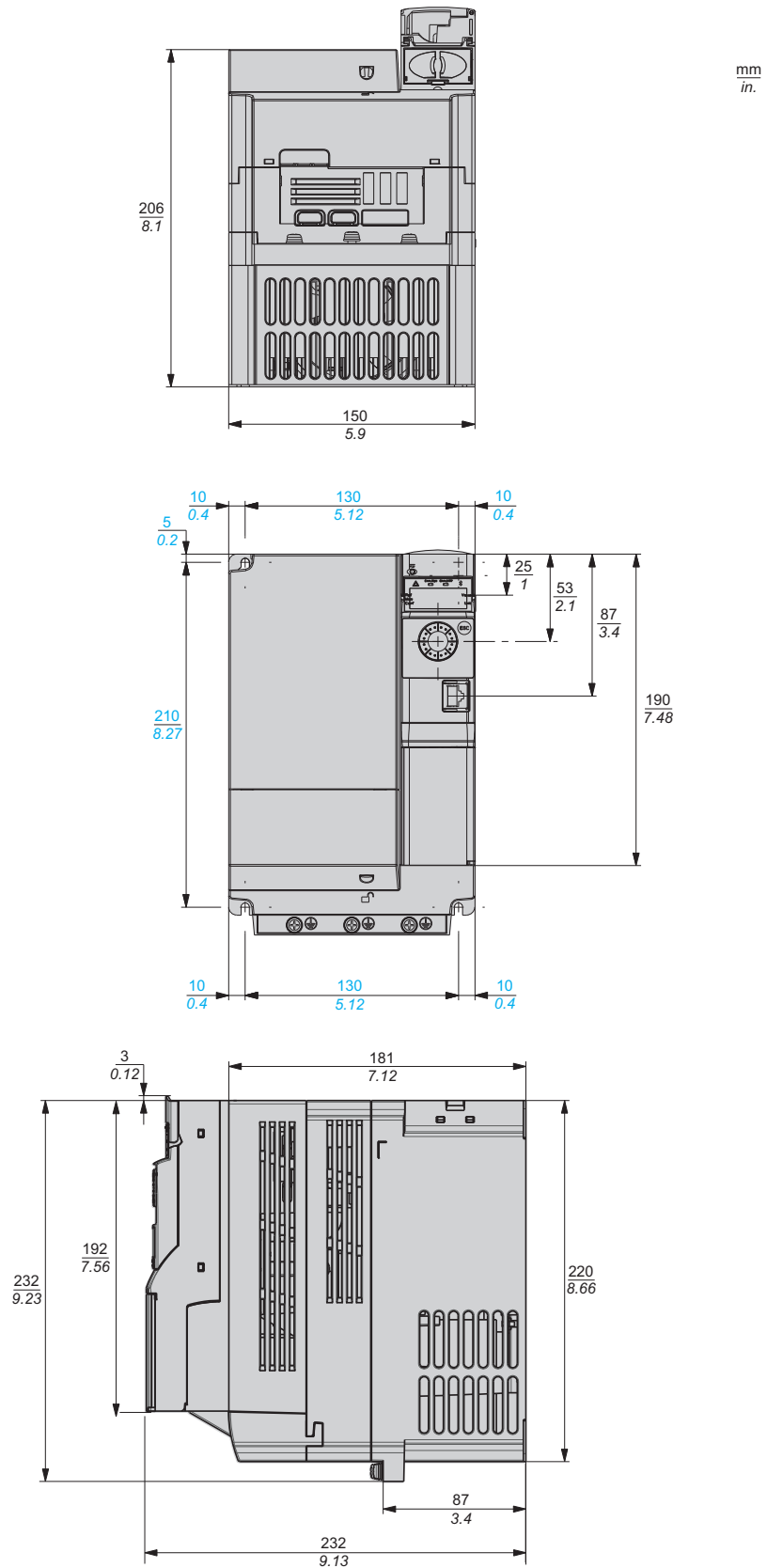
Weights

Reference	Weight (kg) (lb)
ATV32H018M2	1.590 (3.50)
ATV32H037M2, 055M2, 075M2	1.646 (3.63)
ATV32H037N4	1.618 (3.57)
ATV32H055N4, 075N4	1.715 (3.78)
ATV32HU11N4, U15N4	1.705 (3.76)

ATV32HU11M2, U15M2, U22M2, U22N4, U30N4, U40N4 - Size B - dimensions and weights

Weights

Reference	Weight (kg) (lb)
ATV32HU11M2, U15M2	1.952 (4.30)
ATV32HU22M2	2.066 (4.55)
ATV32HU22N4	2.320 (5.11)
ATV32HU30N4	2.122 (4.68)
ATV32HU40N4	2.176 (4.80)

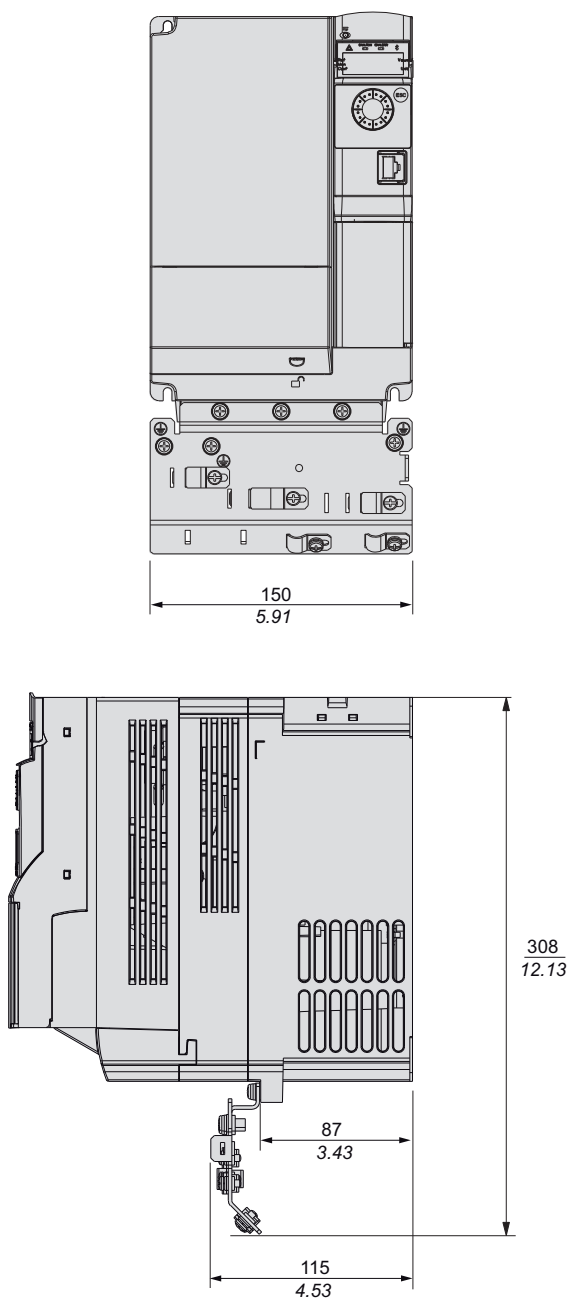
ATV32HU55N4, U75N4 - size C - dimensions and weights



Weight

4.20 kg (9.26 lb)

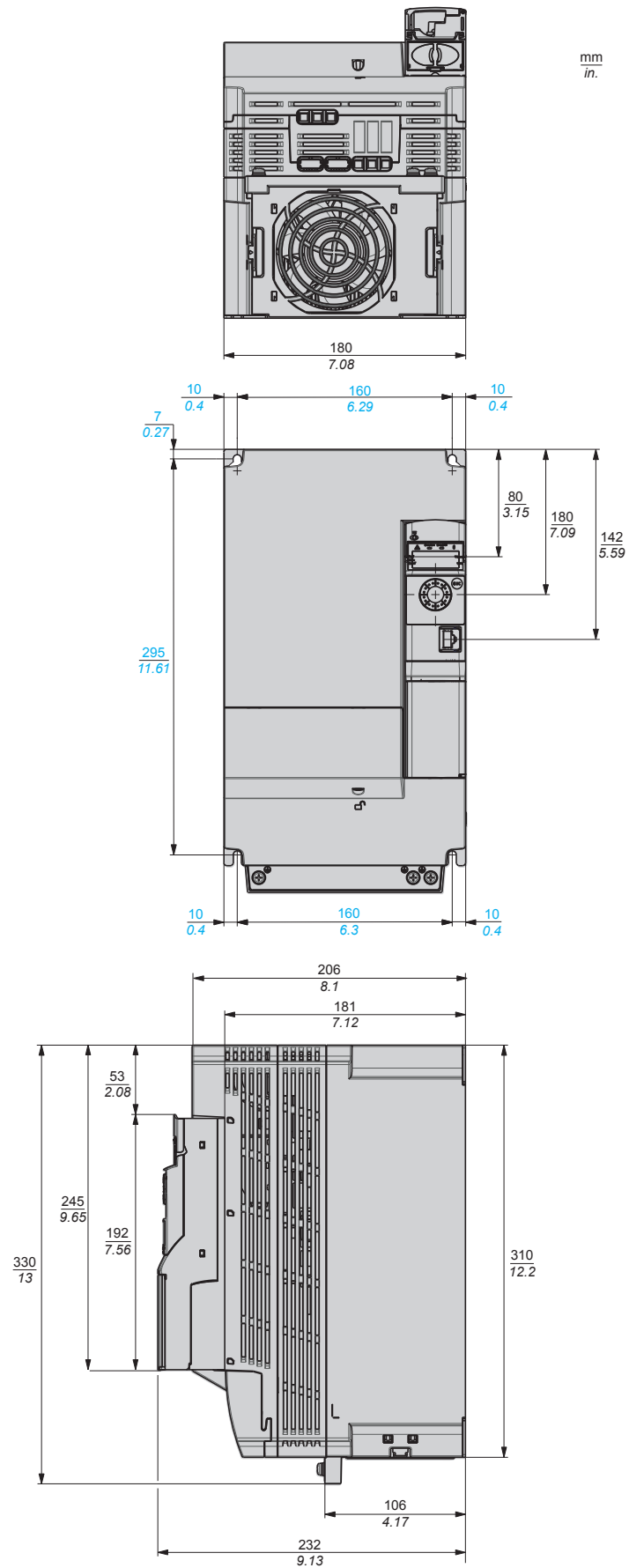
ATV32HU55N4, U75N4 - size C with EMC plate - dimensions and weight



Weight

4.41 kg (9.72 lb)

