

# Altivar 212

Variable speed drives  
for asynchronous motors

## Installation manual

01/2011



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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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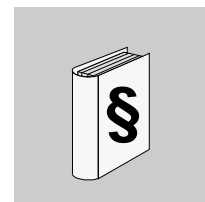


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# Safety Information



## 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.

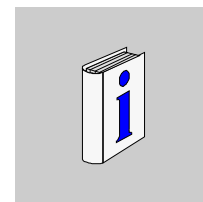
Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this product.

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## About the book



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### At a Glance

#### Document Scope

The purpose of this document is:

- to give you mechanical and electrical information related to the ATV212 drive,
- to show you how to install and wire this drive.

#### Validity Note

This documentation is valid for the Altivar 212 drive.

#### Related Documents

Title of Documentation	Reference Number
ATV212 Quick Start	S1A53825
ATV212 Programming manual	S1A53838
ATV212 Modbus manual	S1A53844
ATV212 BACnet manual	S1A53845
ATV212 Metasys N2 manual	S1A53846
ATV212 Apogee FLN P1 manual	S1A53847
ATV212 LonWorks manual	S1A53848

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# Introduction



1

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## What's in this Chapter?

This chapter contains the following topics:

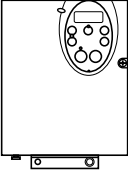
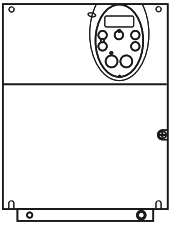
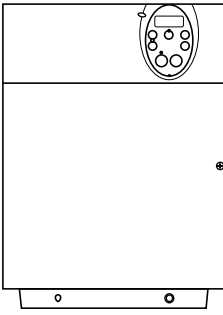
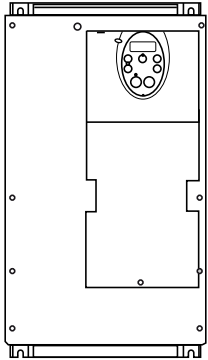
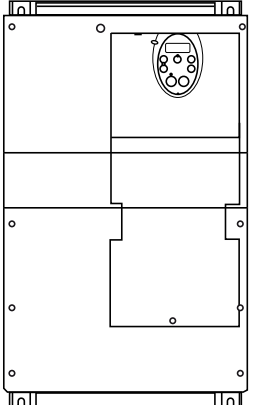
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Reference description	11

## Device overview

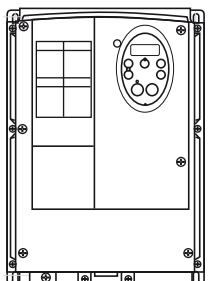
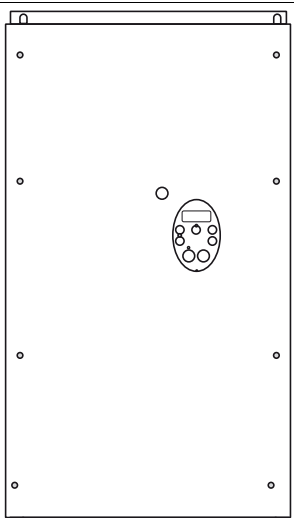
### The product

The ATV212 drive is mainly dedicated to HVAC applications in Building sector. The ATV212 drive family consists of five IP21 and two IP55 product sizes

### The IP21 «H» range - 5 drive sizes - Three-phase 50/60 Hz supply voltage

ATV212H075M3X, U15M3X, U22M3X, 075N4, U15N4, U22N4, U30M3X, U40M3X, U30N4, U40N4, U55N4	ATV212HU55M3X, U75M3X, U75N4, D11N4	ATV212HD11M3X, D15M3X, HD15N4, HD18N4, D22N4S
0.75 to 5.5 kW	5.5 to 11 kW	11 to 22 kW
		
ATV212HD22M3X, D22N4, D30N4, D37N4, D45N4	ATV212HD30M3X, D55N4, D75N4	
22 to 45 kW	30 to 75 kW	
		

### The IP55 «W» range - 2 drive sizes - Three-phase 50/60 Hz supply voltage

ATV21W075N4...U22N4, U30N4...U75N4	ATV12WD11N4...D75N4
0.75 to 7.5 kW	11 to 75 kW
	

## Reference description

IP21 and IP55 variable speed drives - Three-phase 50/60 Hz supply voltage: 200 ... 240 V and 380 ... 480 V

	ATV	212	H	D30	N4	S
<b>Product designation</b> ATV - Altivar						
<b>Product range</b>						
<b>Degree of protection</b> H - IP21 product W - IP55 product						
<b>Drive rating</b> 075 - 0.75 kW (1 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 <sup>1/2</sup> HP) U75 - 7.5 kW (10 HP) D11 - 11 kW (15 HP) D15 - 15 kW (20 HP) D18 - 18.5 kW (25 HP) D22 - 22 kW (30 HP) D30 - 30 kW (40 HP)						
D37 - 37 kW (50 HP) D45 - 45 kW (60 HP) D55 - 55 kW (75 HP) D75 - 75 kW (100 HP)						
				<b>380 - 400 V range only</b>		
<b>Power supply voltage</b> M3X : 200 - 240 V range three-phase N4 : 380 - 480 V range three-phase (With integrated EMC filter C2, C3, for UL Type 12/IP55 products ATV212W●●●●●) N4C : 380 - 480 V range three-phase (With integrated C1 EMC filter for UL Type 12/IP55 products ATV212W●●●●●)						
<b>Slim version</b> Available for 22 kW (30 HP) rating, IP21 version						



## Before you begin

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### What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Safety instructions	14

## 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

#### 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 link<sup>1</sup>.

**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.**

Before removing the drive from its packaging, verify that the carton was not damaged in shipping. Carton damage usually indicates improper handling and the potential for device damage. If any damage is found, notify the carrier and your Schneider Electric representative.

**▲WARNING**

**DAMAGED PACKAGING**

If the packaging appears damaged:

- handle with care
- check if the product appears damaged

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

**▲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.**

**Storing and shipping**

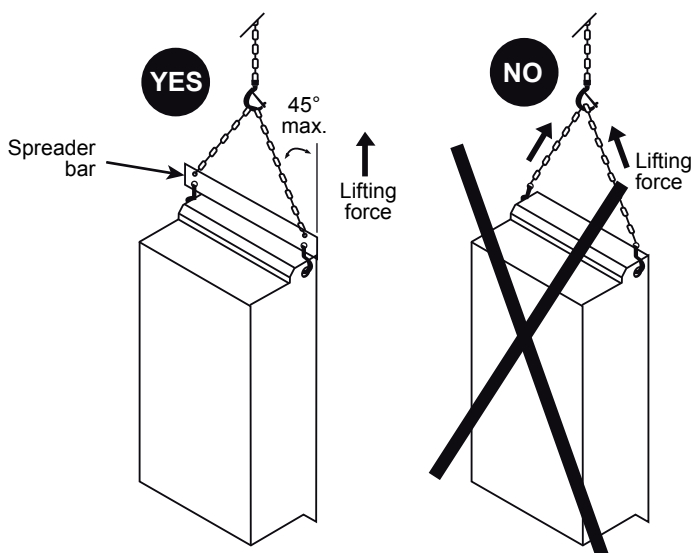
If the drive is not immediately installed, store it in a clean, dry area where the ambient temperature is between  $-25$  and  $+70$  °C ( $-13$  to  $+158$  °F). If the drive has to be shipped to another location, use the original shipping material and carton to help protect the drive.

## Lifting and handling instructions

**⚠ WARNING****HANDLING AND LIFTING HAZARD**

Keep the area below any equipment being lifted clear of all personnel and property. Use the lifting method illustrated in following figure.

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



- Altivar 212 drives up to ATV212HD22N4S and ATV212W075N4 can be removed from their packaging and installed without a handling device.
- A hoist must be used for higher ratings.
- After removing the drive from its packaging, inspect it for damage. If any damage is found, notify the carrier and your sales representative.
- Verify that the drive nameplate and label conform to the packing slip and corresponding purchase order.

**⚠ WARNING****RISK OF TOPPLING**

- Keep the drive on the pallet until ready to install.
- Never place the drive in an upright position without proper support, such as a hoist, braces, or other mounting supports.

**Failure to follow these instructions can result in death, serious 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 ATV212●●●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

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### What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Steps for setting up	18

## 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 [23](#)).

### 3. Mount the drive vertically

- Mount the drive in accordance with the instructions in this document (see page [28](#)).
- Install any options required (see option documentation).

### 4. Wire the drive (see page [41](#))

- 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.

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



## PROGRAMMING

5. Please refer to the programming manual.

## Technical data



# 4

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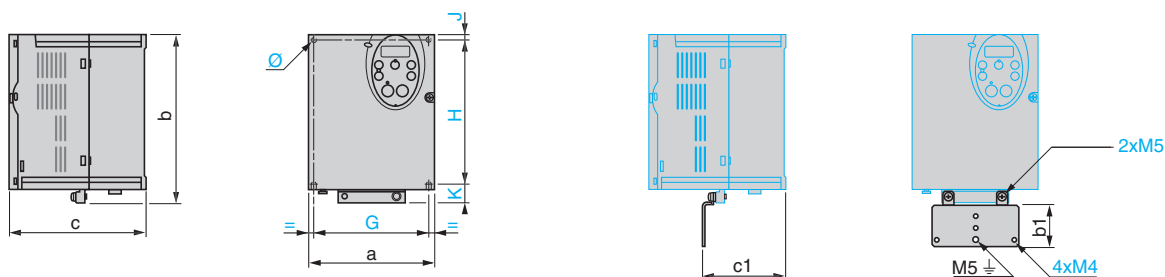
### What's in this Chapter?

This chapter contains the following topics:

Topic	Page
ATV212H dimensions and weights	20
ATV212W dimensions and weights	22
Electrical data	23
Connection diagrams	25

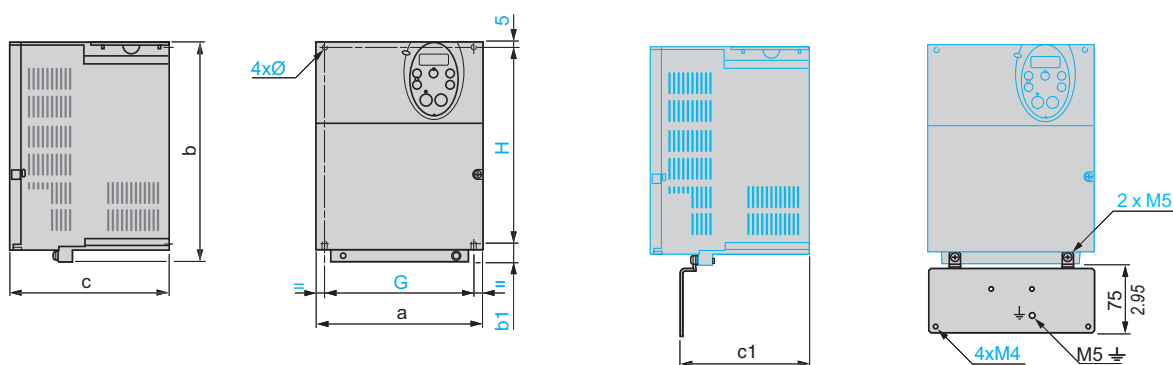
## ATV212H dimensions and weights

The figures below shows outline drawings of the ATV212 drives and the tables gives the dimensions and weights of the various models.

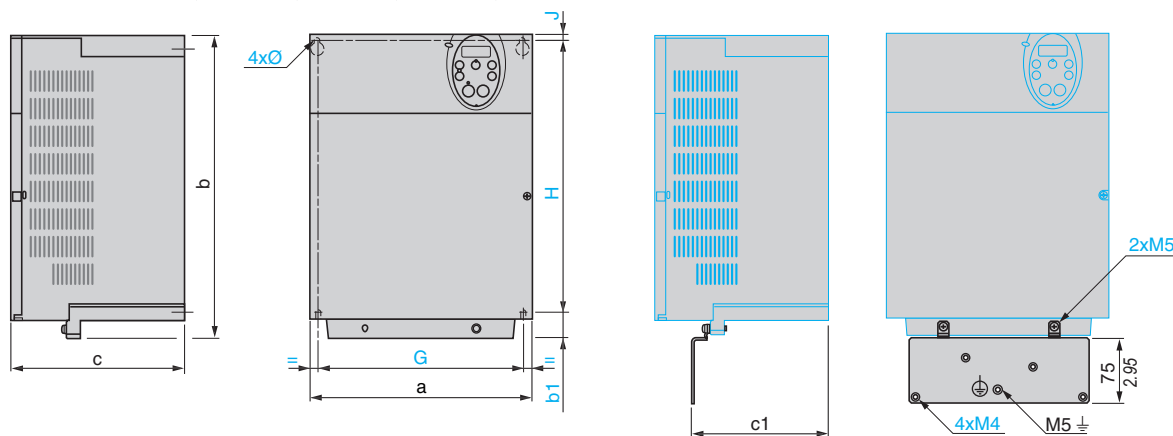


ATV212H	Dimensions mm (in.)										Weight kg (lb)
	a	b	b1	c	c1	G	H	K	J	Ø	
075M3X, U15M3X, U22M3X	107 (4.2)	143 (5.6)	49 (1.93)	150 (5.9)	67.3 (2.65)	93 (3.6)	121.5 (4.7)	16.5 (0.65)	5 (0.20)	5 (0.20)	1.80 (3.978)
075N4, U15N4, U22N4											2.00 (4.42)
U30M3X, U40M3X	142 (5.6)	184 (7.2)	48 (1.8)	150 (5.9)	88.8 (3.50)	126 (4.9)	157 (6.1)	20.5 (0.8)	6.5 (0.26)	5 (0.20)	3.05 (6.741)
U30N4, U40N4, U55N4											3.35 (7.404)

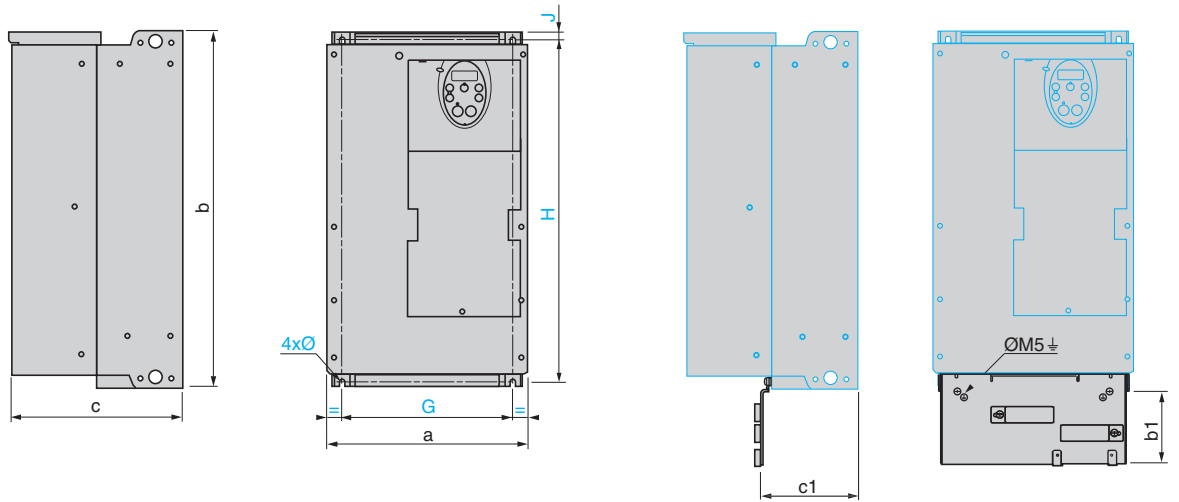
### ATV212HU55M3X, U75M3X, HU75N4, HD11N4



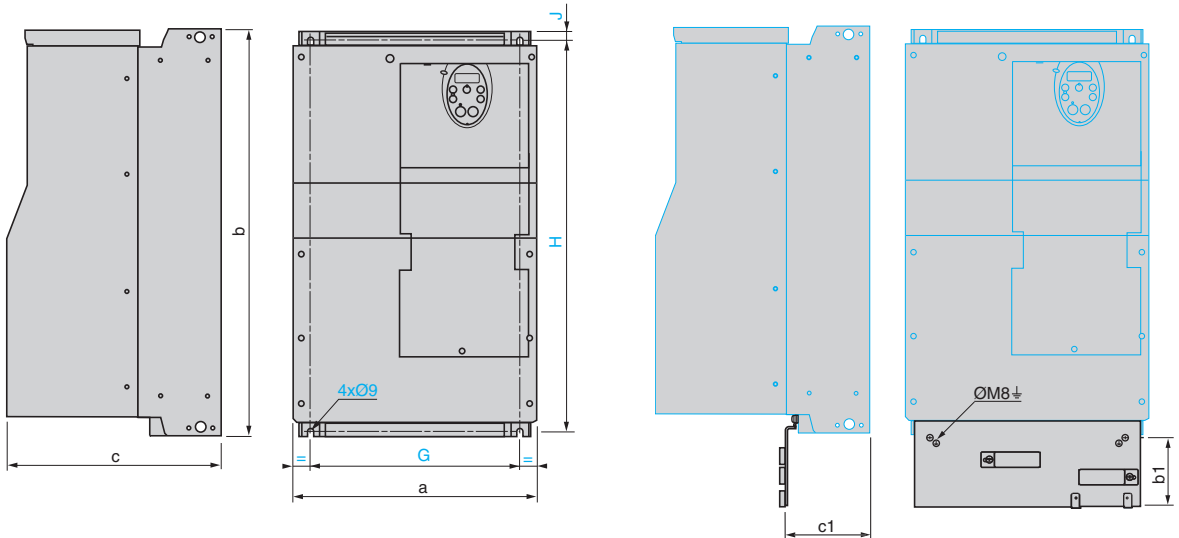
### ATV212HD11M3X, D15M3X, HD15N4, HD18N4, HD22N4S