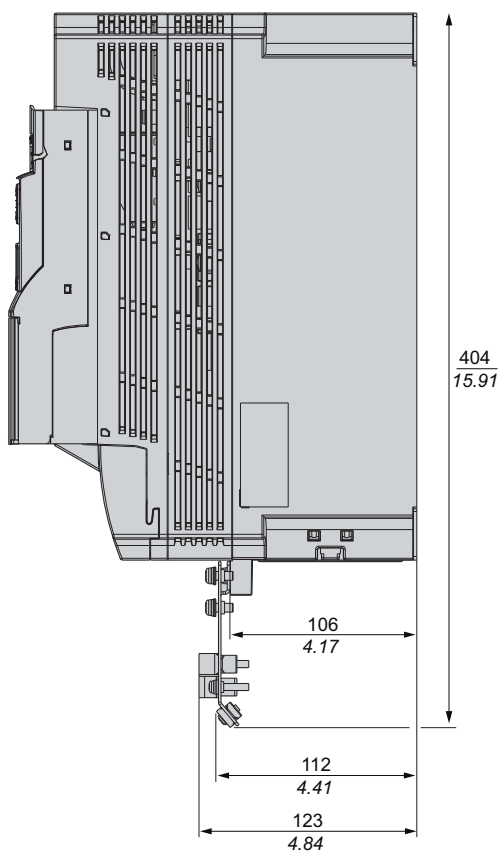
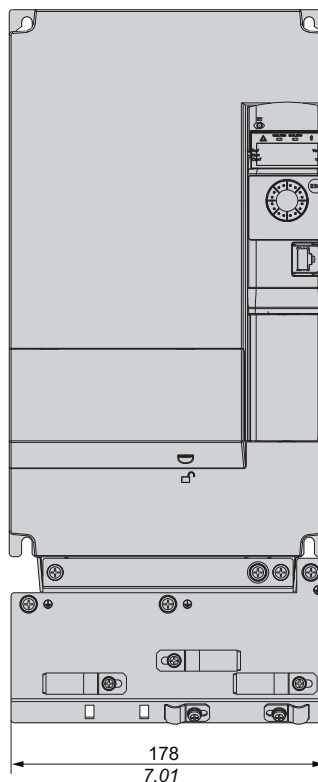
ATV32HD11N4, D15N4 - size D - dimensions and weight



Weight

6.750 kg (14.88 lb)

ATV32HD11N4, D15N4 - size D - with EMC plate - dimensions and weight



Weight

7.00 kg (15.40 lb)

Electrical data

Single phase supply voltage: 200...240 V 50/60 Hz

Motor		Line supply (input)					Drive (output)		Reference (5)	Size
Power indicated on plate (1)		Max. line current (2)		Apparent power	Max. inrush current (3)	Power dissipated at nominal current	Nominal current (1)	Max. transient current (1) (4)		
		at 200 V	at 240 V							
kW	HP	A	A	kVA	A	W	A	A		
0.18	1/4	3.4	2.8	0.7	9.6	25	1.5	2.3	ATV32H018M2	A
0.37	1/2	6	5	1.2	9.6	38	3.3	5.0	ATV32H037M2	A
0.55	3/4	7.9	6.7	1.6	9.6	42	3.7	5.6	ATV32H055M2	A
0.75	1	10.1	8.5	2.0	9.6	51	4.8	7.2	ATV32H075M2	A
1.1	1 ^{1/2}	13.6	11.5	2.8	19.1	64	6.9	10.4	ATV32HU11M2	B
1.5	2	17.6	14.8	3.6	19.1	81	8	12.0	ATV32HU15M2	B
2.2	3	23.9	20.1	4.8	19.1	102	11	16.5	ATV32HU22M2	B

Three phase supply voltage: 380...500 V 50/60 Hz

Motor		Line supply (input)					Drive (output)		Reference	Size
Power indicated on plate (1)	Max. line current (2)		Apparent power	Max. inrush current (3)	Power dissipated at nominal current	Nominal current (1)	Max. transient current (1) (4)			
	at 380 V	at 500 V								
kW	HP	A	A	kVA	A	W	A	A		
0.37	1/2	2.1	1.6	1.4	10	27	1.5	2.3	ATV32H037N4	A
0.55	3/4	2.8	2.2	1.9	10	31	1.9	2.9	ATV32H055N4	A
0.75	1	3.6	2.7	2.3	10	37	2.3	3.5	ATV32H075N4	A
1.1	1 ^{1/2}	5	3.8	3.3	10	50	3	4.5	ATV32HU11N4	A
1.5	2	6.5	4.9	4.2	10	63	4.1	6.2	ATV32HU15N4	A
2.2	3	8.7	6.6	5.7	10	78	5.5	8.3	ATV32HU22N4	B
3	–	11.1	8.4	7.3	10	100	7.1	10.7	ATV32HU30N4	B
4	5	13.7	10.5	9.1	10	125	9.5	14.3	ATV32HU40N4	B
5.5	7 ^{1/2}	20.7	14.5	17.9	27.6	233	14.3	21.5	ATV32HU55N4	C
7.5	10	26.5	18.7	22.9	27.6	263	17	25.5	ATV32HU75N4	C
11	15	36.6	25.6	31.7	36.7	403	27.7	41.6	ATV32HD11N4	D
15	20	47.3	33.3	41.0	36.7	480	33	49.5	ATV32HD15N4	D

(1) These power ratings are for a switching frequency of 4 kHz, in continuous operation. The switching frequency is adjustable from 2 to 16 kHz.

Above 4 kHz, the drive will reduce the switching frequency if an excessive temperature rise occurs. The temperature rise is detected by a probe in the power module. Nonetheless, derating should be applied to the nominal drive current if continuous operation above 4 kHz is required. See page 27.

(2) Current on a line supply with the "Input withstand rating", see page 50.

(3) Peak current on power-up, for the max. voltage (240 V + 10% or 500V + 10%).

(4) **Note:** The drive is designed to run up to 60 seconds at this level.

(5) See reference description on page 8.

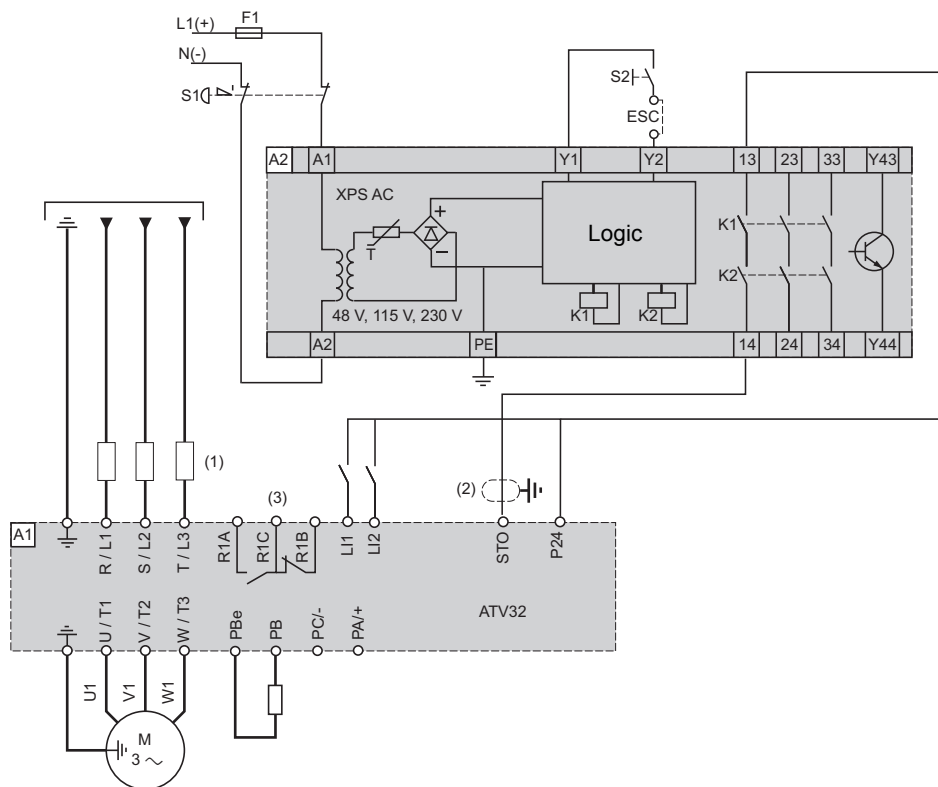
Diagram with Preventa safety module

Connection diagrams conforming to standards EN 954-1 category 3 and IEC/EN 61508 capacity SIL2, stopping category 0 in accordance with standard IEC/EN 60204-1.

The connection diagram below is suitable for use with machines with a short freewheel stop time (machines with low inertia or high resistive torque).

When the emergency stop is activated, the drive power supply is cut immediately and the motor stops in freewheel, according to category 0 of standard IEC/EN 60204-1.

A contact on the Preventa XPS AC module must be inserted in the brake control circuit to engage it safely when the STO (Safe Torque Off) safety function is activated.



- (1) Line choke (if used)
- (2) It is essential to connect the shielding to the ground.
- (3) Fault relay contacts, for remote signaling of drive status

The STO safety function integrated into the product can be used to implement an "EMERGENCY STOP" (IEC 60204-1) for category 0 stops.

With an additional, approved EMERGENCY STOP module, it is also possible to implement category 1 stops.

STO function

The STO safety function is triggered via 2 redundant inputs. The circuits of the two inputs must be separate so that there are always two channels. The switching process must be simultaneous for both inputs (offset < 1 s).

The power stage is disabled and an error message is generated. The motor can no longer generate torque and coasts down without braking. A restart is possible after resetting the error message with a "Fault Reset".

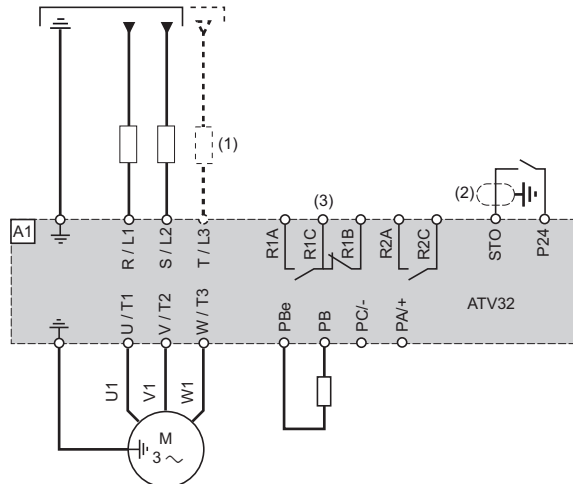
The power stage is disabled and an error message is generated if only one of the two inputs is switched off or if the time offset is too great. This error message can only be reset by switching off the product.

Diagram without Preventa safety module

Connection diagrams conforming to standards EN 954-1 category 2 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.

The connection diagram below is suitable for use with machines with a short freewheel stop time (machines with low inertia or high resistive torque).

When the emergency stop is activated, the drive power supply is cut immediately and the motor stops in freewheel, according to category 0 of standard IEC/EN 60204-1.



- (1) Line choke (if used)
- (2) It is essential to connect the shielding to the ground.
- (3) Fault relay contacts, for remote signaling of drive status

The STO safety function integrated into the product can be used to implement an "EMERGENCY STOP" (IEC 60204-1) for category 0 stops.

Installation

5

What's in this Chapter?

This chapter contains the following topics:

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Drive mounting

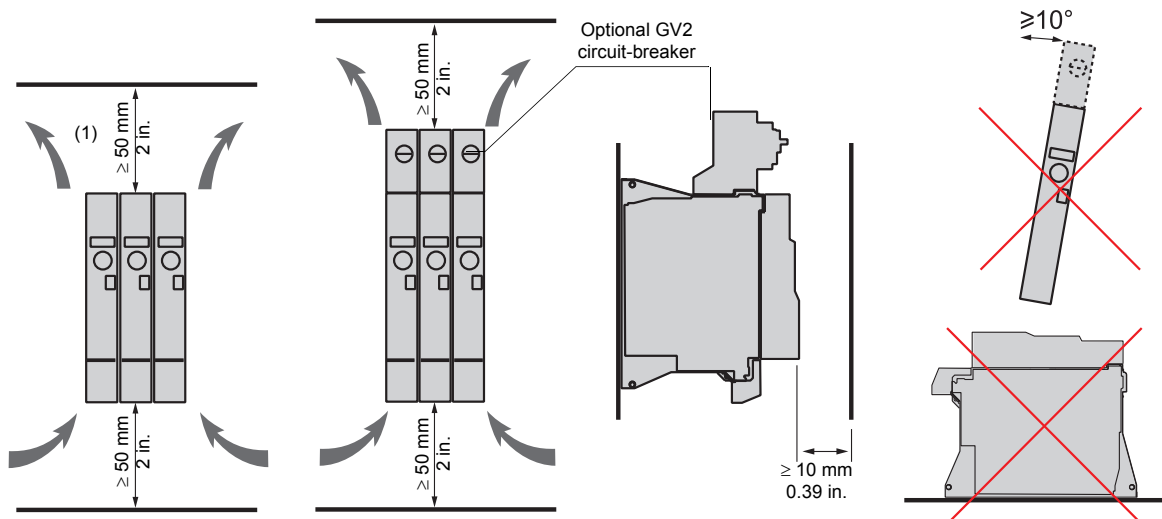
CAUTION

RISK OF DAMAGE TO THE DRIVE

Follow mounting recommendations described in this document.

Failure to follow these instructions can result in equipment damage.

Mounting and temperature conditions



(1) Minimum value corresponding to thermal constraint. On sizes A and B, a 150 mm (5.9 in.) clearance may help to connect the ground.

- Install the drive vertically, at $\pm 10^\circ$.
- Fix it on the mounting surface using M5 screws with captive washer.
- Do not place it close to heating elements.
- Leave sufficient free space so that the air required for cooling purposes can circulate from the bottom to the top of the drive.
- Free space in front of the drive: 10 mm (0.39 in.) minimum.
- The use of washers is recommended with all mounting screws.

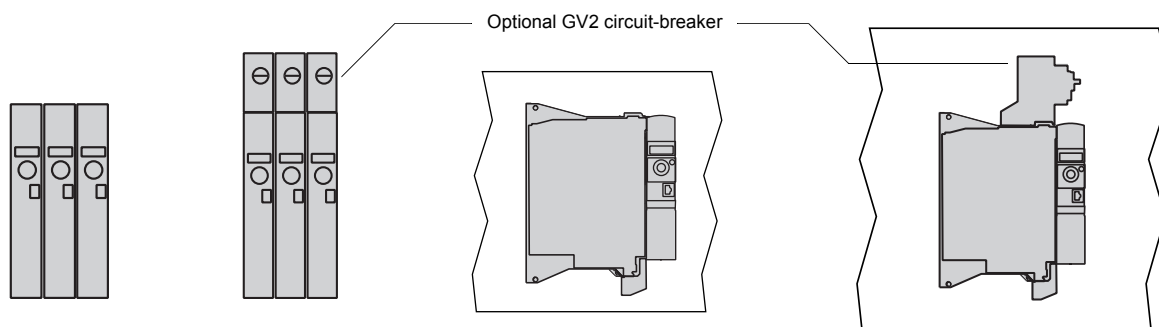
Mounting types

Drive operation is suitable at surrounding air temperature less or equal to 50°C (122°F), for a switching frequency of 4 kHz, for use in continuous operation.

Above this temperature, up to 60°C (140°F), or if operation above 4 kHz needs to be continuous, the nominal drive current should be derated according to the derating curves.

Above 4 kHz, the drive will reduce the switching frequency automatically in the event of an excessive temperature rise.

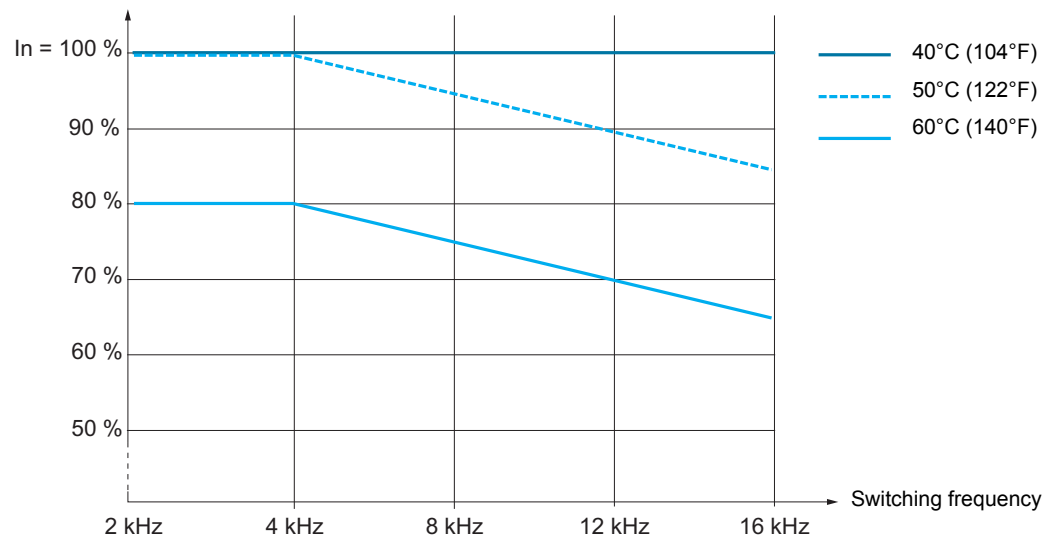
On optional GV2 circuit-breaker can be mounted on size A and B.



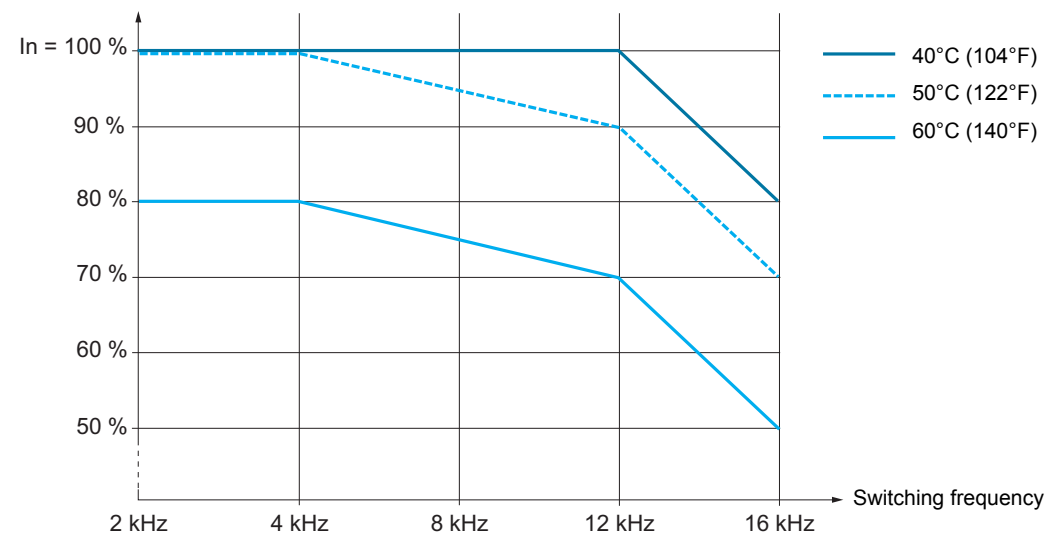
Derating curves

Derating curves for the nominal drive current (I_n) as a function of temperature and switching frequency.

ATV32H●●●M2

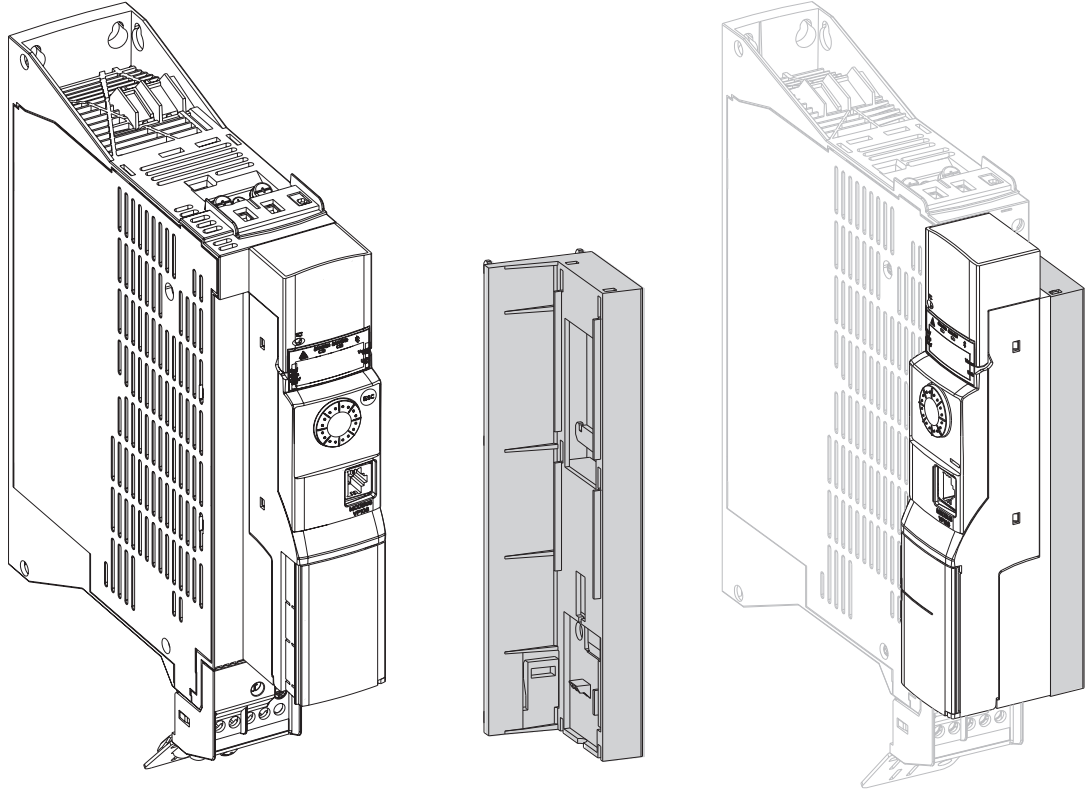


ATV32H●●●N4



Option: Control block 90° bracket (page 26)

This optional bracket allows the drive to be mounted in a shallow enclosure. For further information about this option, please refer to www.schneider-electric.com. This mounting type only applies to sizes A and B. The option is supplied with detailed mounting instruction sheet.