ATV212H	Dimensions mm (in.)										Weight kg (lb)
	a	b	b1	c	c1	G	H	J	Ø		
U55M3X, U75M3X, U75N4, D11N4	180 (7)	232 (9.1)	17 (0.67)	170 (6.7)	134.8 (5.31)	160 (6.3)	210 (8.2)	5 (0.20)	5 (0.20)	6.10 (13.481)	
D11M3X, D15M3X, D15N4, D18N4, D22N4S	245 (9.6)	329.5 (12.97)	27.5 (1.08)	190 (7.5)	147.6 (5.81)	225 (8.8)	295 (11.6)	7 (0.28)	6 (0.24)	11.50 (25.4)	

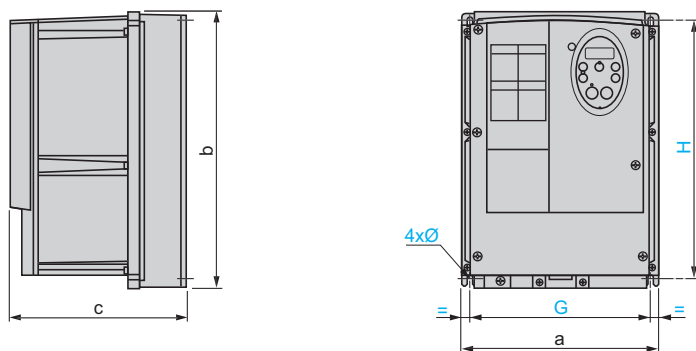


ATV212H	Dimensions mm (in.)									Weight kg (lb)
	a	b	b1	c	c1	G	H	J	Ø	
D22M3X	240 (9.4)	420 (16.5)	122 (4.8)	214 (8.4)	120 (4.72)	206 (8.1)	403 (15.8)	10 (0.39)	6 (0.24)	27.40 (60.554)
D22N4, D30N4										26.40 (58.344)
D37N4, D45N4	240 (9.4)	550 (21.65)	113 (4.45)	244 (9.61)	127 (5.0)	206 (8.1)	529 (20.83)	10 (0.39)	6 (0.24)	23.50 (51.81)

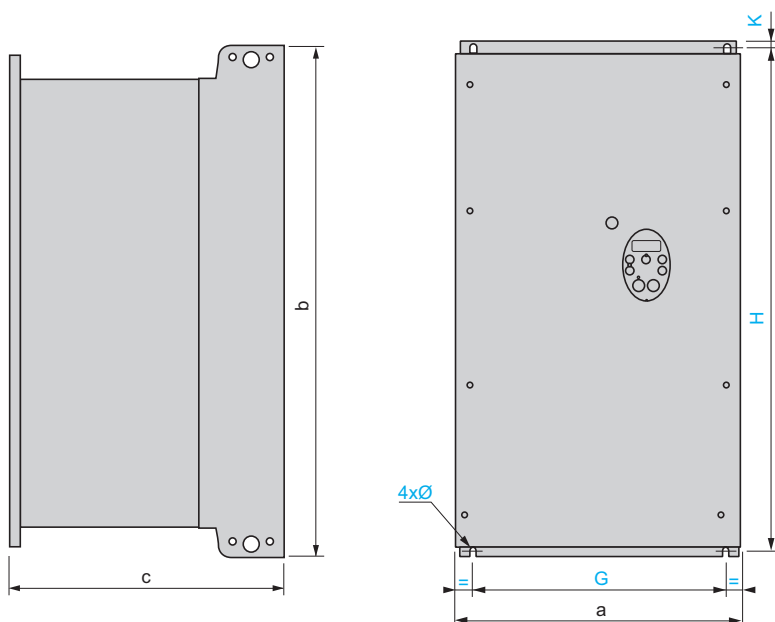


ATV212H	Dimensions mm (in.)									Weight kg (lb)
	a	b	b1	c	c1	G	H	J	Ø	
D30M3X	320 (12.5)	630 (24.8)	118 (4.65)	290 (11.4)	173 (6.81)	280 (11)	604.5 (23.8)	10 (0.39)	9 (0.35)	38.650 (85.42)
D55N4, D75N4	320 (12.5)	630 (24.8)	118 (4.65)	290 (11.4)	173 (6.81)	280 (11)	604.5 (23.8)	10 (0.39)	9 (0.35)	39.70 (87.74)

### ATV212W dimensions and weights



ATV212W	Dimensions mm (in.)						Weight kg (lb)
	a	b	c	G	H	Ø	
075N4...U22N4	230 (9.1)	340 (13.4)	208 (8.2)	212 (8.3)	318 (12.5)	5.5 (0.2)	7.00 (15.43)
075N4C...U22N4C							7.50 (16.53)
U30N4...U55N4							9.65 (21.27)
U75N4							10.95 (24.14)
U30N4C...U55N4C							10.55 (23.53)
U75N4C							11.85 (26.13)



ATV212W	Dimensions mm (in.)							Weight kg (lb)
	a	b	c	G	H	K	Ø	
D11N4, D15N4, D11N4C, D15N4C	290 (11.41)	560 (22.05)	315 (12.40)	250 (9.84)	544 (21.42)	8 (0.3)	6 (0.24)	30.3 (66.78)
								36.5 (80.45)
D18N4, D18N4C	310 (12.20)	665 (26.18)	315 (12.40)	270 (10.62)	650 (25.59)	10 (0.4)	6 (0.24)	374 (82.43)
								45 (99.18)
D22N4, D30N4, D22N4C, D30N4C	284 (11.18)	720 (28.35)	315 (12.40)	245 (9.64)	700 (27.56)	10 (0.4)	7 (0.27)	49.5 (109.10)
								58.5 (128.93)
D37N4, D45N4 D37N4C, D45N4C	284 (11.18)	880 (34.34)	343 (13.50)	245 (9.64)	860 (33.86)	10 (0.4)	7 (0.27)	57.4 (126.5)
								77.4 (171)
D55N4, D75N4, D55N4C, D75N4C	362 (14.25)	1000 (39.37)	364 (14.33)	300 (11.81)	975 (38.39)	10 (0.4)	9 (0.35)	61.9 (136.5)
								88.4 (195)

**Electrical data**

**ATV212H●●●●●● - Three-phase supply voltage: 200 ... 240 V 50/60 Hz**

Motor		Line supply (input)					Drive (output)		Reference (5)
Power indicated on plate (1)		Max. line current (2)		Apparent power at 240 V	Max. prospective line Isc (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	kA	W	A	A	
0.75	1	3.3	2.7	1.1	5	63	4.6	5.1	ATV212H075M3X
1.5	2	6.1	5.1	2.1	5	101	7.5	8.3	ATV212HU15M3X
2.2	3	8.7	7.3	3.0	5	120	10.6	11.7	ATV212HU22M3X
3	—	—	10.0	4.2	5	146	13.7	15.1	ATV212HU30M3X
4	5	14.6	13.0	5.4	5	193	18.7	19.3	ATV212HU40M3X
5.5	7.5	20.8	17.3	7.2	22	249	24.2	26.6	ATV212HU55M3X
7.5	10	27.9	23.3	9.7	22	346	32.0	35.2	ATV212HU75M3X
11	15	42.1	34.4	14.3	22	459	46.2	50.8	ATV212HD11M3X
15	20	56.1	45.5	18.9	22	629	61.0	67.1	ATV212HD15M3X
18.5	25	67.3	55.8	23.2	22	698	74.8	82.3	ATV212HD18M3X
22	30	80.4	66.4	27.6	22	763	88.0	96.8	ATV212HD22M3X
30	40	113.3	89.5	37.2	22	1085	117.0	128.7	ATV212HD30M3X

**ATV212H●●●●●● - Three-phase supply voltage: 380 ... 480 V 50/60 Hz**

Motor		Line supply (input)					Drive (output)		Reference (5)
Power indicated on plate (1)		Max. line current (2)		Apparent power at 380 V	Max. prospective line Isc (3)	Power dissipated at nominal current	Nominal current (1)	Max. transient current (1) (4)	
		at 380 V	at 480 V						
kW	HP	A	A	kVA	kA	W	A	A	
0.75	1	1.7	1.4	1.1	5	55	2.2	2.4	ATV212H075N4
1.5	2	3.2	2.5	2.1	5	78	3.7	4.0	ATV212HU15N4
2.2	3	4.6	3.6	3.0	5	103	5.1	5.6	ATV212HU22N4
3	—	6.2	4.9	4.1	5	137	7.2	7.9	ATV212HU30N4
4	5	8.1	6.4	5.3	5	176	9.1	10.0	ATV212HU40N4
5.5	7.5	10.9	8.6	7.2	22	215	12.0	13.2	ATV212HU55N4
7.5	10	14.7	11.7	9.7	22	291	16.0	17.6	ATV212HU75N4
11	15	21.1	16.8	13.9	22	430	22.5	24.8	ATV212HD11N4
15	20	28.5	22.8	18.7	22	625	30.5	33.6	ATV212HD15N4
18.5	25	34.8	27.8	22.9	22	603	37.0	40.7	ATV212HD18N4
22	30	41.1	32.8	27	22	723	43.5	47.9	ATV212HD22N4S
22	30	41.6	33.1	27.3	22	626	43.5	47.9	ATV212HD22N4
30	40	56.7	44.7	37.3	22	847	58.5	64.4	ATV212HD30N4
37	50	68.9	54.4	45.3	22	976	79	86.9	ATV212HD37N4
45	60	83.8	65.9	55.2	22	1253	94	103.4	ATV212HD45N4
55	75	102.7	89	67.6	22	1455	116	127.6	ATV212HD55N4
75	100	141.8	111.3	93.3	22	1945	160	176	ATV212HD75N4

(1) These values are given for a nominal switching frequency of 12 kHz up to ATV212HD15M3X and up to ATV212HD15N4 or 8 kHz for ATV212HD18M3X...HD30M3X and ATV212HD18N4...HD75N4 drives, 6 kHz for ATV212HD22N4S, for use in continuous operation at 40°C (104 °F) ambient.  
 The switching frequency can be set between 6 and 16 kHz for all ratings.  
 Above 8 kHz or 12 kHz, depending on the rating, the drive will reduce the switching frequency automatically in the event of an excessive temperature rise. For continuous operation above the nominal switching frequency, derate the nominal drive current. See page 29 for derating curves as a function of switching frequency, ambient temperature, and mounting conditions.

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

(3) Current on a line supply with the indicated short-circuit current rating.

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

(5) See reference description on page 11.

**ATV212W●●●●● - Three-phase supply voltage: 380 ... 480 V 50/60 Hz**  
**Drives with an integrated EMC filter, category C2, C3**

Motor		Line supply (input)				Drive (output)		Reference (5)
Power indicated on plate (1)		Max. line current (2)		Apparent power	Max. prospective line Isc (3)	Nominal current (1)	Max. transient current (1) (4)	
		at 380 V	at 480 V	at 380 V				
kW	HP	A	A	kVA	kA	A	A	
0.75	1	1.7	1.4	1.1	5	2.2	2.4	ATV212W075N4
1.5	2	3.2	2.5	2.1	5	3.7	4	ATV212WU15N4
2.2	3	4.6	3.6	3	5	5.1	5.6	ATV212WU22N4
3	—	6.2	4.9	4.1	5	7.2	7.9	ATV212WU30N4
4	5	8.1	6.4	5.3	5	9.1	10	ATV212WU40N4
5.5	7.5	10.9	8.6	7.2	22	12	13.2	ATV212WU55N4
7.5	10	14.7	11.7	9.7	22	16	17.6	ATV212WU75N4
11	15	21.2	16.9	14	22	22.5	24.8	ATV212WD11N4
15	20	28.4	22.6	18.7	22	30.5	33.6	ATV212WD15N4
18.5	25	34.9	27.8	23	22	37	40.7	ATV212WD18N4
22	30	41.6	33.1	27.3	22	43.5	47.9	ATV212WD22N4
30	40	56.7	44.7	37.3	22	58.5	64.4	ATV212WD30N4
37	50	68.9	54.4	45.3	22	79	86.9	ATV212WD37N4
45	60	83.8	65.9	55.2	22	94	103.4	ATV212WD45N4
55	75	102.7	89	67.6	22	116	127.6	ATV212WD55N4
75	100	141.8	111.3	93.3	22	160	176	ATV212WD75N4

**ATV212W●●●●● - Three-phase supply voltage: 380 ... 480 V 50/60 Hz**  
**Drives with an integrated C1 EMC filter**

Motor		Line supply (input)				Drive (output)		Reference (5)
Power indicated on plate (1)		Max. line current (2)		Apparent power	Max. prospective line Isc (3)	Nominal current (1)	Max. transient current (1) (4)	
		at 380 V	at 480 V	at 380 V				
kW	HP	A	A	kVA	A	A	A	
0.75	1	1.7	1.4	1.1	5	2.2	2.4	ATV212W075N4C
1.5	2	3.2	2.6	2.1	5	3.7	4	ATV212WU15N4C
2.2	3	4.6	3.7	3	5	5.1	5.6	ATV212WU22N4C
3	—	6.2	5	4.1	5	7.2	7.9	ATV212WU30N4C
4	5	8.2	6.5	5.4	5	9.1	10	ATV212WU40N4C
5.5	7.5	11	8.7	7.2	22	12	13.2	ATV212WU55N4C
7.5	10	14.7	11.7	9.7	22	16	17.6	ATV212WU75N4C
11	15	21.1	16.7	13.9	22	22.5	24.8	ATV212WD11N4C
15	20	28.4	22.8	18.7	22	30.5	33.6	ATV212WD15N4C
18.5	25	34.5	27.6	22.7	22	37	40.7	ATV212WD18N4C
22	30	41.1	33.1	27.1	22	43.5	47.9	ATV212WD22N4C
30	40	58.2	44.4	38.3	22	58.5	64.4	ATV212WD30N4C
37	50	68.9	54.4	45.3	22	79	86.9	ATV212WD37N4C
45	60	83.8	65.9	55.2	22	94	103.4	ATV212WD45N4C
55	75	102.7	89	67.6	22	116	127.6	ATV212WD55N4C
75	100	141.8	111.3	93.3	22	160	176	ATV212WD75N4C

(1) These values are given for a nominal switching frequency of 12 kHz up to ATV212WD15M3X and up to ATV212HD15N4 or 8 kHz for ATV212WD18M3X...HD30M3X and ATV212WD18N4...HD75N4 drives, for use in continuous operation at 40°C (104 °F) ambient.

Above 8 kHz or 12 kHz, depending on the rating, the drive will reduce the switching frequency automatically in the event of an excessive temperature rise. For continuous operation above the nominal switching frequency, derate the nominal drive current. See page 29 for derating curves as a function of switching frequency, ambient temperature, and mounting conditions

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

(3) Current on a line supply with the indicated short-circuit current rating.

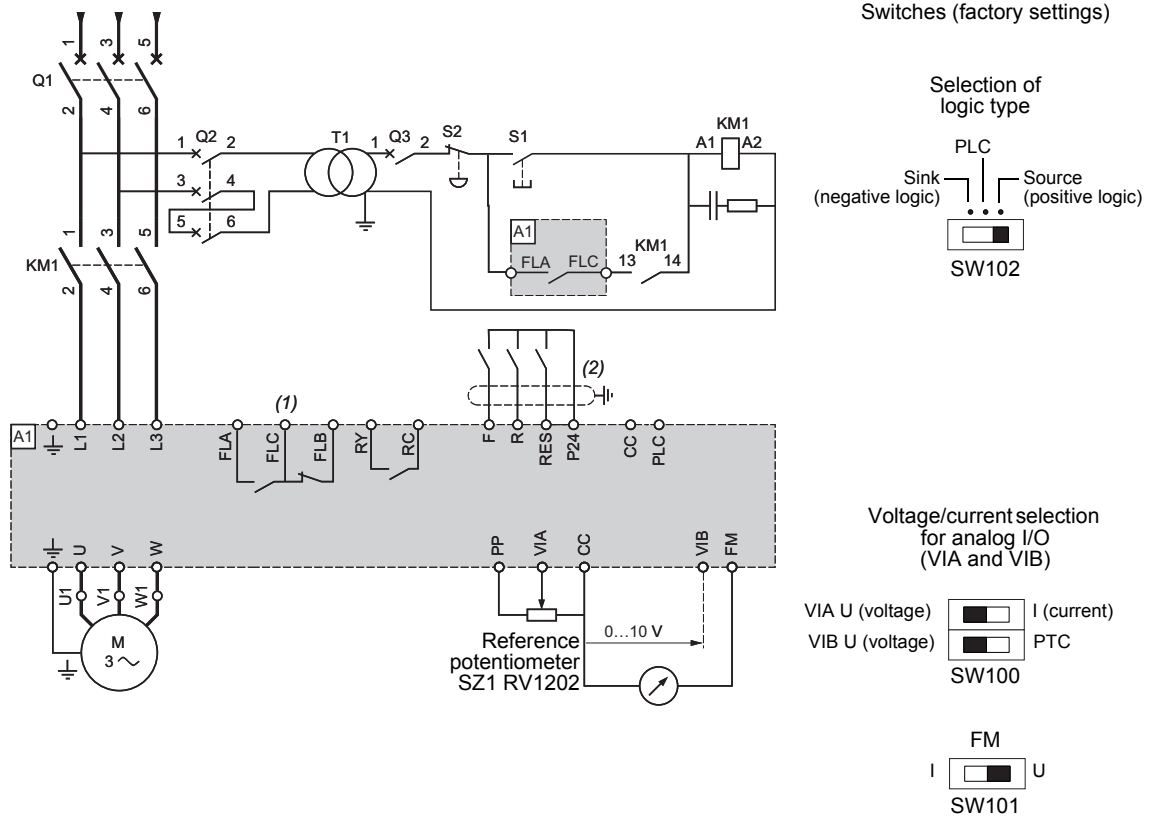
(4) **Note:** The drive is designed to run up to 60 seconds at this level.

(5) See reference description on page 11.



## Connection diagrams

### Recommended diagram for ATV212H●●●M3X, ATV212●●●●N4, ATV212W●●●N4C



(1) Fault relay contacts. Used for remote signaling of the drive status.