Wiring recommendations

DANGER

HAZARD OF FIRE OR ELECTRIC SHOCK

- To avoid overheating or loss of contact, connections must be carried out according to the cable sizes and tightening torques given in this document.
- The use of multi-wire cable without a lug is forbidden for the mains connection.
- On sizes A and B, the stripping length of the output power and braking resistor cables must be shorter than 10 mm (0.39 in.).
- Carry-out a pull out test to check that terminal screws are correctly tighten.

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

Power and circuit protection

The drive must be grounded to conform with the regulations concerning high leakage currents (over 3.5 mA).

Where local and national codes require upstream protection by means of a residual current device, use a type A device for single-phase drives and a type B device for three-phase drives as defined in the IEC Standard 60755.

Choose a suitable model integrating:

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

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

Keep the power cables separate from circuits in the installation with low-level signals (detectors, PLCs, measuring apparatus, video, telephone).

If you are using cables longer than 50 m (164 ft) between the drive and the motor, add output filters (for more details please refer to the catalog).

Control

Keep the control circuits away from the power cables. For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.), connecting the shielding to ground at each end.

Equipment Grounding

Ground the drive according to local and national code requirements. A minimum wire size of 10 mm² (6 AWG) may be required to meet standards limiting leakage current.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The drive panel must be properly grounded before power is applied.
- Use the provided ground connecting point as shown in the figure.

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

⚠ WARNING

INADEQUATE OVERCURRENT PROTECTION

- Overcurrent protective devices must be properly coordinated.
- The Canadian Electrical Code and the National Electrical Code require branch circuit protection. Use the fuses recommended in this manual.
- Do not connect the drive to a power feeder whose short-circuit capacity exceeds the maximum prospective line Isc listed in this manual.

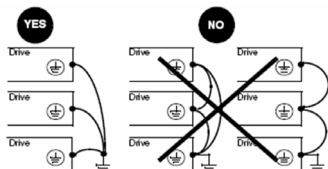
Failure to follow these instructions can result in death, serious injury, or equipment damage.

CAUTION

RISK OF DAMAGE TO THE DRIVE

- The drive will be damaged if input line voltage is applied to the output terminals (U/T1,V/T2,W/T3).
- Check the power connections before energizing the drive.
- If replacing the existing drive by another drive, verify that all wiring connections to the drive comply with wiring instructions in this manual

Failure to follow these instructions can result in equipment damage.



- Ensure that the resistance of the ground is one ohm or less.
- When grounding several drives, you must connect each one directly, as shown in the figure to the left.
- Do not loop the ground cables or connect them in series.

Input installation

Access to the power supply terminals - Sizes A and B

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

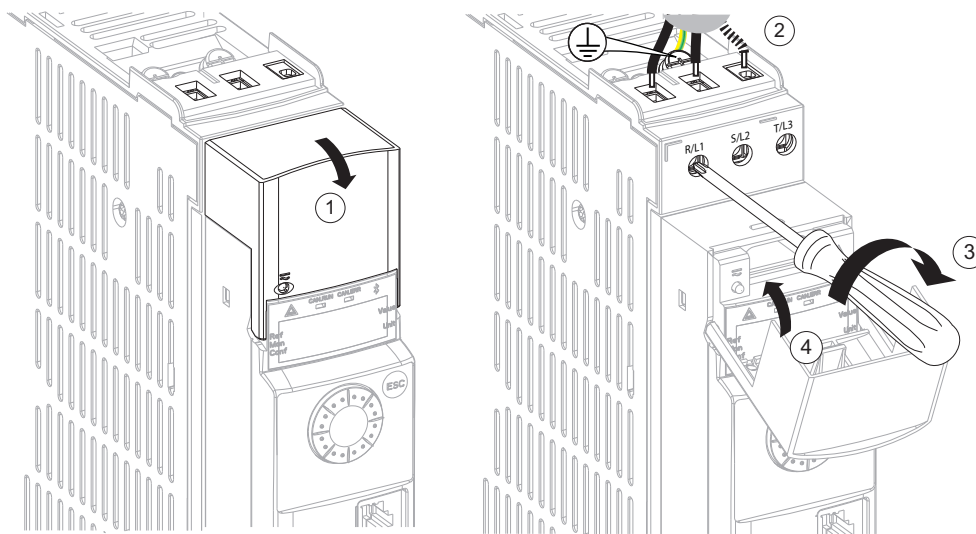
- Replace all the wiring traps before applying power.

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

Power supply terminals are located on the top of the drive.

Motor and braking resistor terminals are located on the bottom of the drive. Arrangement and characteristics of the power terminals are given on page [36](#).

To access input terminals, ① manually pull and tip up the wiring trap. ② Insert the wires into the terminals and connect the ground wire to the ground screw. ③ Tighten the terminal screws. ④ Replace the wiring trap. Output and brake terminals are accessible directly on the plug-in connector. See detailed connector mounting and cable arrangement on page [34](#).

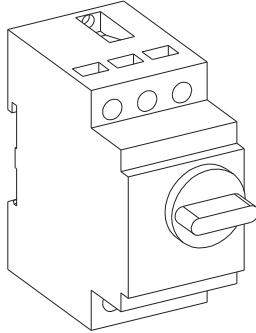


Option: protection device, GV2 circuit-breaker

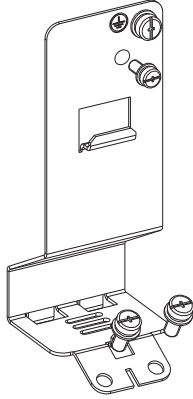
The ATV32 size A and B are prepared to be equipped with an optional GV2 circuit-breaker. For further information about the optional GV2 circuit-breaker, bracket and adaptor plate, please refer to www.schneider-electric.com. The options are supplied with detailed mounting instruction sheet.

Note: The product overall dimension, including GV2 adapter and EMC plate mounted, becomes 424 mm (16.7 in.)

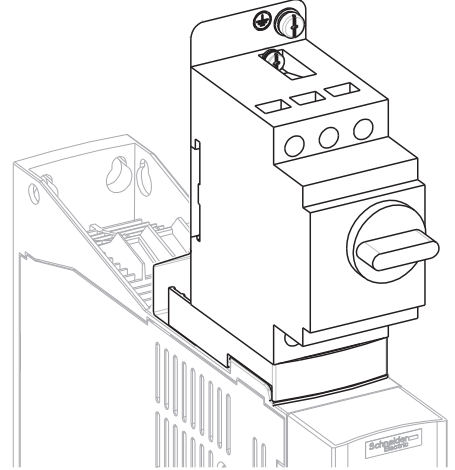
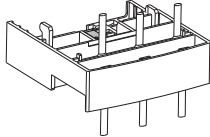
**GV2
circuit-breaker**



**Bracket
for GV2/ATV 32
direct mounting**

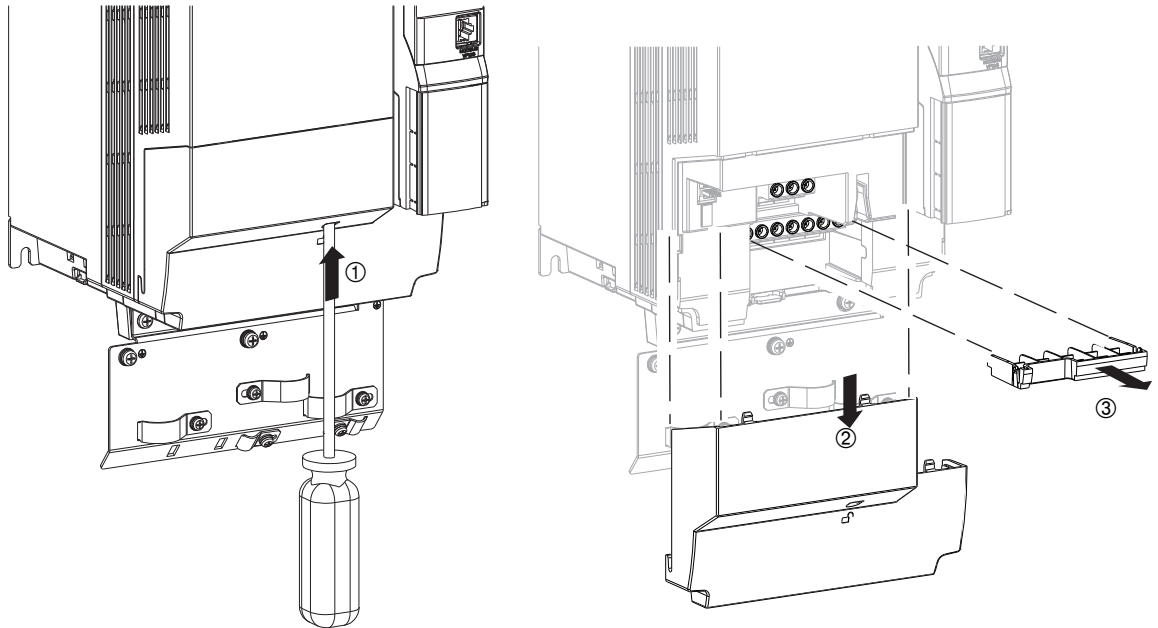


Adaptor plate



Access to the power terminals - Sizes C and D

Power supply terminals, Motor terminals and Braking resistor terminals are located on the bottom of the drive. To access the terminals, ① remove the wiring trap by pushing the locking tab using a screwdriver as shown below. Then remove the terminal cover ②.



Access to the braking resistor terminals - All sizes

Access to the braking resistor terminals is protected by breakable plastic parts. Use a screwdriver to remove these protective parts.

Output installation

Plug-in output connector and EMC plate assembly fitting

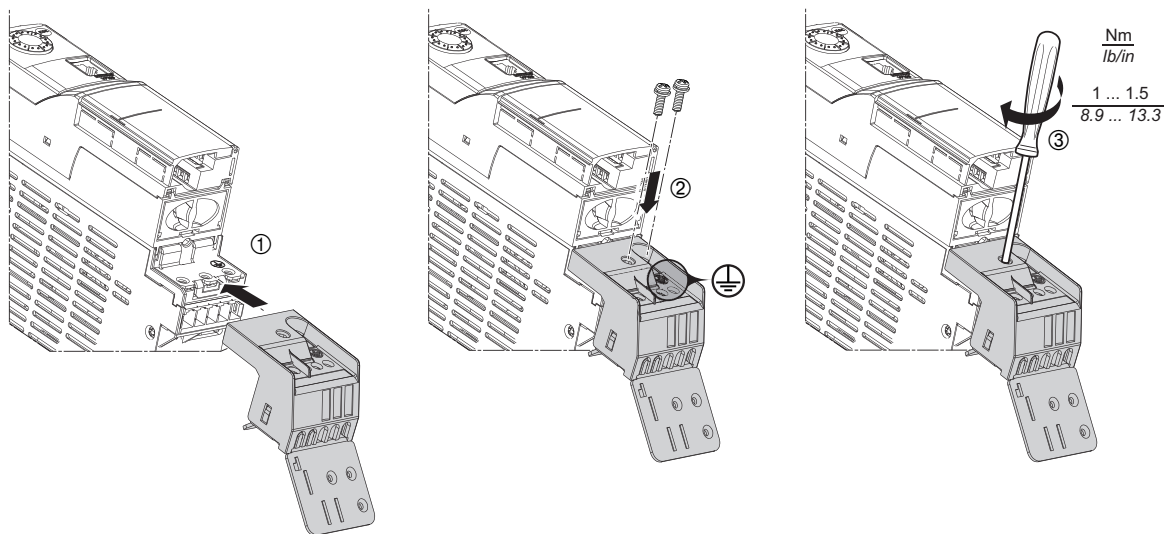
On size A and B drives

The EMC plate and the plug-in output power and braking unit terminal are fitted inseparably together.