(2) Connection of the common for the logic inputs depends on the position of the switch (Source, PLC, Sink); see page 48.

## ⚠ DANGER

### UNINTENDED EQUIPMENT OPERATION

- Modify only the setting of switches when the product is switched off.
- Do not change the setting of switch SW102 unless your system is wired for sink logic.

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

## ⚠ CAUTION

### RISK OF BODY INJURY

use a screw driver to change the position of the switches.

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

**Note:** All terminals are located at the bottom of the drive. Install interference suppressors on all inductive circuits near the drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

## Examples of recommended circuit diagrams

### Logic input switch

The logic input switch SW102 assigns the logic input type to either 24 V (source logic) or 0 V (sink logic).

**⚠ DANGER**

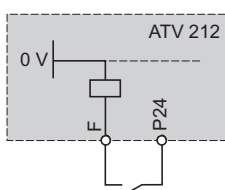
**UNINTENDED EQUIPMENT OPERATION**

- 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.

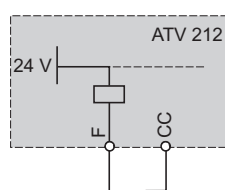
**Failure to follow these instructions will result in death or serious injury.**

### Logic inputs according to the position of the logic type switch

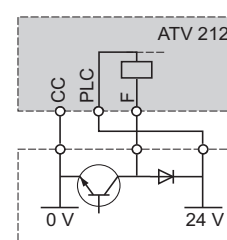
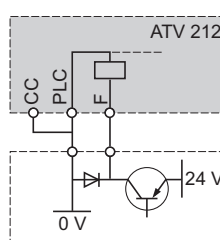
"Source" position



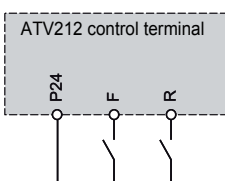
"Sink" position



"PLC" position with PLC transistor outputs

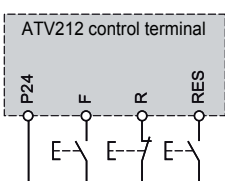


2-wire control



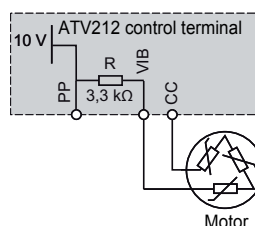
F: Forward  
R: Preset speed

3-wire control



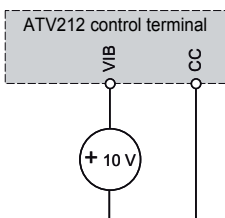
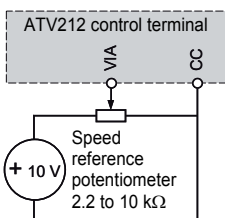
F: Forward  
R: Stop  
RES: Reverse

PTC probe

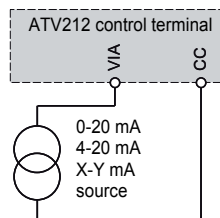


### Analog inputs

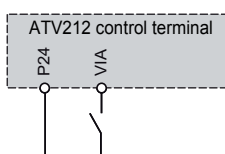
Voltage analog inputs  
External + 10 V



Voltage analog inputs  
0-20 mA, 4-20 mA, X-Y mA

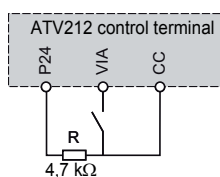


Voltage analog inputs  
Positive logic («Source» position)



VIA U (voltage)  I (current)

Negative logic («Sink» position)



VIA U (voltage)  I (current)

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# Installation



# 5

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## What's in this Chapter?

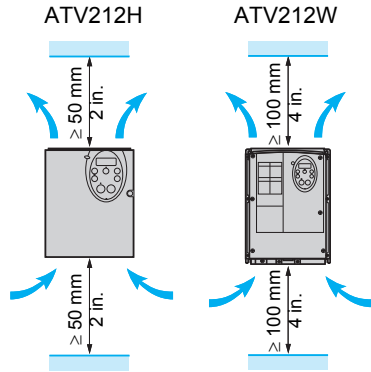
This chapter contains the following topics:

Topic	Page
Drive mounting generalities	28
Specific recommendations for mounting in an enclosure	36
Position of the charging LED	37
Opening the drive to access terminals	38
Wiring recommendations	41
Power terminals	43
Control terminals and switches	48
Installing option card	50
Use on an impedance grounded (IT) system	51
Electromagnetic compatibility (EMC)	54
Maintenance	58

Drive mounting generalities

<b>CAUTION</b>
<p><b>RISK OF DAMAGE TO THE DRIVE</b></p> <p>Follow mounting recommendations described in this document.</p> <p><b>Failure to follow these instructions can result in equipment damage.</b></p>

Mounting and temperature conditions



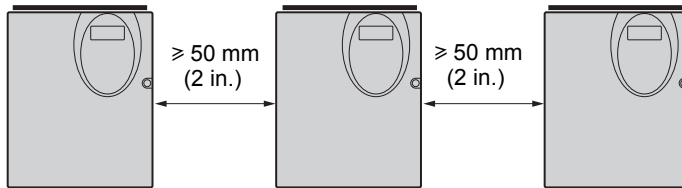
Depending on the conditions in which the drive is to be used, its installation will require certain precautions and the use of appropriate accessories.

- 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.

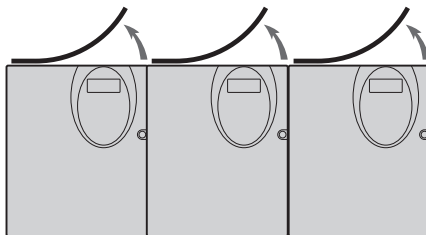
The use of washers is recommended with all mounting screws.

Mounting methods

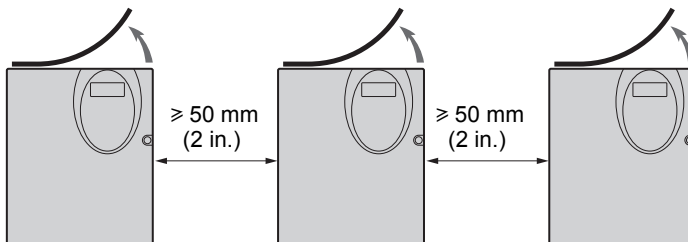
**Type A mounting - ATV212H●●●M3X, ATV212H●●●N4● and ATV212W●●●N4, ATV212W●●●N4C**  
 Free space  $\geq 50$  mm (2 in.) on each side, with the protective cover in place.



**Type B mounting - ATV212H●●●M3X, ATV212H●●●N4●**  
 Drives mounted side-by-side, with the protective cover removed (degree of protection becomes open type IP20).



**Type C mounting - ATV212H●●●M3X, ATV212H●●●N4●**  
 Free space  $\geq 50$  mm (2 in.) on each side, with the protective cover removed (degree of protection becomes open type IP20).



These mounting types are possible without derating up to 40°C (104 °F) at the factory-set switching frequency. For other ambient temperatures and switching frequencies, see derating curves page [29](#).

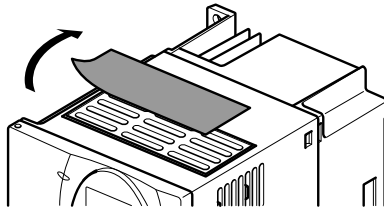
### Removing the protective cover on ATV212H drives

See Mounting methods, page 28 to determine the type of mounting appropriate for your application before removing the protective cover from the drive.

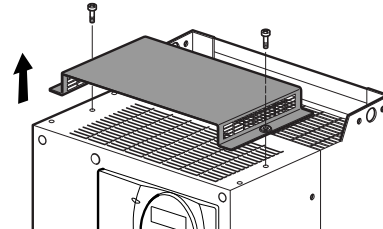
When IP20 protection is adequate, remove the protective cover on top of the drive as shown below.

For UL Type 1 protection, leave the protective cover on top of the drive and install a conduit entry kit (mounting outside the enclosure). See entry kit references in the catalog on [www.schneider-electric.com](http://www.schneider-electric.com).

**ATV212H 075M3X to D18M3X, and  
ATV212H 075N4 to D22N4S**



**ATV212H D22M3X to D30M3X and  
ATV212H D22N4 to D30N4**



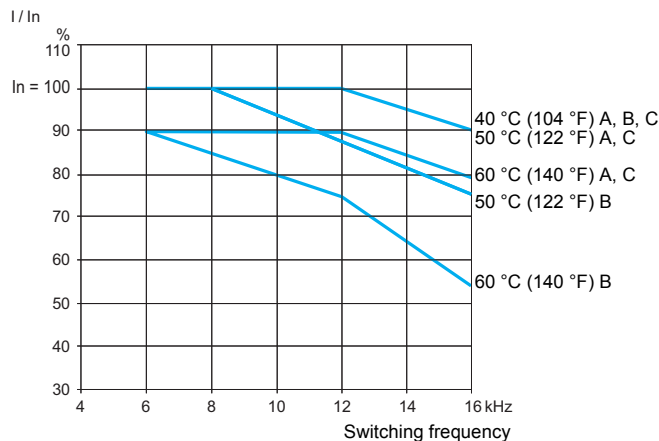
### Derating curves

The curves illustrate the drive nominal current derating percentage ( $I/I_n\%$ ) as a function of the temperature, switching frequency, and the different types of mounting (A, B and C).

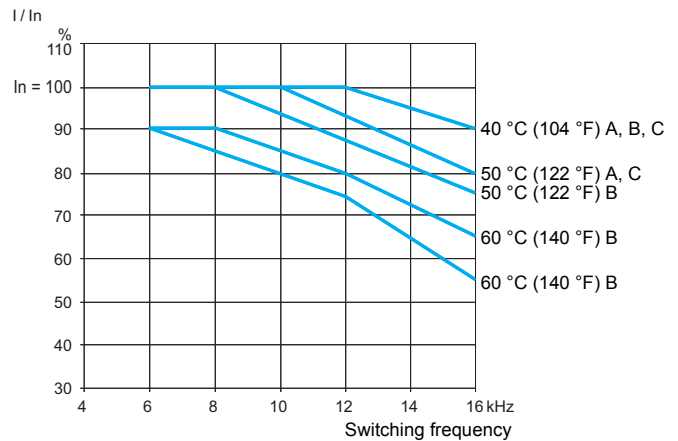
For example, 80% derating of a 20 hp, 460 V ATV212 drive nominally rated for 30.5 amperes continuously:  $30.5 \times 0.8 = 24.4$  (15 hp).

For intermediate temperatures, interpolate between two curves.

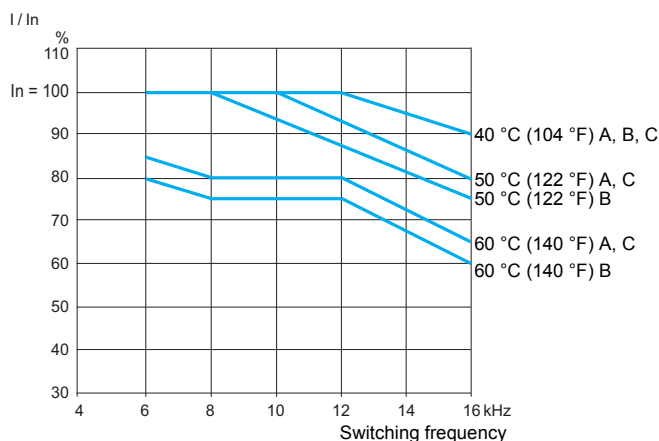
**ATV212H075M3X**



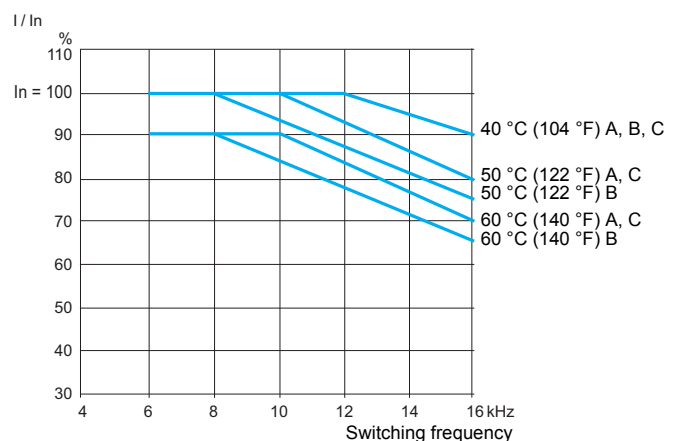
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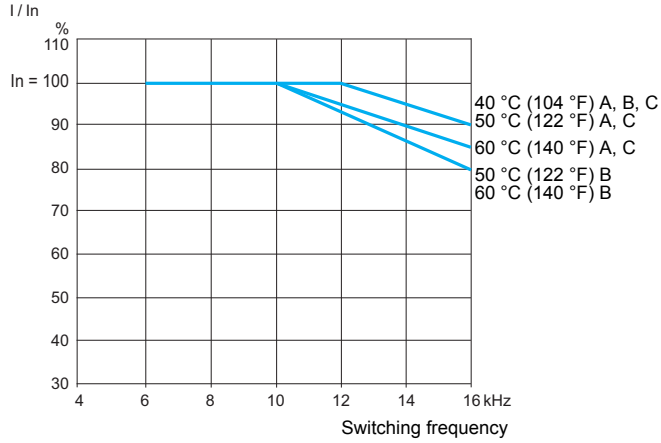
**ATV212HU22M3X**