Input terminals are located on the top of the drive, see page [31](#). Arrangement and characteristics of the power terminals are given on page [36](#).

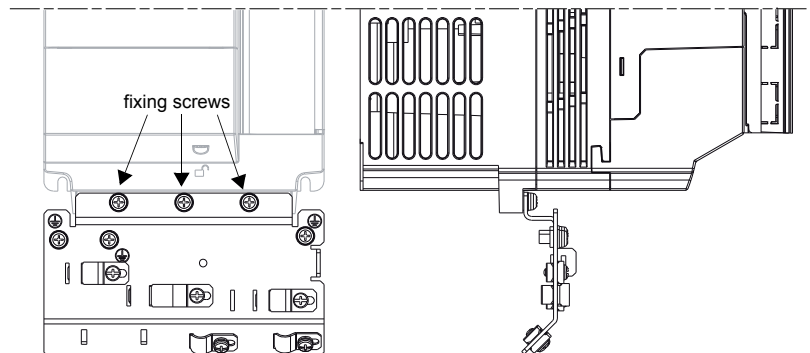
- ① Plug the output power terminal.
- ② Insert the fixing and the grounding screws (print: plus minus HS type 2).
- ③ Tighten to 1 to 1.5 N.m (8.9 to 13.3 lb.in). Cabling can be carried out with the connector mounted on the drive or not.

Cabling will be easier if carried out in this order: brake (1), motor and ground (2). Lastly mount the bridge intended to receive the control wires (3). See detailed cable arrangement in page [37](#).



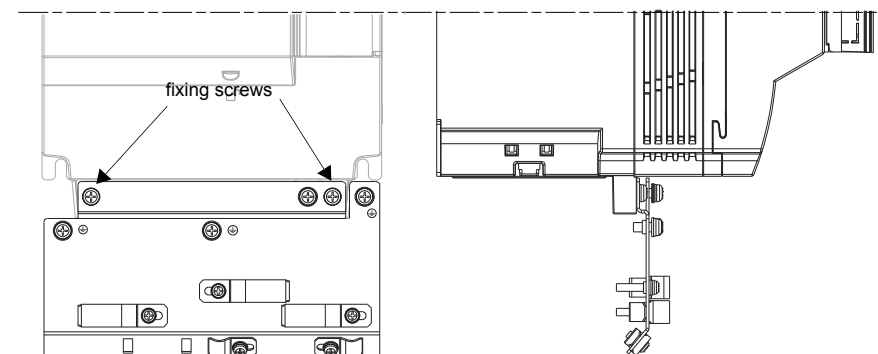
On size C drives

The EMC plate supplied in the package is fitted at the bottom of the drive, using 3 x M5 HS type 2 screws.




On size D drives

The EMC plate supplied in the package is fitted at the bottom of the drive, using 2 x M5 HS type 2 screws.

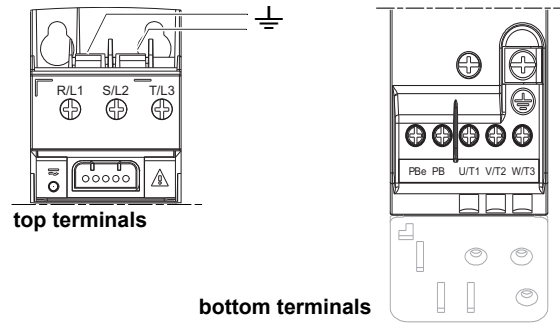


Functions of the power terminals

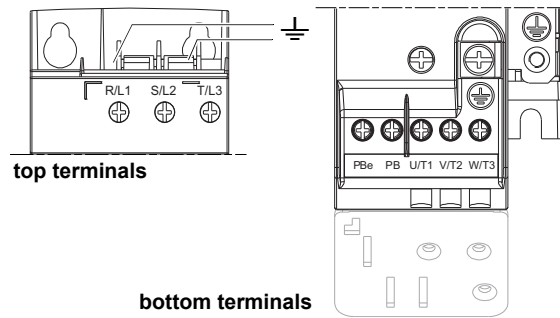
Terminal	Function	For Altivar 32
	Ground terminal	All ratings
R/L1 - S/L2/N	Power supply	ATV32●●●●M2
R/L1 - S/L2 - T/L3		ATV32●●●●N4
PB	Output to braking resistor (1)	All ratings
PBe	Output to braking resistor (+ polarity) (1)	All ratings
PA/+	DC bus + polarity	Size C and D
PC/-	DC bus - polarity	Size C and D
U/T1 - V/T2 - W/T3	Outputs to the motor	All ratings

(1) For further information about the braking resistor option, please refer to www.schneider-electric.com.

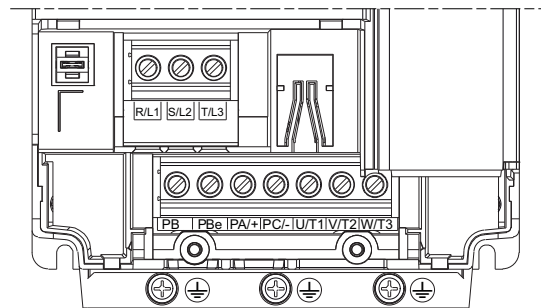
Arrangement and characteristics of the power terminals



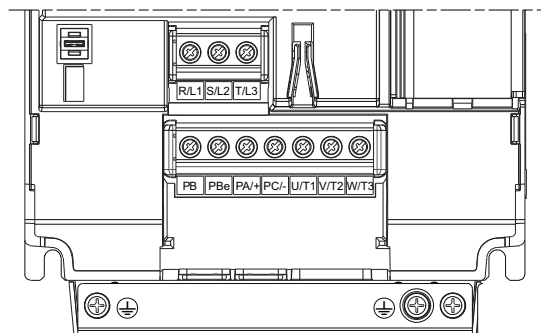
size A	Input power			Output power and braking resistor		
	Wires size		Tightening torque	Wires size		Tightening torque
	Min.	Max.	Rated	Min.	Max.	Min. to Max.
	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)
ATV32H0●●M2, 0●●N4, U1●N4	1.5 (14)	4 (10)	0.6 (5.3)	1.5 (14)	2.5 (12)	0.7 to 0.8 (6.2 to 7.1)



Size B	Input power			Output power and braking resistor		
	Wires size		Tightening torque	Wires size		Tightening torque
	Min.	Max.	Rated	Min.	Max.	Min. to Max.
	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)
ATV32HU22N4, U30N4	1.5 (14)	4 (10)	0.6 (5.3)	1.5 (14)	2.5 (12)	0.7 to 0.8 (6.2 to 7.1)
U11M2, U40N4	2.5 (12)	4 (10)	0.6 (5.3)	1.5 (14)	2.5 (12)	0.7 to 0.8 (6.2 to 7.1)
U15M2	2.5 (10)	4 (10)	0.6 (5.3)	1.5 (14)	2.5 (12)	0.7 to 0.8 (6.2 to 7.1)
U22M2	4 (10)	4 (10)	0.6 (5.3)	1.5 (14)	2.5 (12)	0.7 to 0.8 (6.2 to 7.1)

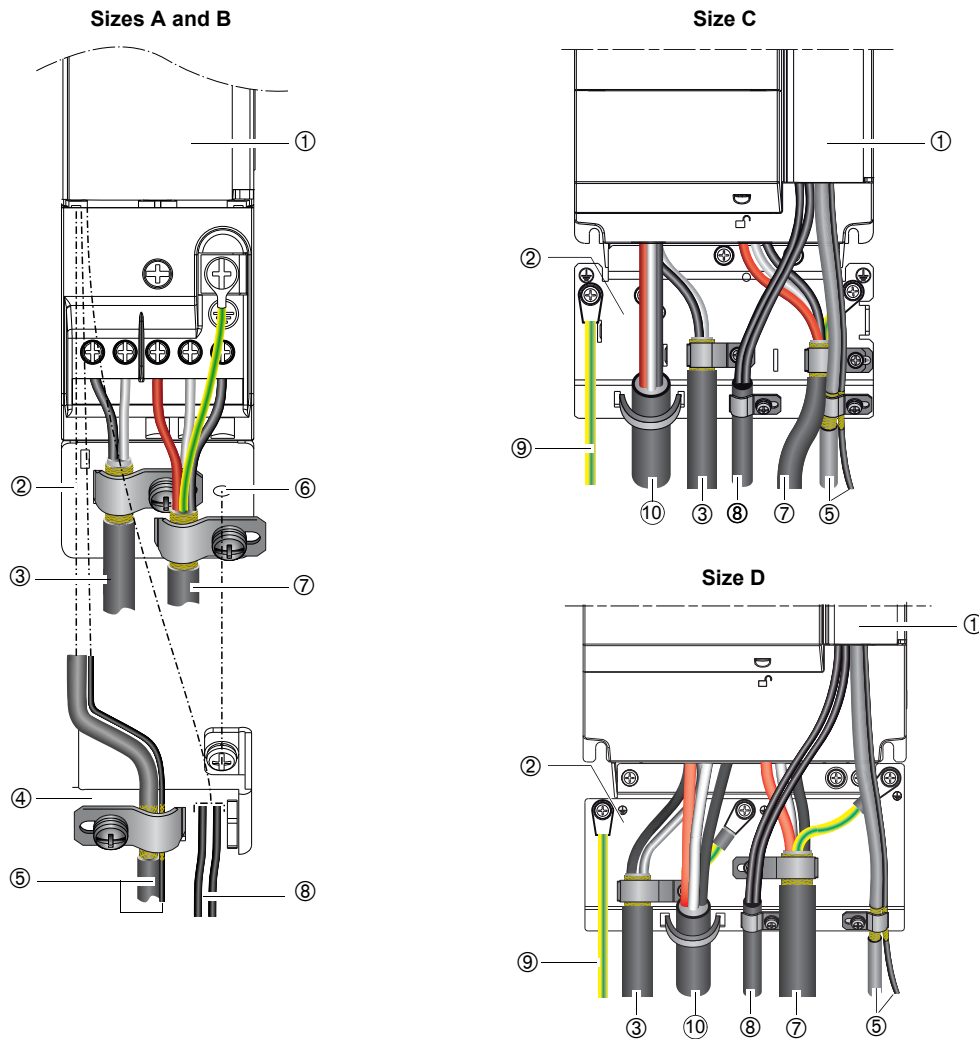


size C	Input power			Output power and braking resistor		
	Wires size		Tightening torque	Wires size		Tightening torque
	Min.	Max.	Min. to Max.	Min.	Max.	Min. to Max.
	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)
ATV32HU55N4	4 (10)	16 (6)	1.2 to 1.5 (10.6 to 13.3)	2.5 (12)	16 (6)	1.2 to 1.5 (10.6 to 13.3)
U75N4	6 (8)	16 (6)	1.2 to 1.5 (10.6 to 13.3)	2.5 (10)	16 (6)	1.2 to 1.5 (10.6 to 13.3)



size D	Input power			Output power and braking resistor		
	Wires size		Tightening torque	Wires size		Tightening torque
	Min.	Max.	Min. to Max.	Min.	Max.	Min. to Max.
	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)
ATV32HD11N4	10 (8)	16 (6)	1.2 to 1.5 (10.6 to 13.3)	6 (8)	16 (6)	1.2 to 1.5 (10.6 to 13.3)
D15N4	16 (6)	16 (6)	1.2 to 1.5 (10.6 to 13.3)	6 (8)	16 (6)	1.2 to 1.5 (10.6 to 13.3)

EMC plates cable arrangement




- ① Altivar 32.
- ② Sheet steel grounded EMC plate.
- ③ Shielded cable for braking resistor connection (if used). The shielding must be continuous and intermediate terminals must be in EMC plate.
- ④ Control EMC plate.
- ⑤ Shielded cable for control-signal section and STO safety function input connection.
- ⑥ Holes for installing the control EMC plate.
- ⑦ Shielded cable for motor connection, with shielding connected to ground at both ends. The shielding must be continuous and intermediate terminals must be in EMC plate.
- ⑧ Non-shielded wires for relay contact output.
- ⑨ Protective ground connection.
- ⑩ Non-shielded cable or wires for drive power supply.

Electromagnetic compatibility (EMC)

NOTE: The high frequency equipotential ground connection between the drive, motor, and cable shielding does not eliminate the need to connect the ground (PE) conductors (green-yellow) to the appropriate terminals on each unit.

Principle and precautions

- Grounds between the drive, motor, and cable shielding must have high frequency equipotentiality.
- When using shielded cable for the motor, use a 4-conductor cable so that one wire will be the ground connection between the motor and the drive. Size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both cable ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for Dynamic Brake (DB) resistors, use a 3-conductor cable so that one wire will be the ground connection between the DB resistor assembly and the drive. The size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both cable ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for control signals, if the cable is connecting equipment that is close together and the grounds are bonded together, then both ends of the shield can be grounded. If the cable is connected to equipment that may have a different ground potential, then ground the shield at one end only to help prevent large currents from flowing in the shield. The shield on the ungrounded end may be tied to ground with a capacitor (for example: 10 nF, 100 V or higher) in order to provide a path for the higher frequency noise. Keep the control circuits away from the power circuits. For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.) Keep the control circuits away from the power circuits.
- Ensure maximum separation between the power supply cable (line supply) and the motor cable.
- The motor cables must be at least 0.5 m (20 in.) long.
- Do not use surge arresters or power factor correction capacitors on the variable speed drive output.
- If using an additional input filter, it should be mounted as closed as possible to the drive and connected directly to the line supply via an unshielded cable. Link on the drive is via the filter output cable.
- For installation of the EMC plate and instructions for meeting IEC 61800-3 standard, refer to the section entitled "Installing the EMC plates".


⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Do not expose cable shielding except where connected to ground at the metal cable glands and underneath the grounding clamps.
- Ensure that there is no risk of the shielding coming into contact with live components.

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

Mains impedance

CAUTION

RISK OF LIFE DURATION AND EMC PERFORMANCES DECREASE

- Do not connect the drive to a low impedance network.
- The input withstand current must not exceed the value in the table page [50](#).
- Installation and supply greater than this value will require an additionnal inductance.

Failure to follow these instructions can result in equipment damage.

Operation on an IT system

IT system: Isolated or impedance grounded neutral. Use a permanent insulation monitor compatible with non-linear loads, such as a XM200 type or equivalent.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

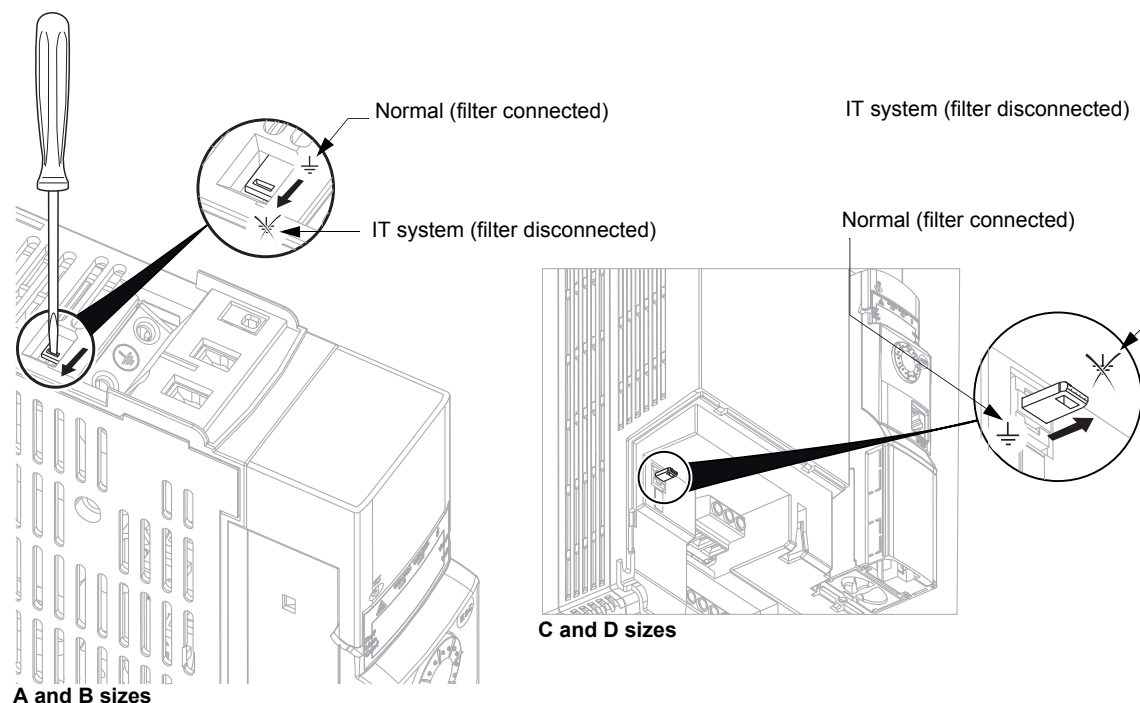
Read and understand the precautions in "before you begin" chapter, before performing the procedure in this section.

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

ATV32 drives have 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 opening the IT jumper as shown below. In this configuration EMC compliance is not guaranteed.

On sizes A and B the IT jumper is located on top of the product, behind the GV2 circuit-breaker adaptor mounting screws.

On sizes C and D it is located on front side, behind the power terminals protective cover, on the left hand side of the power input terminals.



DC bus connection

Uses overview

Drive fed by the AC mains with common DC link

This use is suitable in case of equivalent drive ratings (or not more than 1 rating difference). Each product is fed by the standard main inputs and all products are linked by their DC Bus connection.

The goal of this DC Bus sharing function is to save energy. When a drive is braking, the energy can be reused by another drive on the DC Bus network instead of being dissipated (and so wasted) in a braking resistor.

Moreover, this kind of cabling enables to reduce the braking resistor value and help improving braking performance without braking resistor.

Drive only fed by the DC link

This use is suitable when combining different drive ratings (more than one rating different).

One product is fed by the main network and feeds other products via the DC Bus cable connection.

This kind of installation has the same energy benefit than the previous one but requires at least one higher rating product, able to supply the other ones.

Drive fed by a DC power supply

All products are fed by an external DC power supply via the DC Bus cable connection.

This kind of installation requires to achieve the following requirements:

- This source must be protected against phase to phase short-circuit and earth short-circuit.
- The source must be able to give the sum of all DC drive current used in same time.
- This DC source must integrate DC choke to limit the ripple current less than 5%.

Drive preparation

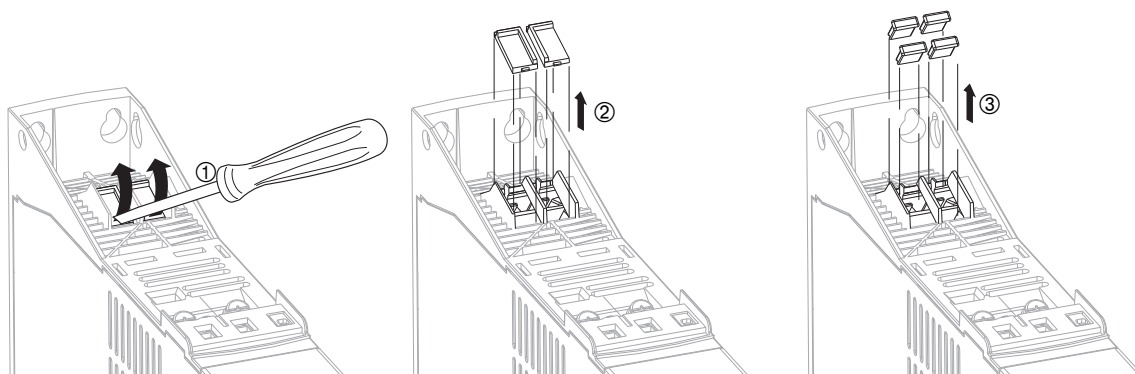
⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK OR ARC FLASH

- Only use dedicated cable references from the catalog.
- As cable is the same for both voltage ranges, ensure voltage range before cabling.
- Use a screwdriver to remove the DC connector protective covers, instead of precision knife or scissors.
- If the DC bus cable is removed, replace the DC bus protective plastic caps provided with the drive.

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

DC bus connectors are located on top of the drive on size A and B. Break the protective covers, using a screwdriver. These covers can easily be removed using a screwdriver ① ②. Remove the plastic protective caps from the terminals ③. When not connected, the DC bus terminals should be covered using the plastic caps. Once this is done the drive becomes IP20 again. If lost, the plastic caps are also available as spare parts.



Connection examples



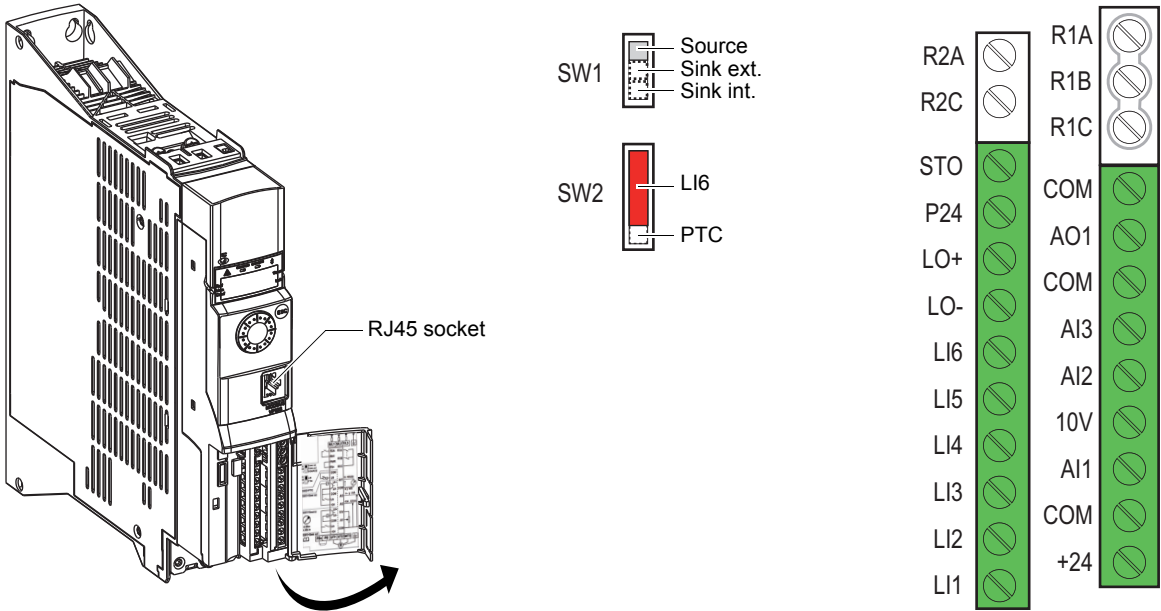
Technical information

For further technical information on DC bus connection, please refer to www.schneider-electric.com.