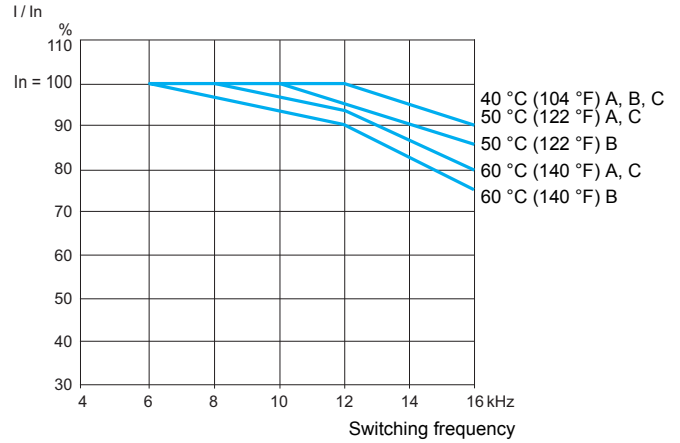
**ATV212HU30M3X, HU40M3X**



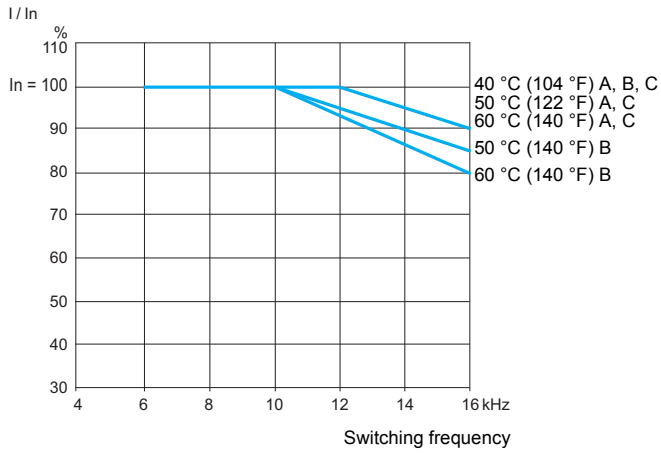
**ATV212HU55M3X**



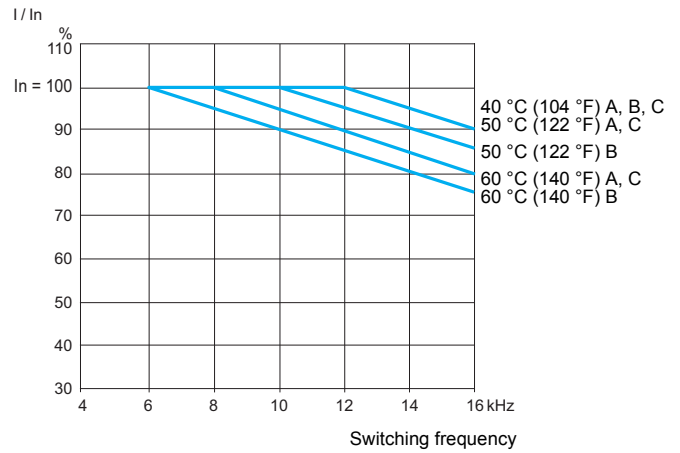
**ATV212HU75M3X**



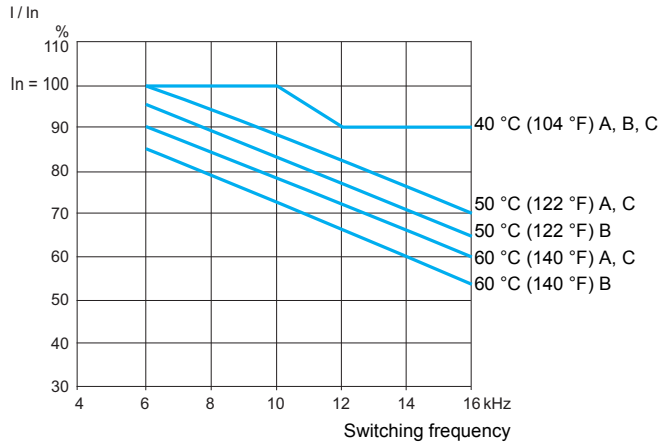
**ATV212HD11M3X**



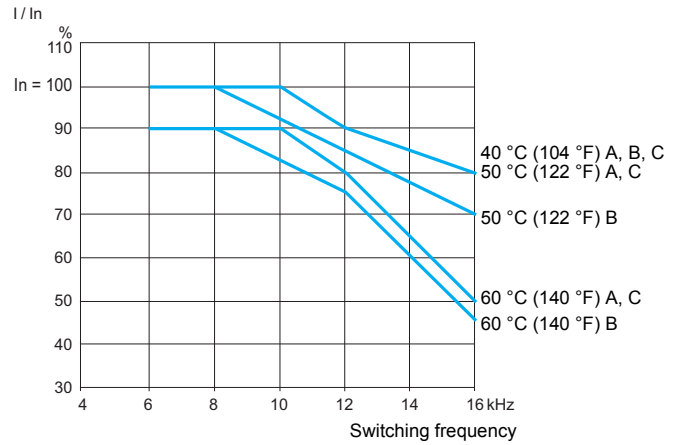
**ATV212HD15M3X**



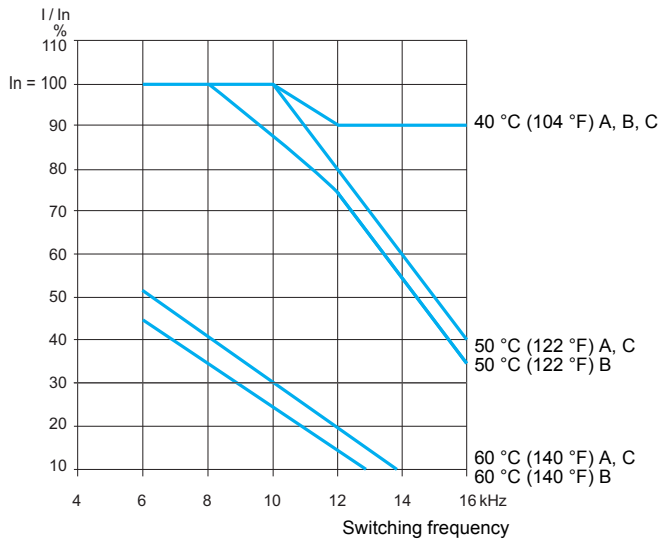
**ATV212HD18M3X**



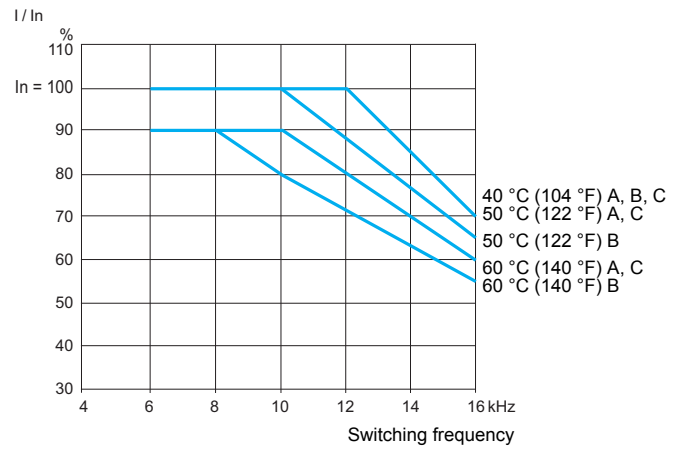
**ATV212HD22M3X**



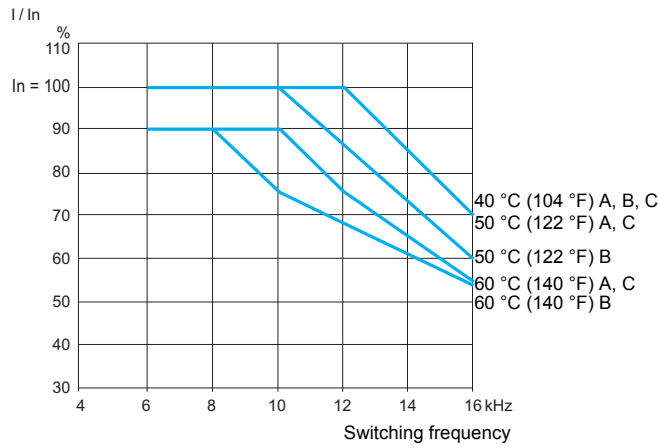
**ATV212HD30M3X**



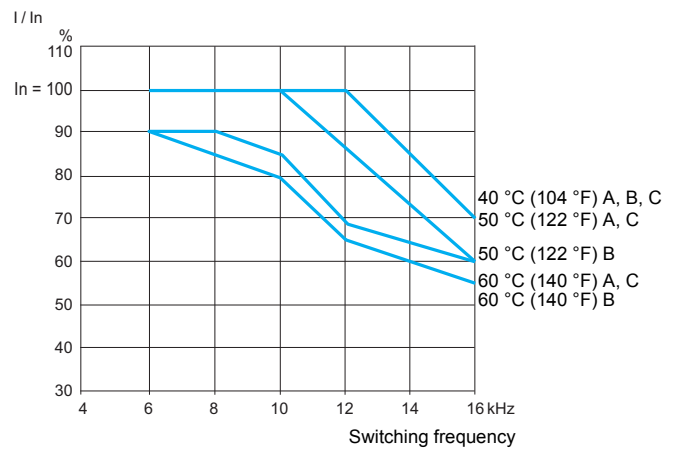
**ATV212H075N4**



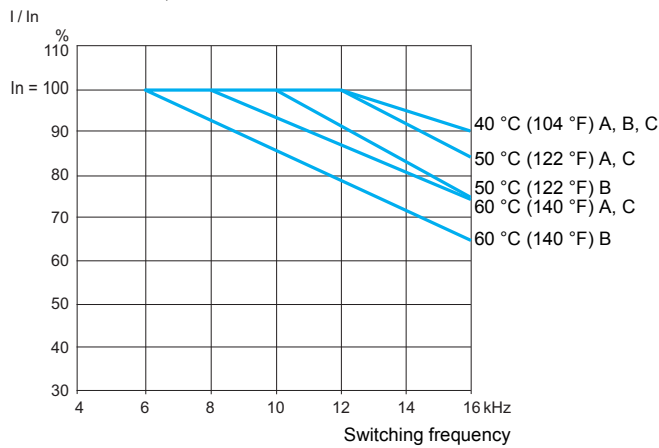
**ATV212HU15N4**



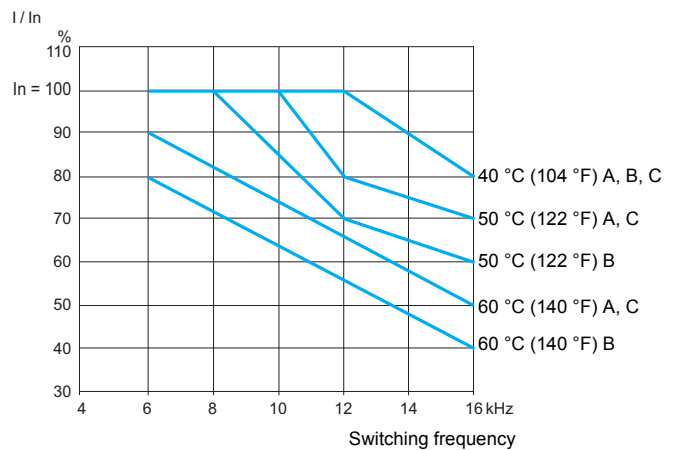
**ATV212HU22N4**



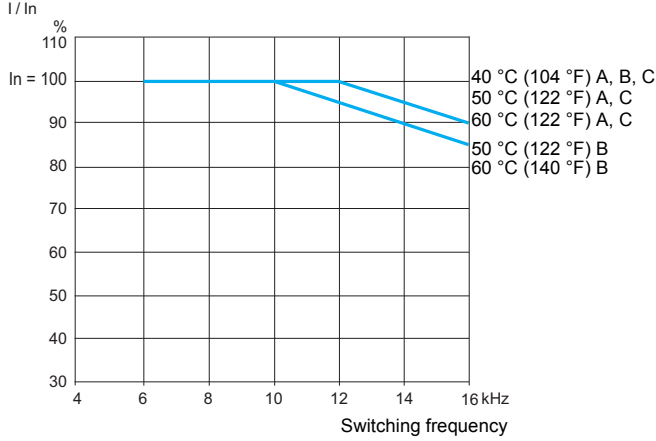
**ATV212HU30N4, HU40N4**



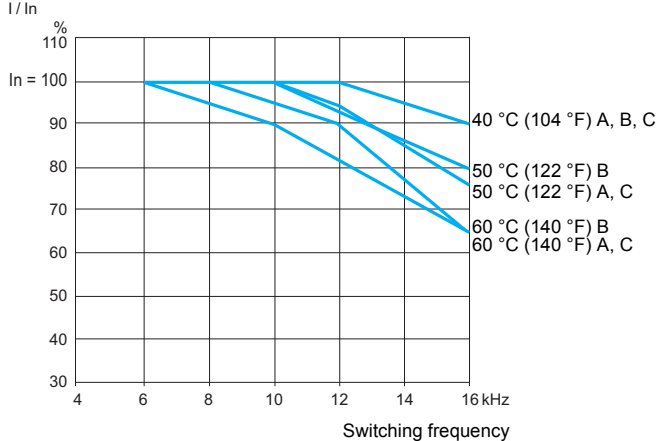
**ATV212HU55N4**



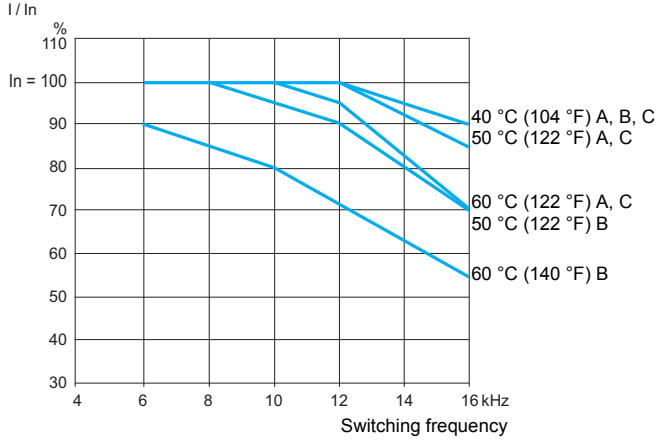
**ATV212HU75N4**



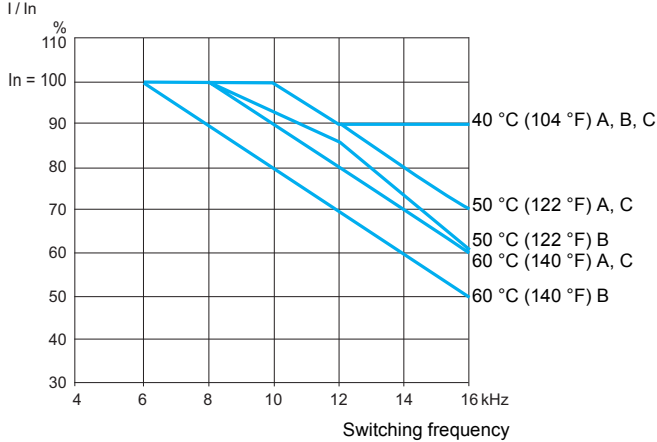
**ATV212HD11N4**



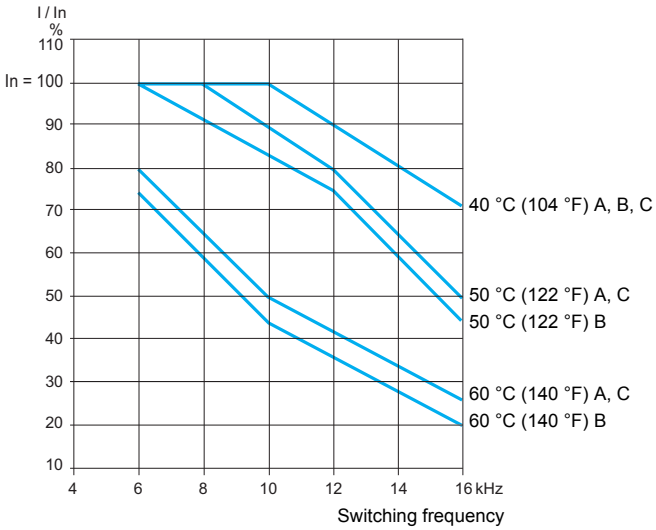
**ATV212HD15N4**



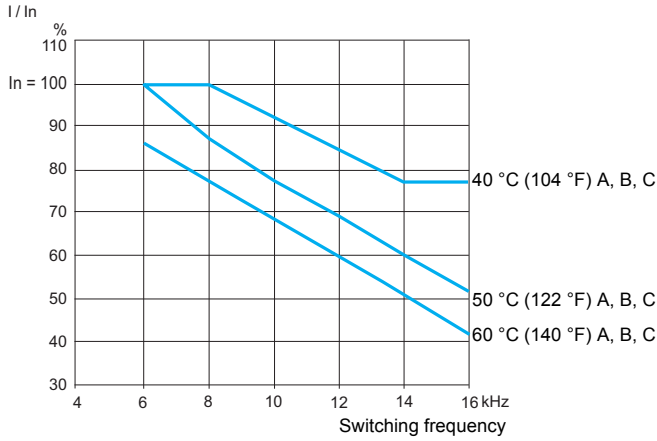
**ATV212HD18N4**



**ATV212HD22N4**

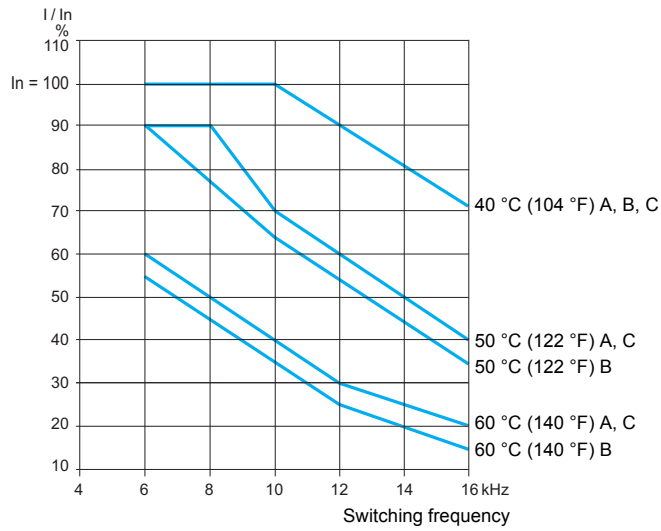


**ATV212HD22N4S**

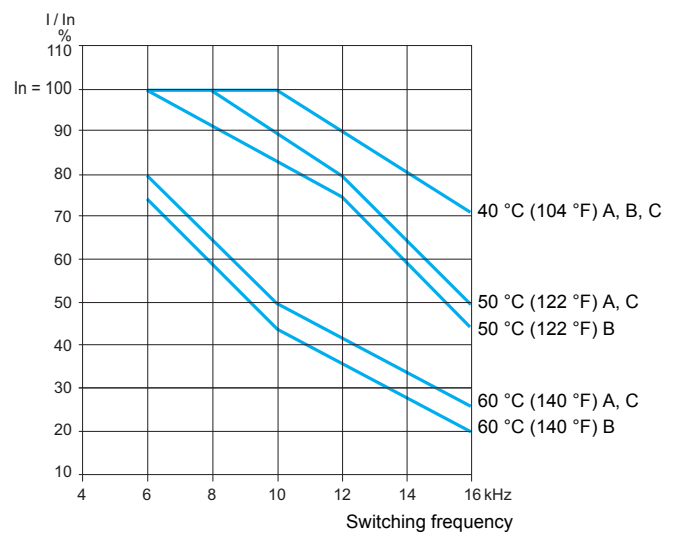




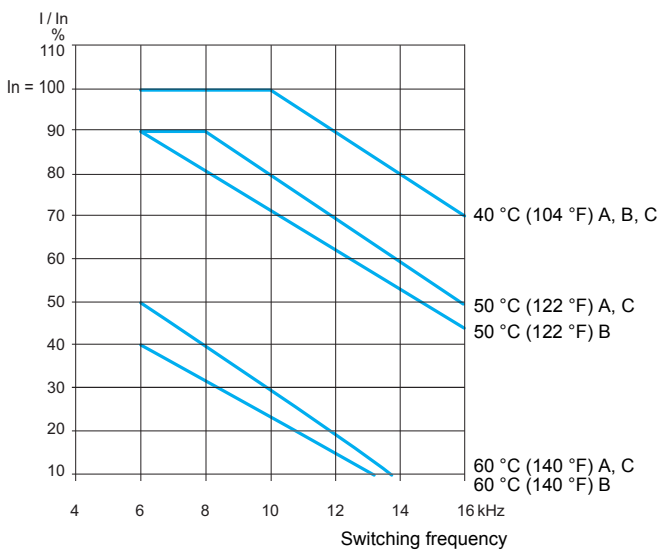
**ATV212HD30N4**



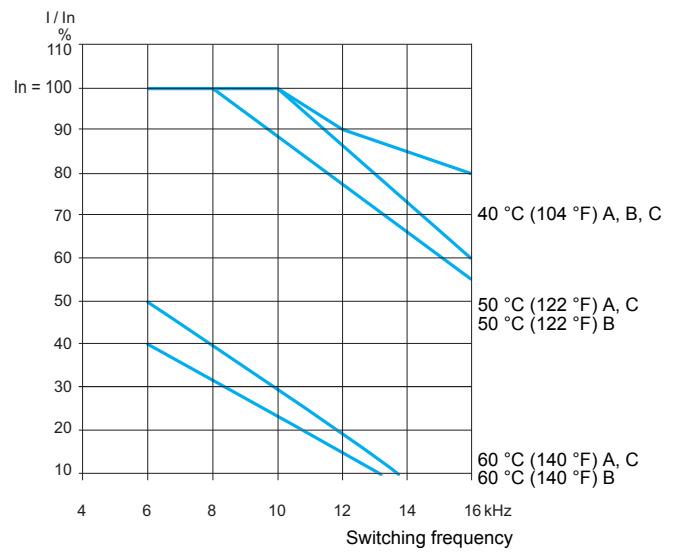
**ATV212HD37N4**



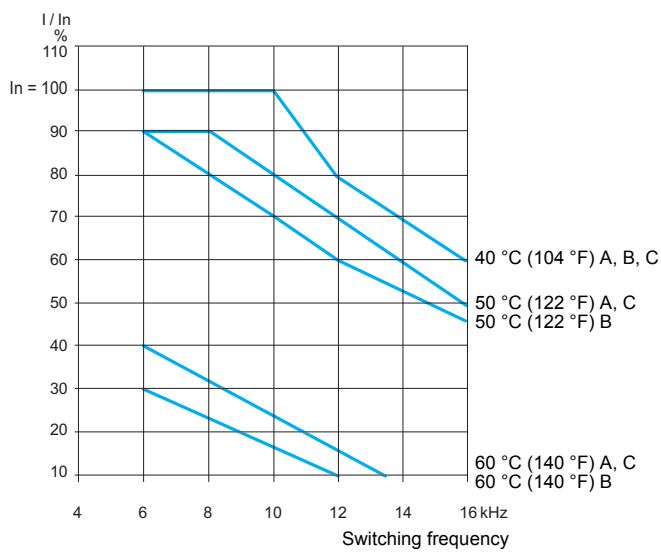
**ATV212HD45N4**



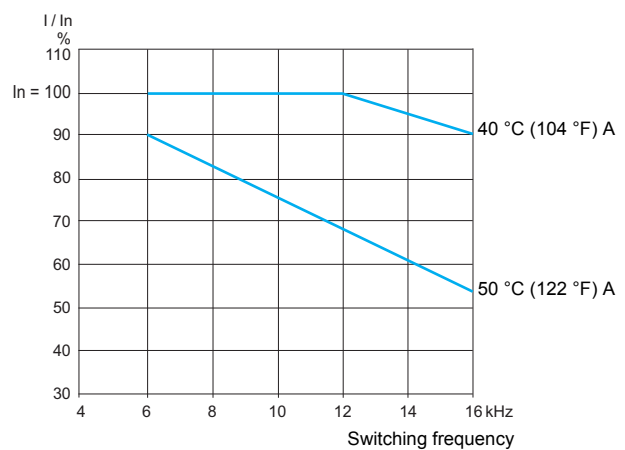
**ATV212HD55N4**



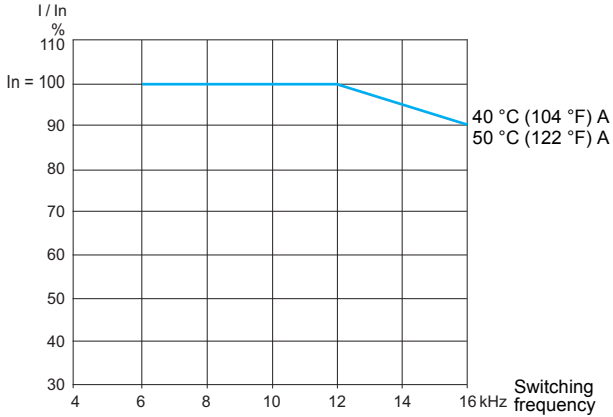
**ATV212HD75N4**



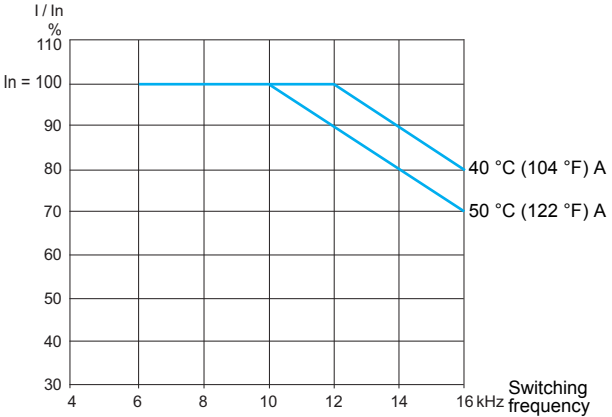
**ATV212W075N4...WU75N4, ATV212W075N4C...WU75N4C**



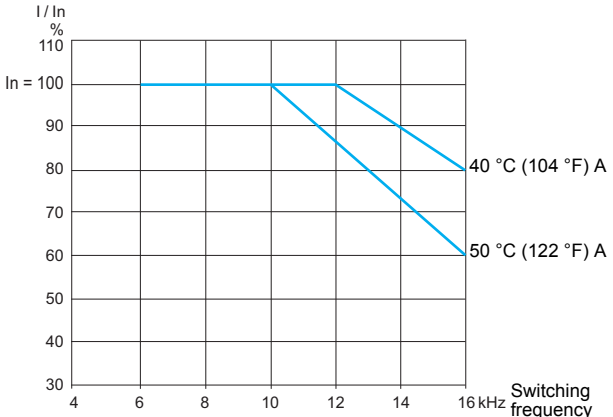
**ATV212WD11N4, ATV212WD11N4C**



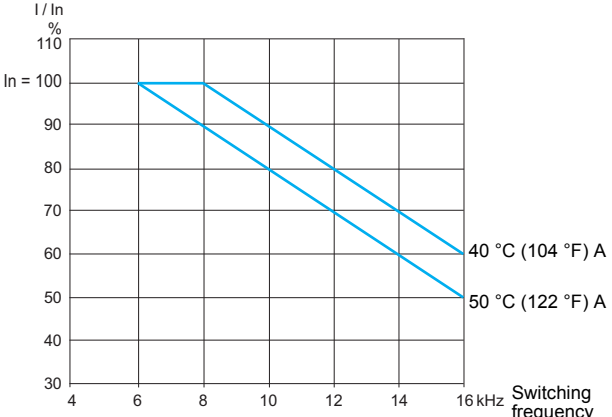
**ATV212WD15N4, ATV212WD15N4C**



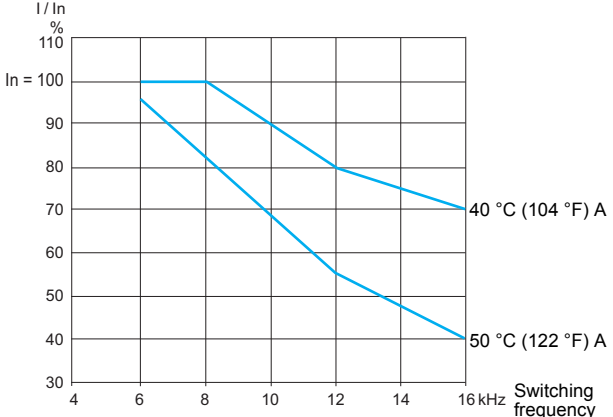
**ATV212WD18N4, ATV212WD18N4C**



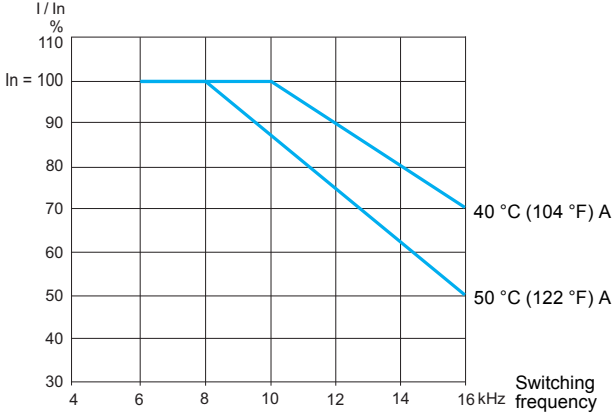
**ATV212WD22N4, ATV212WD22N4C**



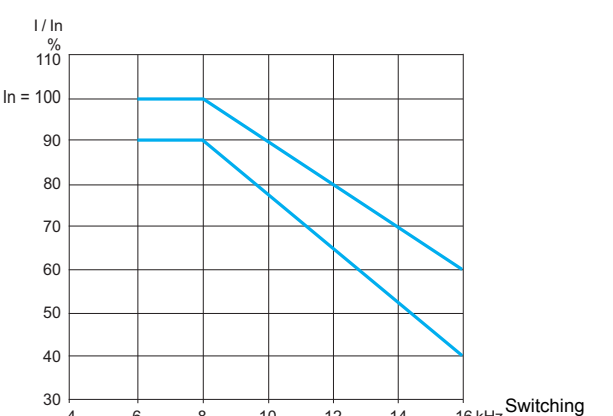
**ATV212WD30N4, ATV212WD30N4C**



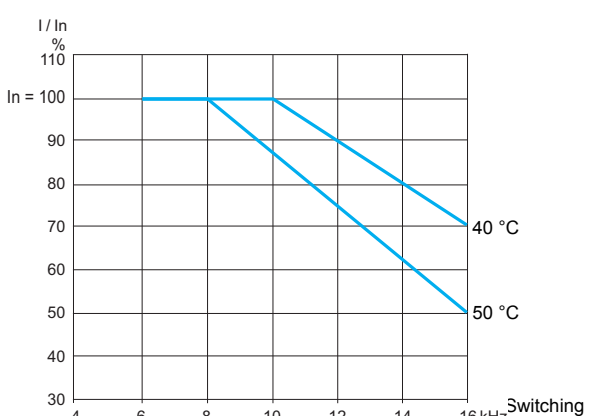
**ATV212WD37N4, ATV212WD37N4C**



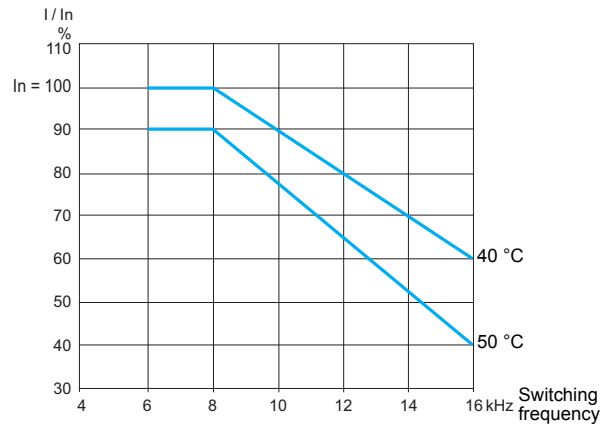
**ATV212WD45N4, ATV212WD45N4C**



**ATV212WD55N4, ATV212WD55N4C**

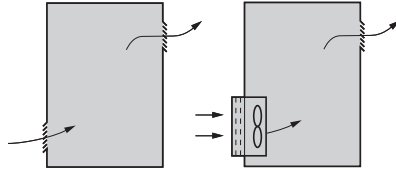


**ATV212WD75N4, ATV212WD75N4C**



## Specific recommendations for mounting in an enclosure

**Note:** The following only applies to ATV212H●●●M3X and ATV212H●●●N4 drives.



Observe the mounting recommendations described on page 28. To help ensure proper air circulation in the drive:

- Fit ventilation grilles.
- Check that there is sufficient ventilation. If there is not, install a forced ventilation unit with a filter. The openings and/or fans must provide a flow rate at least equal to that of the drive fans (see below).
- Use special filters with UL Type 12/IP54 protection.
- Remove the blanking cover from the top of the drive, see page 28.

Refer to power dissipated at nominal current, see page 23.

### Minimum air flow rates

If you are installing the drive in a Type 1 enclosure, provide forced ventilation at a rate at least equal to the value listed below each drive.

For drive	Flow rate	
	m <sup>3</sup> /hour	ft <sup>3</sup> /min
ATV212H075M3X	22	13
ATV212HU15M3X	35	21
ATV212HU22M3X	41	25
ATV212HU30M3X	50	30
ATV212HU40M3X	66	39
ATV212HU55M3X	85	50
ATV212HU75M3X	118	70
ATV212HD11M3X	157	93
ATV212HD15M3X	215	127
ATV212HD18M3X	239	141
ATV212HD22M3X	261	154
ATV212HD30M3X	371	219

For drive	Flow rate	
	m <sup>3</sup> /hour	ft <sup>3</sup> /min
ATV212H075N4	19	12
ATV212HU15N4	27	16
ATV212HU22N4	35	21
ATV212HU30N4	47	28
ATV212HU40N4	60	36
ATV212HU55N4	74	44
ATV212HU75N4	100	59
ATV212HD11N4	147	87
ATV212HD15N4	206	122
ATV212HD18N4	214	126
ATV212HD22N4S	214	126
ATV212HD22N4	214	126
ATV212HD30N4	290	171
ATV212HD37N4	334	197
ATV212HD45N4	429	252
ATV212HD55N4	498	293
ATV212HD75N4	666	392

### Sealed metal enclosure

## CAUTION

### RISK DUE TO CONDENSATION

Where condensation is possible, keep the drive powered up when the motor is not running, or install thermostatically controlled strip heaters.

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

The drive must be mounted in a dust and damp proof enclosure in certain environmental conditions, such as dust, corrosive gases, high humidity with risk of condensation and dripping water, splashing liquid, etc.

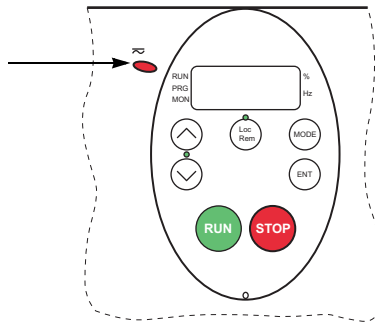
This enables the drive to be used in an enclosure where the maximum internal temperature reaches 50°C.

When mounting the drive inside an UL Type 12 or IP54 enclosure, follow these ventilation instructions:

- Observe the minimum clearance distances shown on page 28.
- If necessary, install a stirring fan to circulate the air inside the enclosure, to help prevent hot spots in the drive, and to distribute the heat uniformly to surfaces used for convection cooling.

## Position of the charging LED

The capacitor charging LED on the drive is not an indicator of the absence of DC bus voltage. It only indicates when the capacitor is fully charged.



## Opening the drive to access terminals

### Procedure

- 1 Any procedure in this section must be performed when product is powered off.

### **⚠ ⚠ DANGER**

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

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

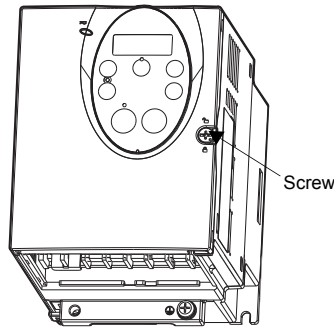
**Failure to follow these instructions will result in death or serious injury.**

- 2 Open the ATV212 front cover.

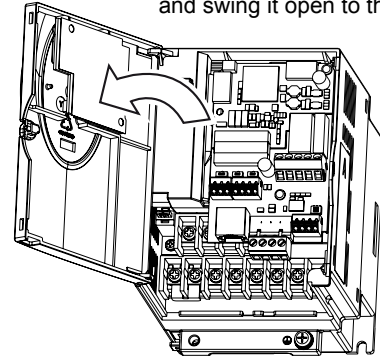
#### **ATV212H products up to 22 kW**

Turn the screw on the front panel 90° counter-clockwise to align the dot on the screw with the unlock position.

To avoid damaging the screw, do not apply excessive force or turn the screw more than 90°.

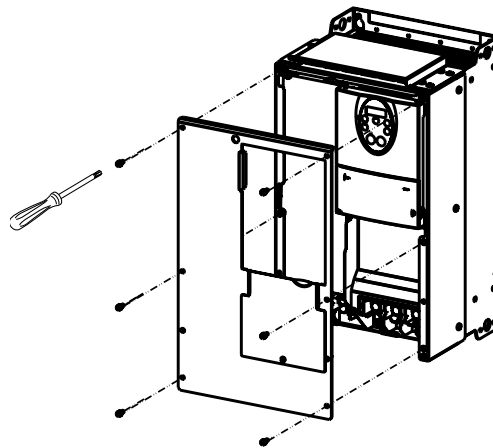


Pull the front panel toward you and swing it open to the left

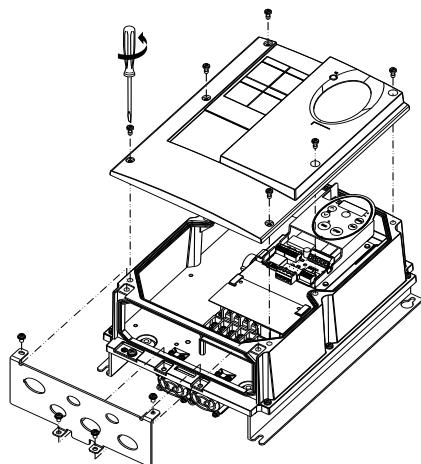


#### **ATV212H products from 22 kW**

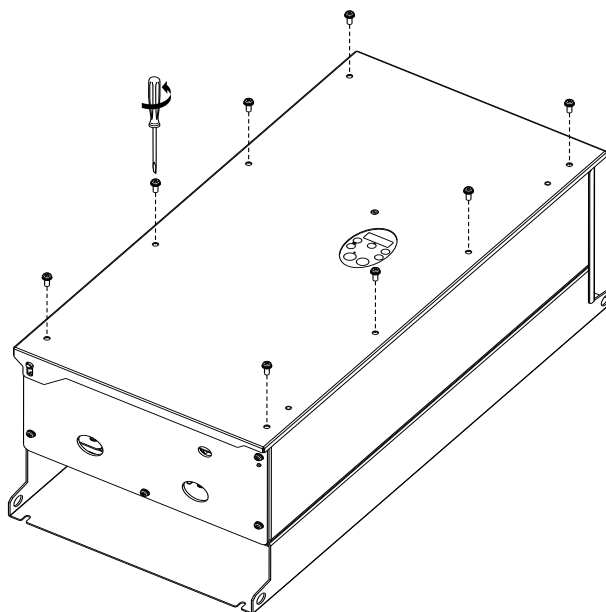
Remove the screws.  
Lift off the cover.