Control part installation

Access to the control terminals

Access to the terminals is the same on all products. Just open the cover as shown in the example below. All screws are M3 slotted type, 3.8 mm (0.15 in.) diameter.



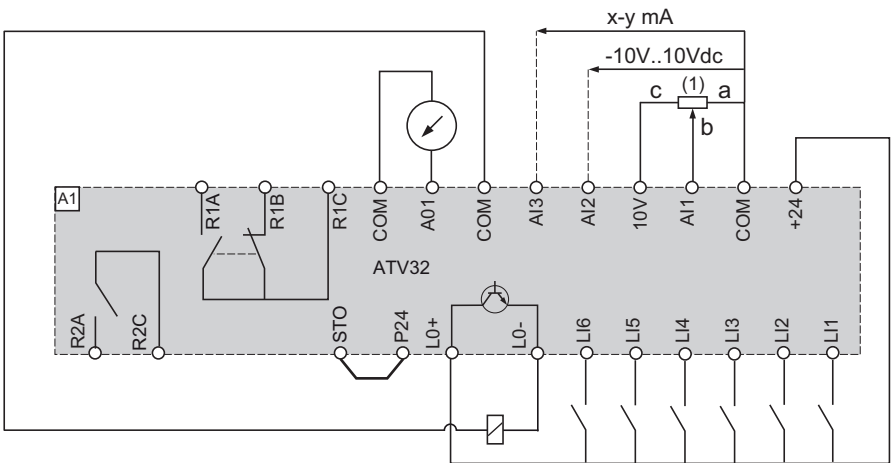
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in "before you begin" chapter, before performing the procedure in this section.

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

Control connection diagram in source mode



(1) Reference potentiometer SZ1RV1202 (2.2 kΩ) or similar (10 kΩ maximum)

Arrangement of the control terminals

ATV32H control terminals	Wire size		Tightening torque
	Minimum (1)	Maximum	
	mm ² (AWG)	mm ² (AWG)	N·m (lb.in)
R1A, R1B, R1C, R2A, R2C	0.75 (18)	1.5 (16)	0.5 (4.4)
All other terminals	0.5 (20)	1.5 (16)	0.5 (4.4)

(1) The value in bold corresponds to the minimum wire gauge to permit secureness.

Characteristics and functions of the control terminals

Terminal	Function	Type	Electrical characteristics
R1A	NO contact of the relay	I/O	<ul style="list-style-type: none"> • Min. switching capacity: 5 mA for 24 V --- • Max. switching capacity on resistive load: ($\cos \varphi = 1$) 3 A for 250 V \sim and 4 A for 30 V --- • Max. switching capacity on inductive load: ($\cos \varphi = 0.4$ and $L/R = 7$ ms): 2 A for 250 V \sim and 30 V --- • Refresh time: 2 ms • Service life: 100,000 operations at max. switching power
R1B	NC contact of the relay	I/O	
R1C	Common point contact of programmable relay R1	I/O	
COM	Analog I/O common	I/O	0 V
AO1	Voltage or current analog output (collector)	O	Analog output 0 to 10 V, min. load impedance 470 Ω or Analog output 0 to 20 mA, max. load impedance 800 Ω <ul style="list-style-type: none"> • Resolution 10 bits • Precision $\pm 1\%$ in 50/60Hz for 25°C $\pm 10^\circ\text{C}$, $\pm 2\%$ in 50/60Hz for -10 to +60°C • Linearity $\pm 0.3\%$ • Sampling time 2 ms
COM	Analog I/O common	I/O	0 V
AI3	Analog input current	I	Analog input 0-20 mA (or 4-20 mA, X-20 mA, 20-Y mA). X and Y can be programmed from 0 to 20 mA <ul style="list-style-type: none"> • Impedance 250 Ω • Resolution: 10 bits • Precision $\pm 0.5\%$ in 50/60 Hz for 25 °C, $\pm 0.2\%$ in 50/60 Hz for -10 to +60 °C at $\Delta\theta = 60^\circ\text{C}$, • Linearity $\pm 0.2\%$ (max. $\pm 0.5\%$), of max. value • Sampling time 2 ms
AI2	Analog input voltage	I	Bipolar analog input 0 \pm 10 V (maximum voltage ± 30 V) The + or - polarity of the voltage on AI2 affects the direction of the setpoint and therefore the direction of operation. <ul style="list-style-type: none"> • Impedance 30 kΩ • Resolution: 10 bits • Precision $\pm 0.5\%$ in 50/60 Hz for 25 °C, $\pm 0.2\%$ in 50/60 Hz for -10 to +60 °C at $\Delta\theta = 60^\circ\text{C}$, • Linearity $\pm 0.2\%$ (max. $\pm 0.5\%$), of max. value • Sampling time 2 ms
10 V	Power supply for reference potentiometer	O	+10 Vdc <ul style="list-style-type: none"> • Tolerance: 0..+10% • Current: 10 mA max
AI1	Analog input voltage	I	Analog input: 0 + 10 V <ul style="list-style-type: none"> • Impedance: 30 kΩ • Resolution: 10 bits converter • Precision: $\pm 0.5\%$ in 50/60 Hz for 25 °C, $\pm 0.2\%$ in 50/60 Hz for -10 to +60 °C at $\Delta\theta = 60^\circ\text{C}$, • Linearity $\pm 0.2\%$ (max. $\pm 0.5\%$), of max. value • Sampling time: 2 ms
COM	Analog I/O common	I/O	0 V

Terminal	Function	Type	Electrical characteristics
+24	Logic input power supply	O	+24 Vdc • Tolerance: -15..+20% • Current: 100 mA
R2A R2C	NO contact of programmable relay R2	I/O	• Min. switching capacity: 5 mA for 24 V $\overline{\text{---}}$ • Max. switching capacity on resistive load: ($\cos \varphi = 1$) 5 A for 250 V \sim and 30 V $\overline{\text{---}}$ • Max. switching capacity on inductive load: ($\cos \varphi = 0.4$ and $L/R = 7$ ms): 2 A for 250 V \sim and 30 V $\overline{\text{---}}$ • Refresh time: 2 ms • Service life: - 100,000 operations at max. switching power - 1,000,000 operations with 500mA current to inductive load 58 Vac or 30 Vdc
STO	STO (Safe Torque Off) safety function input	I	24 Vdc • Impedance 1.5 k Ω
P24	External power supply for control circuit / Internal power supply for STO	I/O	+24 Vdc • Tolerance: -15..+20% • Current: 1.1 A max.
LO+ LO-	Logic output	O	Open collector output configurable as sink or source using SW1 switch • Refresh time: 2 ms • Maximum current: 100 mA • Maximum voltage: 30 V
LI6 LI5	Logic inputs	I	If programmed as logic inputs, same characteristics as LI1 to LI4. • LI5 can be programmed as pulse input 20 kpps (pulse per second). • LI6 can be used as PTC using SW2 switch. • Trip threshold 3 k Ω , reset threshold 1.8 k Ω • Short-circuit detection threshold < 50 Ω
LI4 LI3 LI2 LI1	Logic inputs	I	4 programmable logic inputs configurable as sink or source using SW1 switch • + 24 V power supply (max. 30 V) • State 0 if < 5 V, state 1 if > 11 V (in source mode) • State 0 if > 19 V, state 1 if < 13 V (in sink mode) • Response time 8 ms at Stop

RJ45 Communication port

It is used to connect:

- a PC using SoMove software,
- a graphic or remote keypad,
- Modbus or CANopen network,
- Configuration loader tools...

Note: Check that RJ45 cable is not damaged prior to connect it to the product otherwise the power supply of the control could be lost.

Sink / source switch configuration (SW1)

⚠ ⚠ DANGER**UNINTENDED EQUIPMENT OPERATION**

- When switch SW1 is set to "Sink Int" or "Sink Ext", the COM terminal must never be connected to ground or to protective ground. There is a risk of unintended equipment operation on the first insulation fault.
- Prevent accidental grounding of logic inputs configured for sink logic. Accidental grounding can result in unintended activation of drive functions.
- Protect the signal conductors against damage that could result in unintentional conductor grounding.
- Follow NFPA 79 and EN 60204 guidelines for proper control circuit grounding practices

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

⚠ CAUTION**RISK OF BODY INJURY**

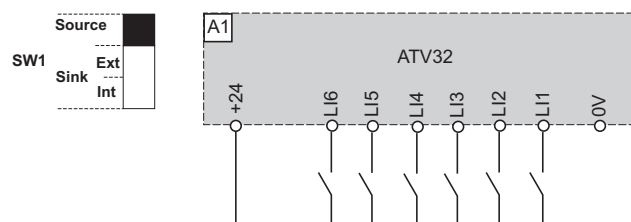
Use a screwdriver to change the position of the switch.

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

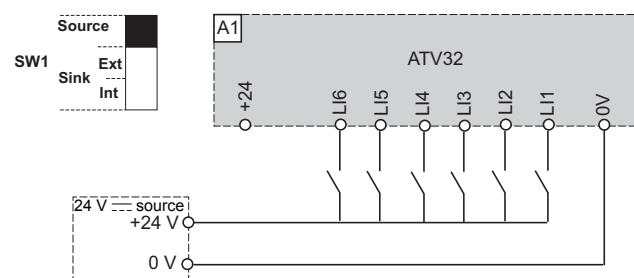
The logic input switch (SW1) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs. To access to SW1, open the control terminals door. The SW1 is located on the left side of the control terminals, see page [42](#).

- Set the switch to Source (factory setting) if using PLC outputs with PNP transistors.
- Set the switch to Sink Int or Sink Ext if using PLC outputs with NPN transistors.