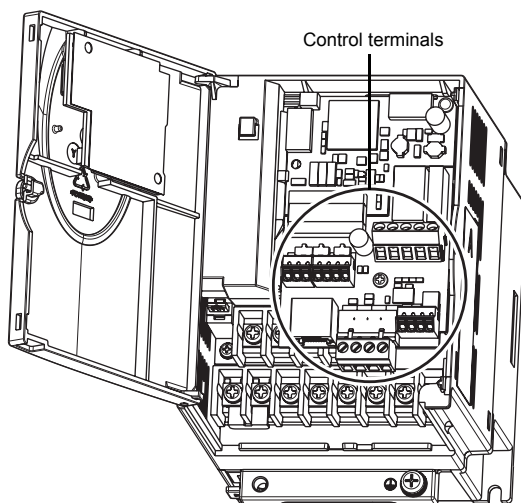
ATV212W up to 7.5 kW



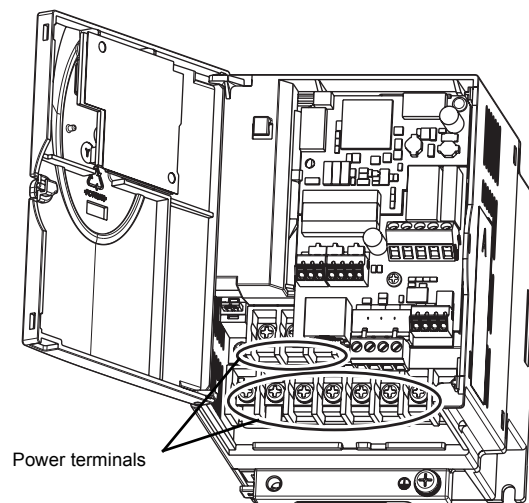
ATV212W above 7.5 kW



Terminal location on ATV212H



Control terminals



Power terminals

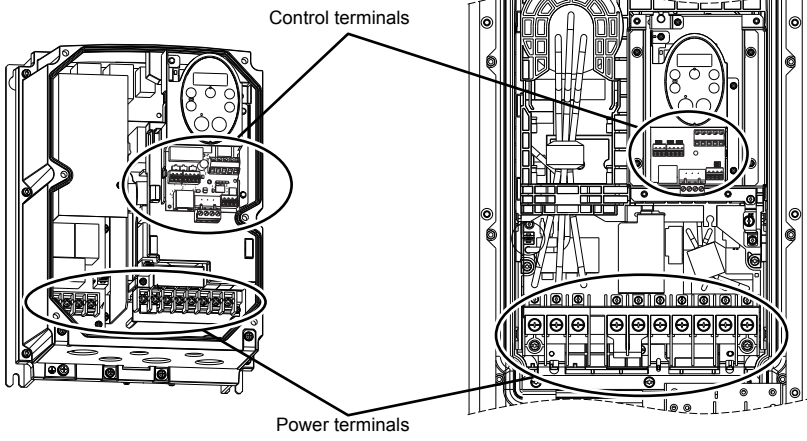
On drives ATV212H075M3X...U55N4 (page 10) first remove control board to access power terminals.

- 1 Remove the terminal board mounting screw and take off the ATV212 standard terminal board. Be careful not to lose the terminal board mounting screw.
- 2 Connect the power terminals
- 3 Reinstall the terminal board and fit the board mounting screw (M3 tapping type) and tighten to 0.7 to 0.8Nm.

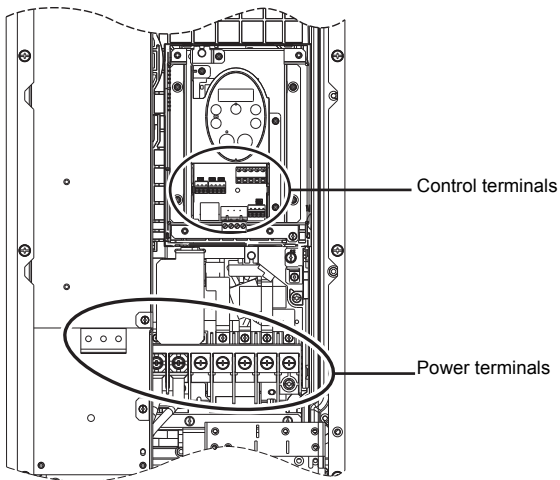
Terminal location on ATV212W

Example ATV212WU55N4C

Example ATV212WD15N4



Example ATV212WD18N4C





## Wiring recommendations

### **DANGER**

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

- 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.
- 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 mm<sup>2</sup> (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 recommendations in the ATV212 Quick Start Annex document, reference S1A73476 provided with the product.
- Do not connect the drive to a power feeder whose short-circuit capacity exceeds the maximum prospective line Isc listed in this manual.

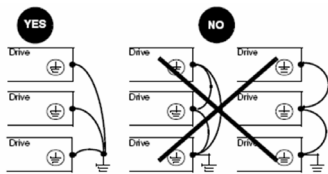
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**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.**


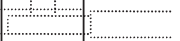


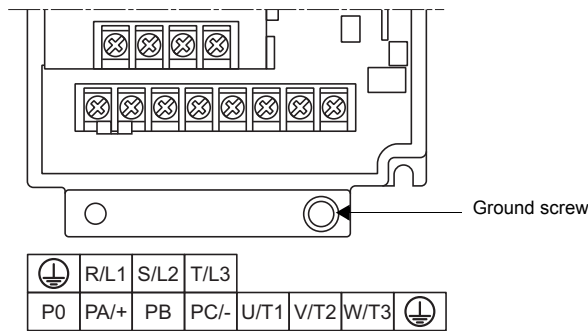
- Ensure that the resistance of the ground is one ohm or less.
- When grounding several drives, you must connect each one directly, as shown in the figure to the left.
- Do not loop the ground cables or connect them in series.

## Power terminals

### ATV212H - Arrangement and characteristics of the power terminals

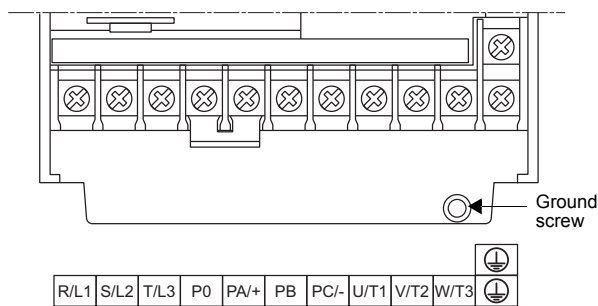
Connect the power terminals before connecting the control terminals.

- A**  Each power terminal has the structure shown in the figure at left. Connect a cable to **A** if it has a ring terminal or to **B** if it does not have a terminal (bare wire).
- B**  Parts A and B can accommodate different cable sizes.

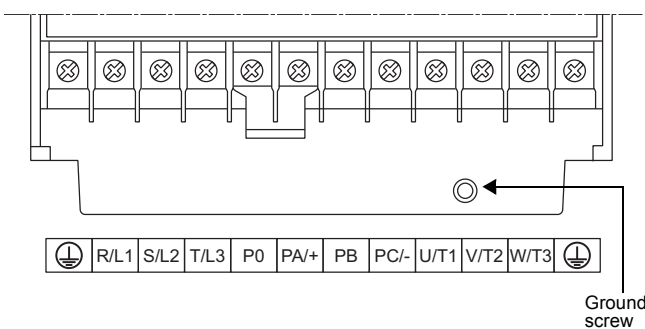


ATV212H	Maximum wire size		Tightening torque
(1)	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>075M3X, U15M3X, U22M3X, U30M3X, U40M3X, 075N4, U15N4, U22N4, U30N4, U40N4</b>	6	10	1.3 (11.5)

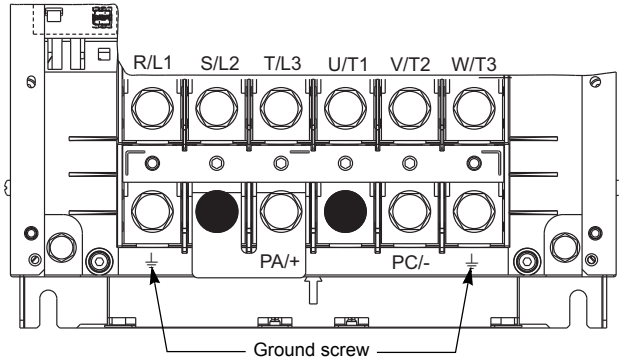
(1) On drives ATV212H075M3X...U55N4 first remove control board to access power terminals.



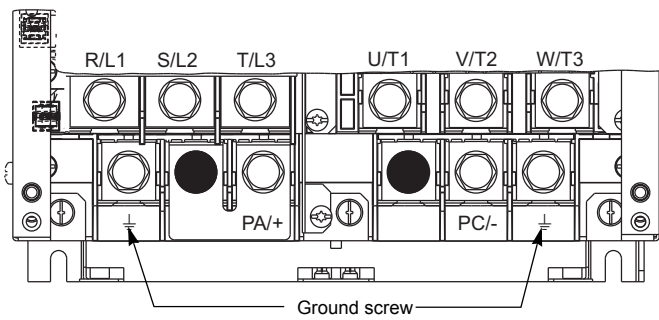
ATV212H	Maximum wire size		Tightening torque
(1)	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>U55N4</b>	6	10	1.3 (11.5)
<b>U55M3X, U75M3X, U75N4, D11N4</b>	16	6	2.5 (22.0)



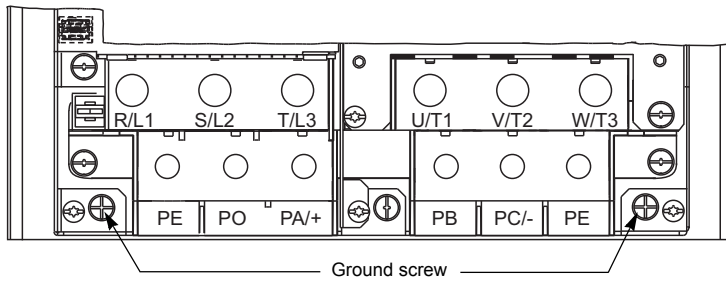
ATV212H	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>D11M3X, D15M3X, D18M3X, D15N4, D18N4, D22N4S</b>	25	3	4.5 (40.0)



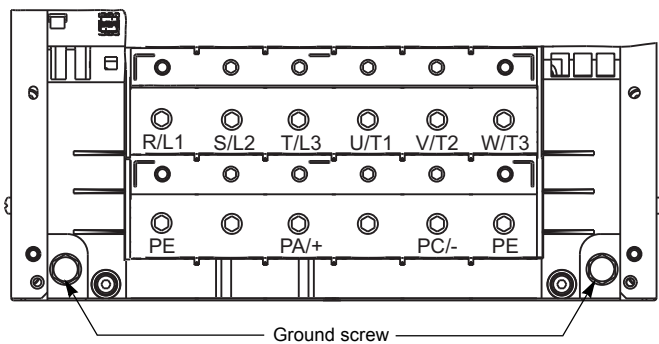
ATV212H	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>D22M3X D22N4, D30N4</b>	50	1/0	24 (212.0)



ATV212H	Maximum wire size		Tightening torque
	mm <sup>2</sup>	kcmils	N·m (lb-in)
<b>D30M3X</b>	150	300	41 (363.0)



ATV212H	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>D37N4, D45N4</b>	50	1/0	24 (212.0)



ATV212H	Maximum wire size		Tightening torque
	mm <sup>2</sup>	kcmils	N·m (lb-in)
<b>D55N4, D75N4</b>	150	300	41 (363.0)



**Characteristics**

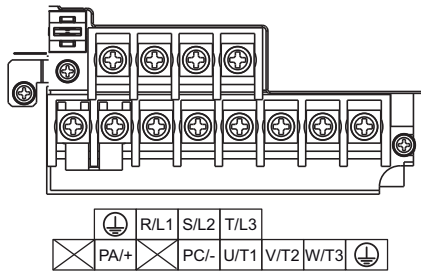
Terminal	Function
⏏	Ground terminal
R/L1 S/L2 T/L3	Power supply
U/T1 V/T2 W/T3	Outputs to the motor
PO (2)	DC bus (+) polarity (do not use)
PA/+ (2) (3)	DC bus (+) polarity
PB	DC bus connection (do not use)
PC/- (3)	DC bus (-) polarity

- (1) ATV212 drives have two ground terminals, one on the power terminal strip and one on the heatsink.
- (2) Never remove the jumper between PO and PA/+.
- (3) The PA/+ and PC/- terminals can only be used to measure the DC bus voltage.

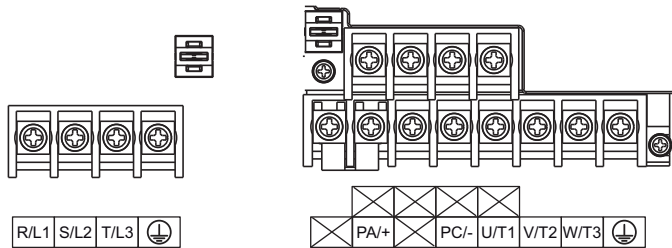
**ATV212W - Arrangement and characteristics of the power terminals**

Connect the power terminals before connecting the control terminals.

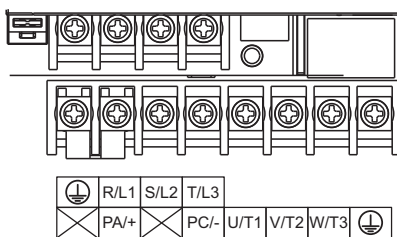
- A**  Each power terminal has the structure shown in the figure at left. Connect a cable to **A** if it has a ring terminal or to **B** if it does not have a terminal (bare wire).
- B**  Parts A and B can accommodate different cable sizes.



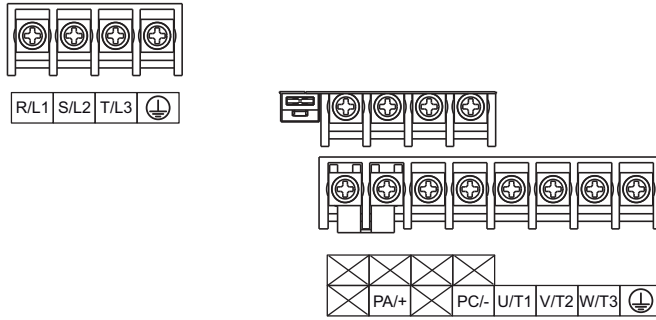
ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>075N4, U15N4, U22N4</b>	6	10	1.3 (11.5)



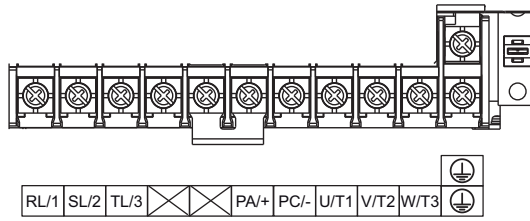
ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>075N4C, U15N4C, U22N4C</b>	6	10	1.3 (11.5)



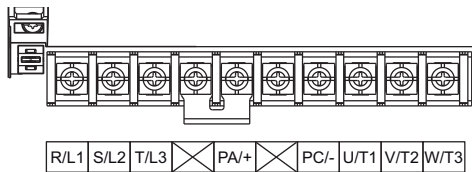
ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>U30N4, U40N4, U55N4,</b>	6	10	1.3 (11.5)



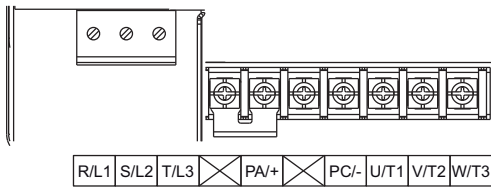
ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>U30N4C, U40N4C, U55N4C,</b>	6	10	1.3 (11.5)



ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>U75N4, U75N4C</b>	16	6	2.5 (22)

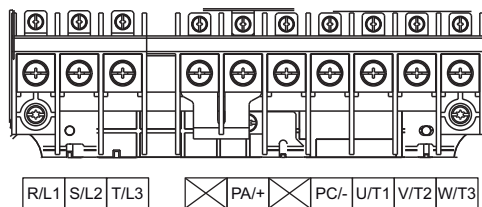


ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>D11N4, D15N4</b>	16	4	3 (26.5)



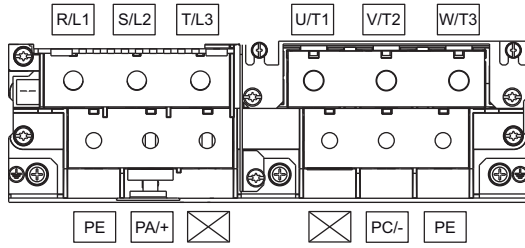
ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>D11N4C, D15N4C</b>	16	4	3 (26.5)
<b>D11N4C, D15N4C</b>	<i>10</i>	<i>6</i>	<i>4.5 (40.0)</i>

Values in italics are for terminals R/L1, S/L2, T/L3 terminals only.



ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)
<b>D18N4, D18N4C</b>	25	3	5.4 (48)
<b>D18N4C</b>	<i>16</i>	<i>4</i>	<i>2.2 (19.5)</i>

Values in italics are for terminals R/L1, S/L2, T/L3 terminals only.

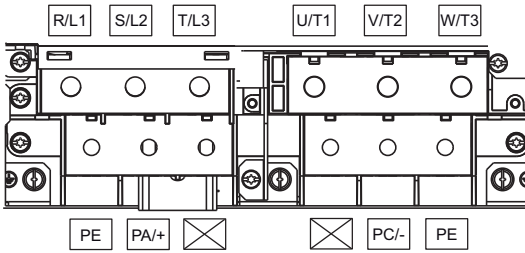


ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)

<b>D22N4, D22N4C</b> <b>D30N4, D30N4C</b>	50	1/0	24 (212)
----------------------------------------------	----	-----	----------

<b>D22N4C, D30N4C</b>	25	3	4.3 (38)
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Values in italics are for terminals R/L1, S/L2, T/L3 terminals only.