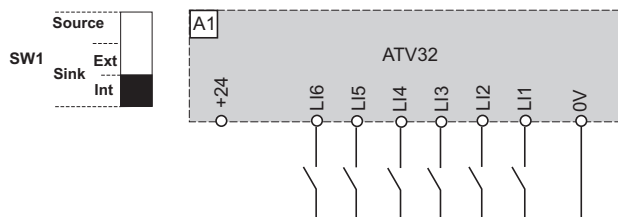
Switch SW1 set to "Source" position



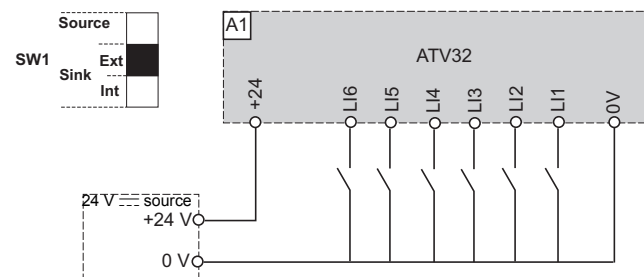
Switch SW1 set to "Source" position and use of an external power supply for the LIs



Switch SW1 set to "Sink Int" position



Switch SW1 set to "Sink Ext" position



Communication module

CAUTION

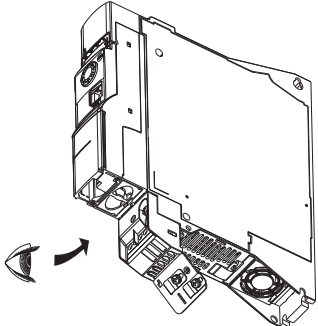
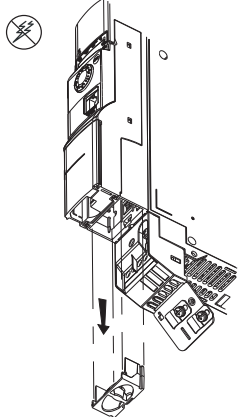
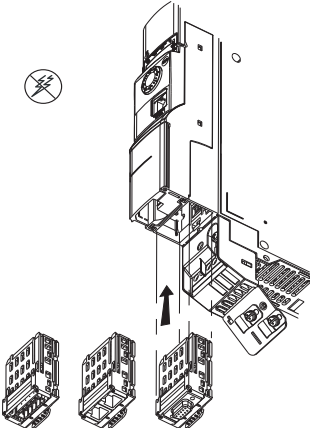
RISK OF DAMAGE TO THE DRIVE

- Install only communication modules designed for the drive. See references in the catalog.
- Do not insert any other thing than communication module inside the drive.


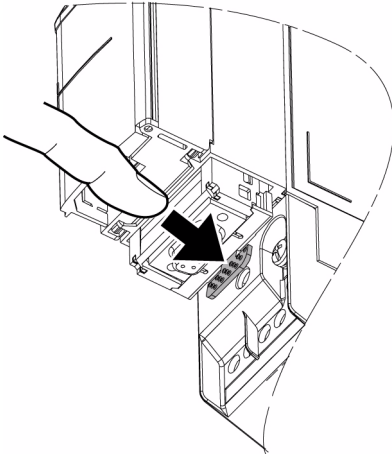

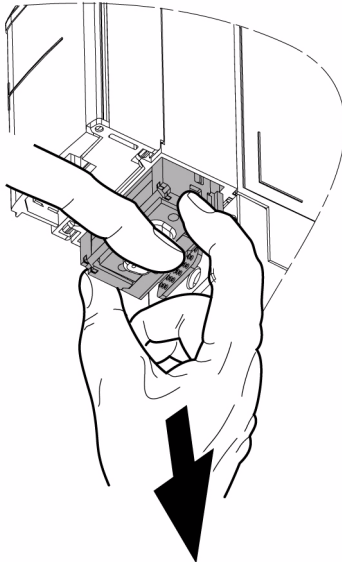
Failure to follow these instructions can result in equipment damage.

The ATV32 drive is designed to be fitted with optional communication modules. These modules slide directly into the control block as shown below. For further information related to the communication modules, please refer to the option module communication guides.

Install the communication module in ATV32 as follows:

Step	Action	Comment
1	Find out the position of the module on the ATV32	
2	Extract the cover	
3	Insert the option module	
4	Check that the module is inserted and locked mechanically in the drive.	

Extract the communication module as follows:

Step	Action	Comment
1	Ensure that the power is off. Press the strip.	 
2	Extract the module while maintaining the strip pressed.	 

Maintenance

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in "before you begin" chapter, before performing the procedure in this section.

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

Limitation of Warranty

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

Servicing

CAUTION

RISK OF DAMAGE TO THE DRIVE

Adapt the following recommendations according to the environment conditions: temperature, chemical, dust, vibration.

Failure to follow these instructions can result in equipment damage.

It is recommended to do the following in order to optimize continuity of operation.

Environment	Part concerned	Action	Periodicity
Knock on the product	Housing - control block (led - display)	Check the drive visual aspect	At least each year
Corrosion	Terminals - connector - screws - EMC plate	Inspect and clean if required	
Dust	Terminals - fans - blowholes		
Temperature	Around the product	Check and correct if required	
Cooling	Fan	Check the fan operation	At least each year
		Replace the fan (page 49)	after 3 to 5 years, depending on the operating conditions
Vibration	Terminal connections	Check tightening at recom- mended torque	At least each year

Note: The fan operation depends of the drive thermal state. The drive may be running and the fan not.

Spares and repairs

Serviceable product. Please refer to your Customer Care Centre.

Long time storage

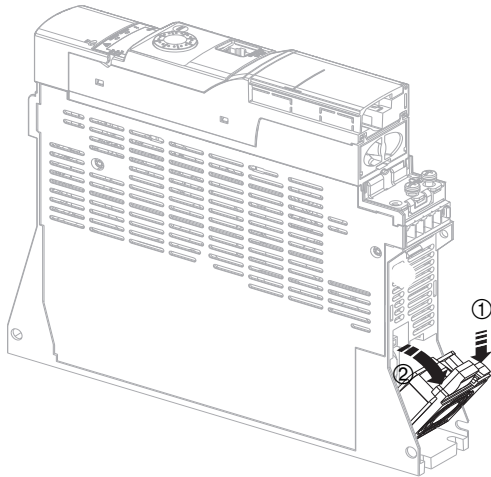
The product capacitor performances after a long time storage above 2 years can be degraded. See page 11.

Fan replacement

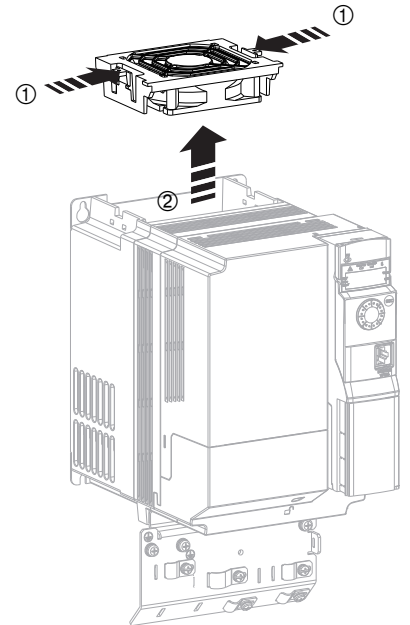
It is possible to order a new fan for the ATV32 maintenance, see the commercial references on www.schneider-electric.com.

① Push the locking tab. ② Disconnect the plug-in connector and remove the fan.

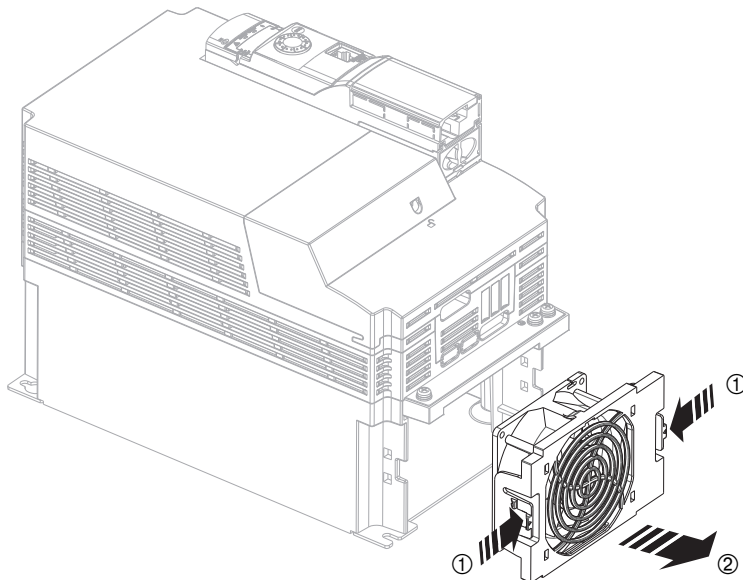
On sizes A and B



On size C



On size D



Short-circuit rating and branch circuit protection

Recommended fuse ratings for UL and CSA requirements

Reference	Voltage (Y)	Input withstand rating (1)	Output interrupt rating (X)(2)	Branch Circuit protection (Z1)	Rating (Z2)
	V	kA	kA		A
ATV32H018M2	200-240	1	5	Fast Acting Class CC Ferraz ATDR	7
ATV32H037M2	200-240	1	5	Fast Acting Class J Ferraz HSJ	15
ATV32H055M2	200-240	1	5	Fast Acting Class J Ferraz HSJ	25
ATV32H075M2	200-240	1	5	Fast Acting Class J Ferraz HSJ	25
ATV32HU11M2	200-240	1	5	Fast Acting Class J Ferraz HSJ	25
ATV32HU15M2	200-240	1	5	Fast Acting Class J Ferraz HSJ	40
ATV32HU22M2	200-240	1	5	Fast Acting Class J Ferraz HSJ	45
ATV32H037N4	380-500	5	5	Fast Acting Class CC Ferraz ATDR	6
ATV32H055N4	380-500	5	5	Fast Acting Class CC Ferraz ATDR	6
ATV32H075N4	380-500	5	5	Fast Acting Class CC Ferraz ATDR	6
ATV32HU11N4	380-500	5	5	Fast Acting Class CC Ferraz ATDR	12
ATV32HU15N4	380-500	5	5	Fast Acting Class CC Ferraz ATDR	12
ATV32HU22N4	380-500	5	5	Fast Acting Class J Ferraz HSJ	15
ATV32HU30N4	380-500	5	5	Fast Acting Class J Ferraz HSJ	17.5
ATV32HU40N4	380-500	5	5	Fast Acting Class J Ferraz HSJ	25
ATV32HU55N4	380-500	22	22	Fast Acting Class J Ferraz HSJ	40
ATV32HU75N4	380-500	22	22	Fast Acting Class J Ferraz HSJ	40
ATV32HD11N4	380-500	22	22	Fast Acting Class J Ferraz HSJ	60
ATV32HD15N4	380-500	22	22	Fast Acting Class J Ferraz HSJ	70

Components for use together in accordance with standard UL508

Suitable For Use On A Circuit Capable Of Delivering Not More Than ___X___ rms Symmetrical Amperes, ___Y___ Volts Maximum, When Protected by ___Z 1___ with a Maximum rating of ___Z 2___.

(1) Input withstand rating is that for which the product has been designed thermally. Installation on a supply greater than this level will require additional inductance to satisfy this level.

(2) Output interrupt rating relies on Integral solid state short circuit protection. This does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes. This is dependant on the type of installation.