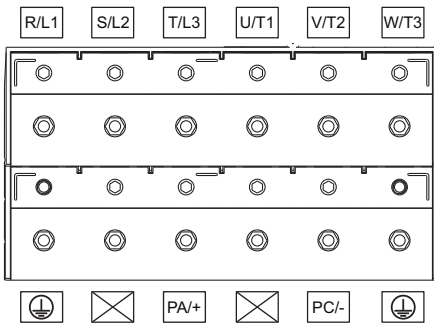


ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	AWG	N·m (lb-in)

<b>D37N4, D37N4C</b> <b>D45N4, D45N4C</b>	50	1/0	24 (212)
----------------------------------------------	----	-----	----------

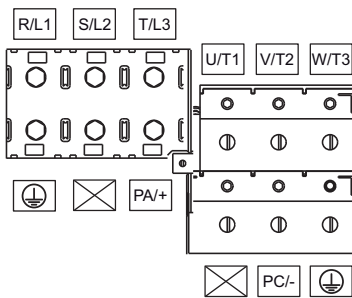
<b>D37N4C, D45N4C</b>	-	-	7 (62)
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Values in italics are for terminals R/L1, S/L2, T/L3 terminals only.



ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	kcmls	N·m (lb-in)

<b>D55N4, D75N4,</b>	150	300	41 (360)
----------------------	-----	-----	----------



ATV212W	Maximum wire size		Tightening torque
	mm <sup>2</sup>	kcmls	N·m (lb-in)

<b>D55N4C, D75N4C</b>	150	300	41 (360)
-----------------------	-----	-----	----------

	130	250	16 (142)
--	-----	-----	----------

Values in italics are for terminals R/L1, S/L2, T/L3 terminals only.

## Control terminals and switches

### Preliminary recommendations

Connect the control terminals after connecting the power terminals.

The logic input switch SW102 assigns the logic input type to either 24 V (source logic) or 0 V (sink logic).

**⚠ DANGER**

**UNINTENDED EQUIPMENT OPERATION**

- 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.**

**⚠ DANGER**

**UNINTENDED EQUIPMENT OPERATION**

- Modify only the setting of switches when the product is switched off.
- Do not change the setting of switch SW102 unless your system is wired for sink logic.

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

**⚠ CAUTION**

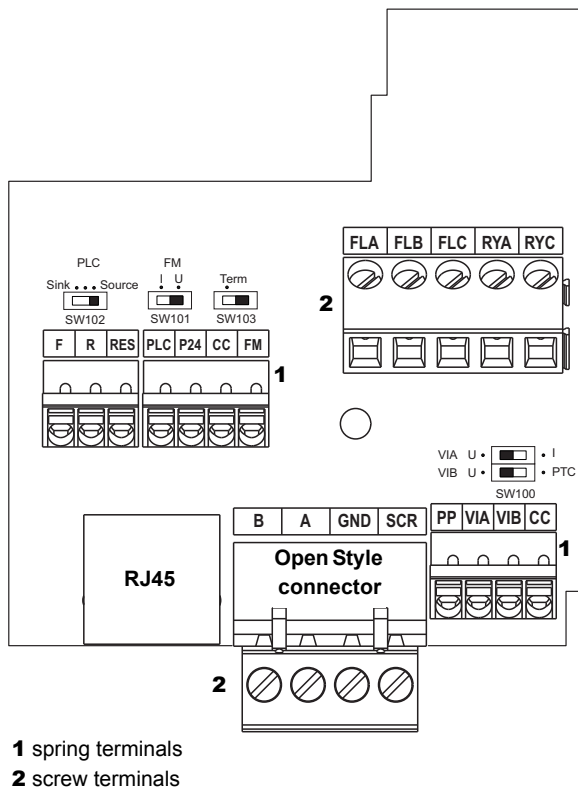
**RISK OF BODY INJURY**

use a screwdriver to change the position of the switches.

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

Refer to “Logic Input Switch” on page 26 for recommended circuit diagrams for source and sink logic.

### Arrangement



Switch	Factory Setting
SW100 VIA voltage/current selection VIB voltage/PTC selection (1)	Voltage (U) Voltage (U)
SW101 (FM voltage/ current selection)	Voltage (U)
SW102 Selection of logic type	Source
SW103 Selection of communication terminal resistor (2)	Term no resistor

#### Control terminal wire size and torque:

Applicable wire size:

- Screw terminals : 0.75 to 2.5 mm<sup>2</sup> (AWG 18 to 14)

- Spring terminals : 0.2 to 1 mm<sup>2</sup> (AWG 24 to 16)

Tightening torque:

0.5 to 0.6 N·m (4.4 to 5.3 lb-in)

(1) When SW100 is set to PTC, VIB is configured as PTC input connected to the 3.3 kΩ internal resistor. Connect the PTC probe between CC and VIB terminals.

If the 3.3 kΩ internal resistor does not suit the installation, regarding to the PTC resistor value, set SW100 to VIB, connect the PTC probe between CC and VIB terminals and add an external resistor between PP and VIB terminals.

(2) When SW103 is set to Term, internal 120 Ω termination resistor is connected between A and B terminals.



## Characteristics

Terminals	Function	Characteristics	Default function setting
PLC	External power supply input	+24 Vdc input for external power supply for logic inputs Max. permissible voltage: 50 Vdc	
P24	Internal supply	Short-circuit and overload protection: 24 Vdc supply (min. 21 Vdc, max. 27 Vdc), maximum current: 200 mA	—
CC	Common	0 Vdc common (2 terminals)	
FLA, FLB, FLC	Configurable relay outputs	1 relay logic output, 1 N/C contact, and 1 N/O contact with common point Minimum switching capacity: 10 mA for 5 Vdc Maximum switching capacity: • On resistive load ( $\cos \varphi = 1$ ): 5 A for 250 Vac or 30 Vdc • On inductive load ( $\cos \varphi = 0.4$ and $L/R = 7$ ms): 2 A for 250 Vac or 30 Vdc Max. response time: 10 ms	Fault relay
RY, RC		1 relay logic output, 1 N/O contact Minimum switching capacity: 3 mA for 24 Vdc Maximum switching capacity: • On resistive load ( $\cos \varphi = 1$ ): 3 A for 250 Vac or 30 Vdc • On inductive load ( $\cos \varphi = 0.4$ and $L/R = 7$ ms): 2 A for 250 Vac or 30 Vdc Max. response time: 7 ms $\pm$ 0.5 ms	Speed attained
F R RES	Configurable logic inputs	3 programmable logic inputs, 24 Vdc, compatible with level 1 PLC, IEC 65A-68 standard Impedance: 4.7 k $\Omega$ Maximum voltage: 30 Vdc Max. sampling time: 2 ms $\pm$ 0.5 ms Multiple assignment makes it possible to configure several functions on one input	F: Run forward (2-wire control) R: Preset speed 1 command (15 Hz) RES: Clear trip
		Positive logic (Source): State 0 if $\leq 5$ Vdc or logic input not wired, state 1 if $\geq 11$ Vdc	
		Negative logic (Sink): State 0 if $\geq 16$ Vdc or logic input not wired, state 1 if $\leq 10$ Vdc	
FM	Configurable analog output	1 switch-configurable (SW101) voltage or current analog output: • Voltage analog output 0–10 Vdc, minimum load impedance 7.62 k $\Omega$ • Current analog output X–Y mA by programming X and Y from 0 to 20 mA, maximum load impedance: 970 $\Omega$ Max. sampling time: 2 ms $\pm$ 0.5 ms Resolution: 10 bits Accuracy: $\pm 1$ % for a temperature variation of 60 °C Linearity: $\pm 0.2$ %	Output frequency
PP	Internal supply available	Short-circuit and overload protection: One 10.5 Vdc $\pm$ 5% supply for the reference potentiometer (1 to 10 k $\Omega$ ), maximum current: 10 mA	—
VIA	Configurable analog/logic input	Switch-configurable voltage or current analog input: • Voltage analog input 0–10 Vdc, impedance 30 k $\Omega$ maximum voltage: 24 Vdc • Analog current input X–Y mA by programming X and Y from 0 to 20 mA, with impedance 250 $\Omega$ Max. sampling time: 3.5 ms $\pm$ 0.5 ms Resolution: 10 bits Accuracy: $\pm 0.6$ % for a temperature variation of 60 °C Linearity: $\pm 0.15$ % of the maximum value This analog input is also configurable as a logic input. Consult the Altivar 212 Programming Manual for more information.	Primary speed reference, 0–10 V
VIB	Configurable analog input	Voltage analog input, configurable as an analog input or as a PTC probe input. Voltage analog input: • 0–10 Vdc, impedance 30 k $\Omega$ max. voltage 24 Vdc • Max. sampling time: 22 ms $\pm$ 0.5 ms • Resolution: 10 bits • Accuracy: $\pm 0.6$ % for a temperature variation of 60 °C • Linearity: $\pm 0.15$ % of the maximum value PTC probe input: • 6 probes max. mounted in series • Nominal value < 1.5 k $\Omega$ • Trip resistance 3 k $\Omega$ , reset value 1.8 k $\Omega$ • Short-circuit detection threshold < 50 $\Omega$	Secondary speed reference, 1–10 V
RJ45	Graphic display terminal or Modbus	Used to connect graphic display terminal or connect the drive to a Modbus fieldbus. <b>Note:</b> For using Modbus on the RJ45, modify parameter F807. See Modbus manual.	
Open Style connector	Fieldbus	Refer to communication manual related to the fieldbus.	

## Installing option card

### ⚠️ ⚠️ DANGER

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

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

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

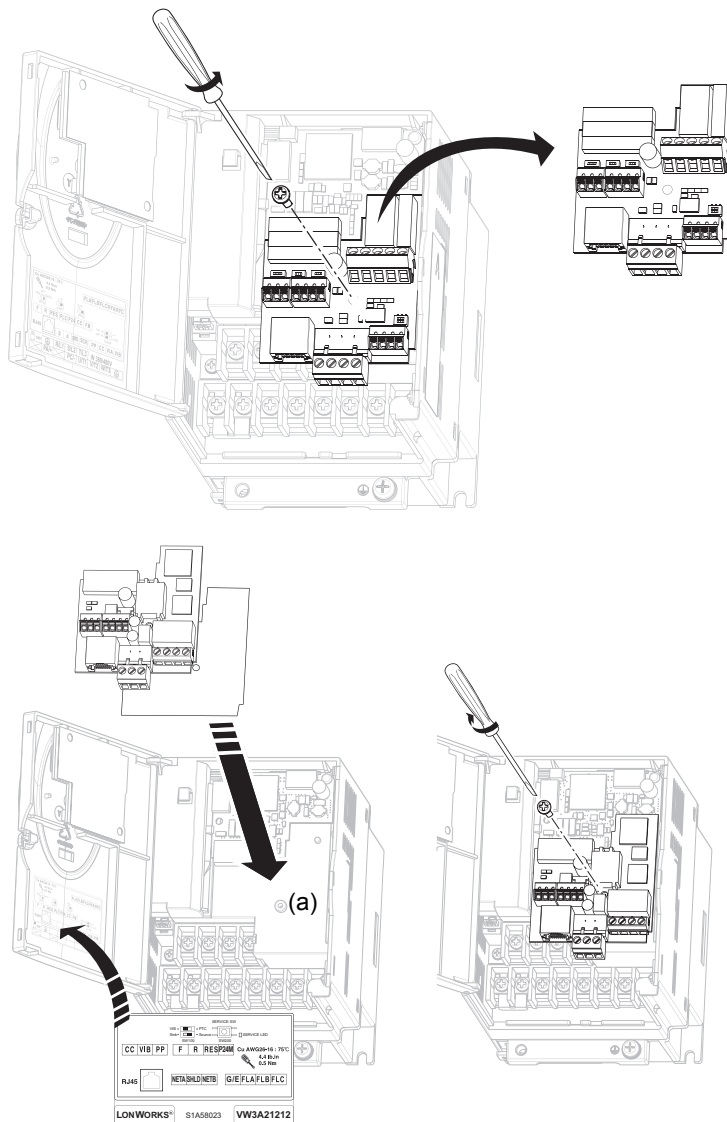
### ⚠️ DANGER

#### UNINTENDED EQUIPMENT OPERATION

- Do not plug or unplug the terminal board while drive is powered.
- Check the tightening of the mounting screw after any manipulation on the terminal board.

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

Example for installing the LonWorks communication card in ATV212.



- 1 Open the ATV212 front cover, remove the terminal board mounting screw and take off the ATV212 standard terminal board. See paragraph How to open the front cover, page 38. Be careful not to lose the terminal board mounting screw when removed since it may be used again. On drives from 0.75 to 2.2 kW the board features a plastic tag to hold the mounting screw in place.
- 2 Attach the insulating sheet in ATV212. Fix to the terminal board mounting screw hole and ATV212 catch pin (a).
- 3 Install the LonWorks communication card over the insulating sheet. Fit the board mounting screw (M3 tapping type) and tighten to 0.7 to 0.8 Nm.
- 4 Make the power and control wiring connections before installing communication card. For size 1 products (see page 10), connect power terminals before step 3.
- 5 Stick the cabling label for communication card on the standard cabling label stuck on front cover (internal side) ATV212. And stick the communication card nameplate close to the standard nameplate. Be careful not to cover slits on the ATV212 enclosure.

**Note:** To install or remove the terminal board, make it slide in or out in parallel with board.

## Use on an impedance grounded (IT) system

### Principle

When using the ATV212 drive on a system with an 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**

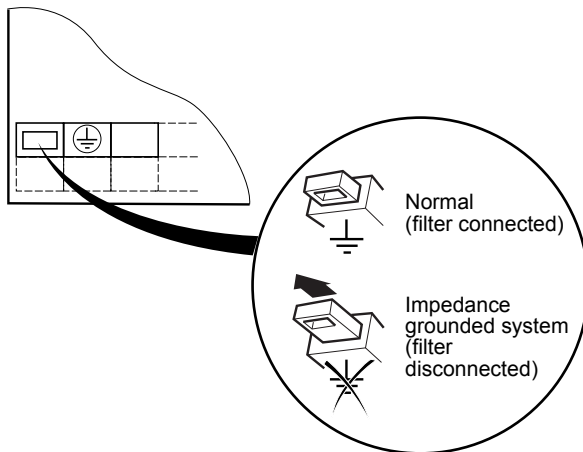
Read and understand the instructions in "before you begin" chapter, before performing the procedure in this section.

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

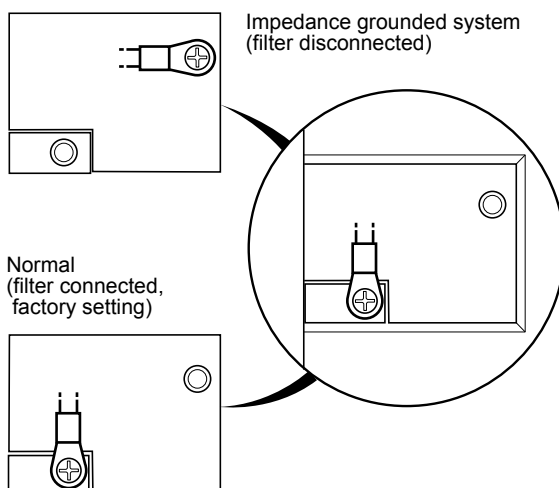
ATV212 480 V rated drives feature built-in radio frequency interference (RFI) filters with grounded capacitors. When using the drive on an impedance grounded system, we recommend that you isolate the RFI filters from ground to help prevent reduction of their operating life.

### Jumper Location

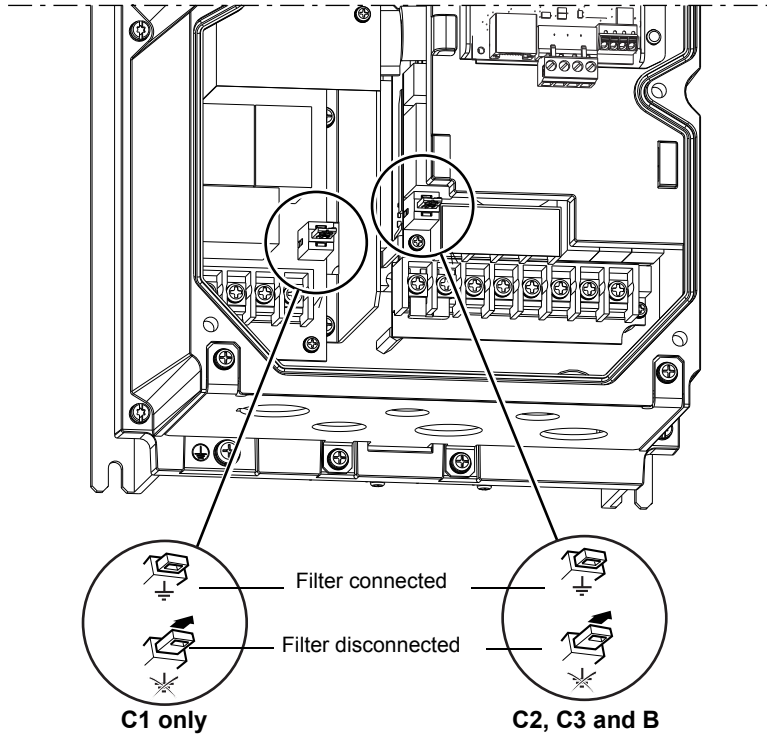
- ATV212H075N4 to U55N4, ATV212H D22N4 to D30N4:  
Pull out the jumper to the left of the ground terminal as illustrated below to isolate the RFI filters.



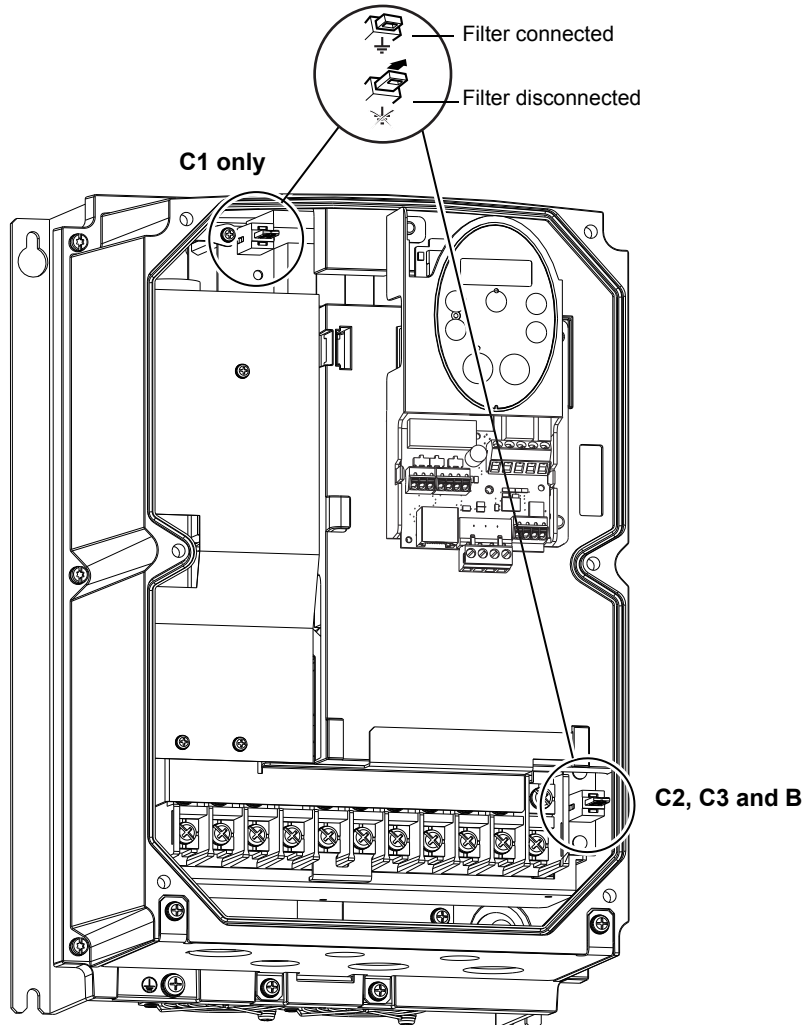
- ATV212HU75N4 to D22N4S:  
Connect the cable to the top left of the power terminals as illustrated below to isolate the filters.



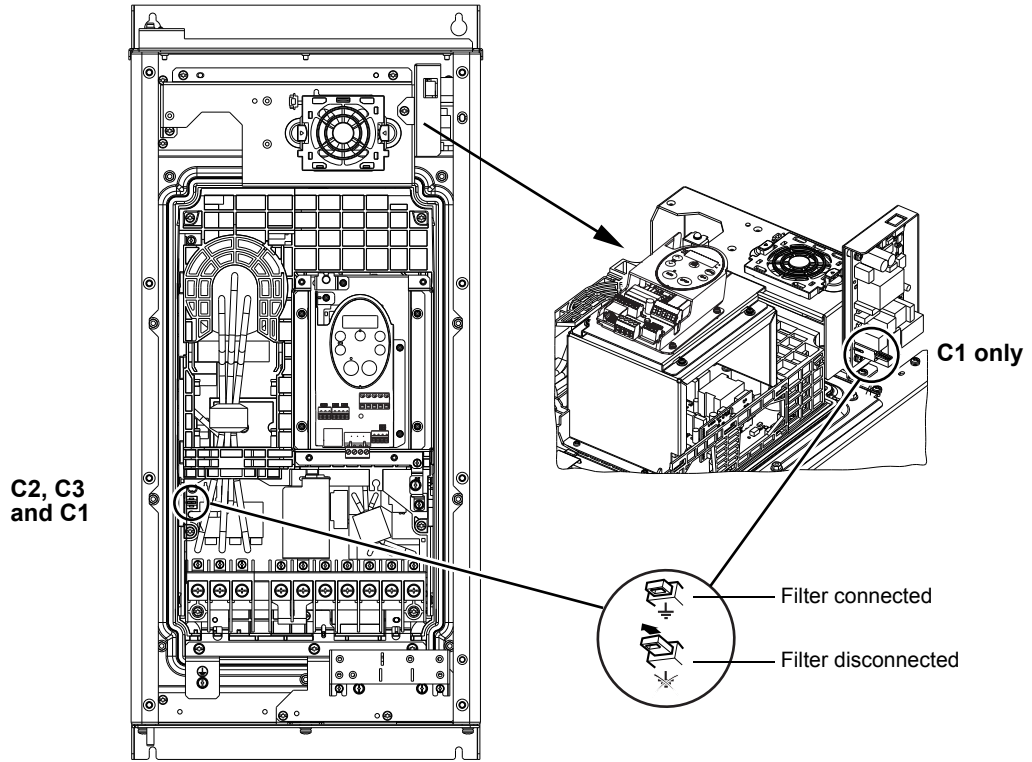
- ATV212W075N4 to U55N4 (C2, C3) and ATV212W075N4C to U55N4C (C1)



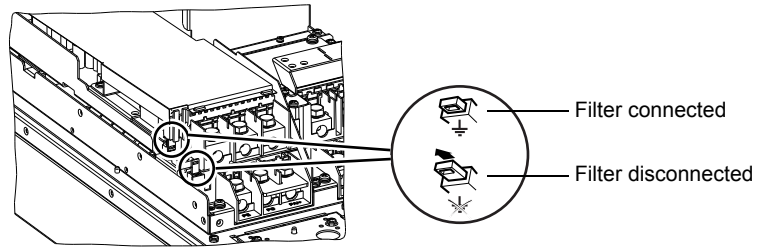
- ATV212WU75N4 (C2, C3) and ATV212WU75N4C (C1)



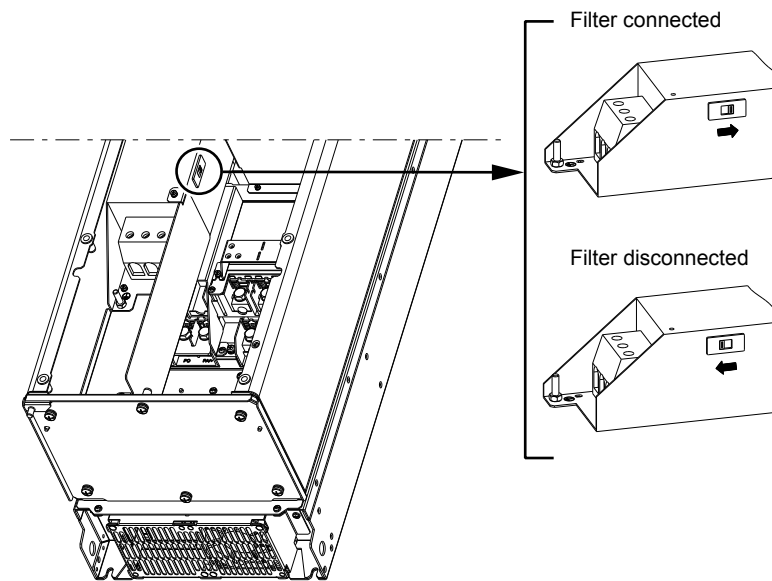
- ATV212WD11N4 to D18N4 (C2, C3) and ATV212WD11N4C to D18N4C (C1)



- ATV212WD22N4 to D75N4 (C2, C3)



- ATV212WD22N4C to D75N4C (C1)



## 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

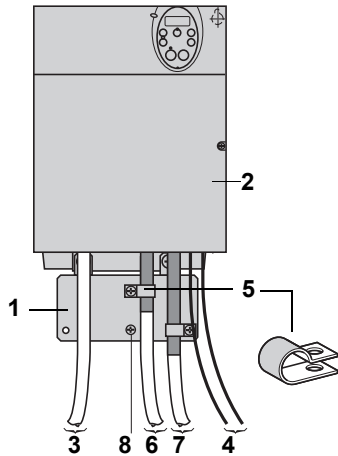
### RISK OF LIFE DURATION AND EMC PERFORMANCES DECREASE

- Do not connect the drive to a low impedance network.
- The input withstand current must not exceed the value in the table defined in the ATV212 Quick Start Annex document, reference S1A73476 provided with the product.
- Installation and supply greater than this value will require an additional inductance.

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

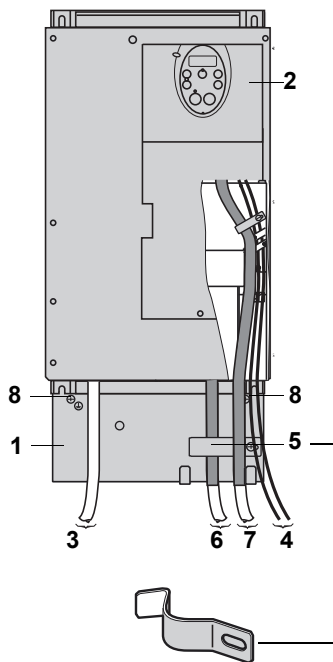
**EMC Plate and cable arrangement on ATV212H drives**

**ATV212H 075M3X to D18M3X  
ATV212H 075N4 to D22N4S**



- 1 EMC plate supplied with the ATV212 drive.
- 2 ATV212 drive.
- 3 Non-shielded power supply wires or cables.
- 4 Non-shielded wires for the output of the relay contacts.
- 5 The shields for cables 6 and 7 must be securely attached to the EMC plate with stainless steel clamps not supplied with the product. See catalog to order the clamps (ref. TM200RSRC EMC). Strip cables 6 and 7 to expose the shields. Apply appropriately-sized clamps around the stripped portion of the cables and fasten them to the EMC plate.
- 6 Shielded cable for connection to the motor, with shield connected to ground at both ends. This shield must not be interrupted. If intermediate terminal blocks are used, they must be in EMC-shielded metal boxes.
- 7 Shielded cable for connection to control/command devices. For applications which require a large number of conductors, small cross-sections must be used (0.5 mm<sup>2</sup>, 20 AWG). This shield must not be interrupted. If intermediate terminal blocks are used, they must be in EMC-shielded metal boxes.
- 8 Ground screw. Use this screw for the motor cables on the low power rated drives, as the ground screw on the heatsink is inaccessible.

**AV212H D22M3X to D30M3X  
ATV212H D22N4 to D75N4**



If using an additional input filter, connect it directly to the line supply with an unshielded cable. Then make connection 3 on the drive using the filter output cable.

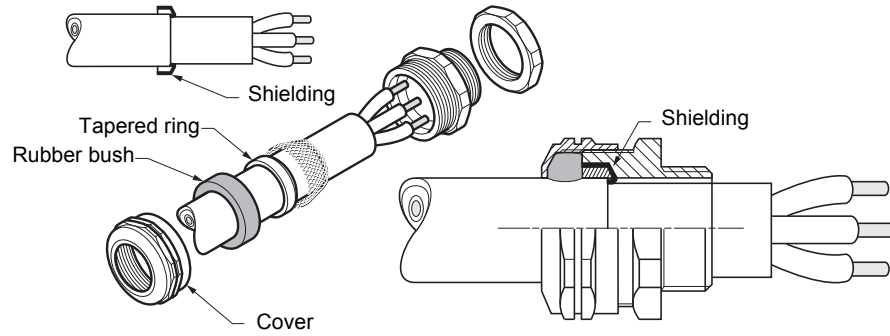
Although there is a high frequency equipotential ground connection between the drive, motor, and cable shielding, you must still connect the PE protective conductors (green-yellow) to the appropriate terminals on each of the devices. You may also need to disconnect the shield at the motor end for very long cable runs to alleviate noise generation.

**ATV212W connection plates**

There are connection plates on the lower sections of the variable speed drives. These plates are drilled in order to allow cables to be routed through them via cable glands. Cable glands must be ordered separately; **they are not supplied with the drive.**

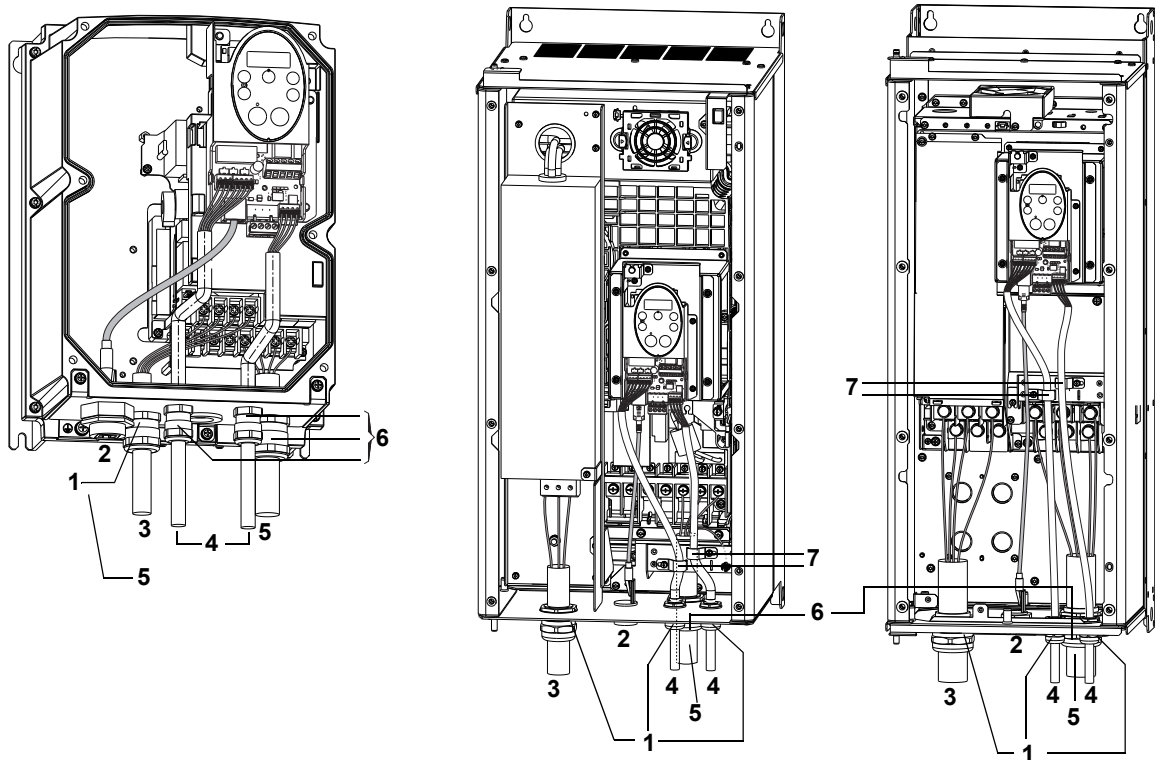
**Mounting and connecting a shielded motor cable with metal cable gland (not supplied with the drive)**

- Prepare the shielded cable by stripping both ends ready for connection.
- Loosen the cover of the cable gland.
- Attach the shielded cable to the cable gland ensuring it is fully in contact (throughout 360°).
- Fold back the shielding and clamp it between the ring and the body of the cable gland, and tighten the cover.



**EMC Plate and cable arrangement on ATV212W drives**

**ATV212W075N4C to U55N4C**



- 1 Standard cable gland (not supplied with the drive)
- 2 RJ45 connector
- 3 Unshielded power supply cable
- 4 Shielded control cables
- 5 Shielded motor cable
- 6 Metal cable glands (not supplied with the drive) for shielded control and motor cables
- 7 Metal clamps for grounding control cable shielding (shielding should be stripped)



**Using the RJ45 socket**

For example, ATV212W075N4 to U75N4

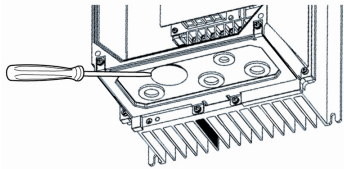
Using the dust and damp proof (UL Type 12/IP55) RJ45 cable VW3A01500 and cable VW3A01501.

VW3A01500

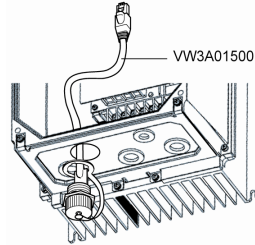
VW3A01501



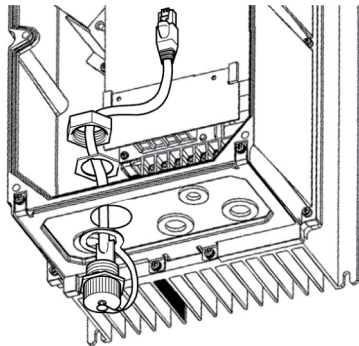
1)



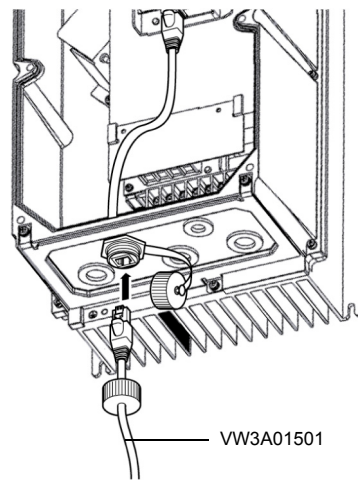
2)



3)



4)



**Maintenance**

<b>⚠ DANGER</b>
<b>HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH</b>
Read and understand the instructions in "before you begin" chapter, before performing the procedure in this section.
<b>Failure to follow these instructions will result in death or serious injury.</b>

**Limitation of Warranty**

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

**Servicing**

<b>CAUTION</b>
<b>RISK OF DAMAGE TO THE DRIVE</b>
Adapt the following recommendations according to the environment conditions: temperature, chemical, dust, vibration.
<b>Failure to follow these instructions can result in equipment damage.</b>

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	
Vibration	Terminal connections	Check tightening at recommended torque	At least each year

**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 [16](#).

## **Recommended branch circuit protection devices**

Please refer to the ATV212 Quick Start Annex document, reference S1A73476 : Short Circuit Current Ratings (SCCR) and branch circuit protection.

This document is delivered with the product, and you can download it on [www.schneider-electric.com](http://www.schneider-electric.com).



## Migration ATV21 --> ATV212

# 6

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### What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Generalities	62
Differentiating points	62
Terminal and switches arrangement comparison	63

## Generalities

The ATV212 is compatible with the ATV21 (latest version), nevertheless some differences exist between both drives.

## Differentiating points

### Power part

The power connections are identical to that of ATV21

### Control part overview

The control terminals are arranged and marked differently.

Furthermore ATV21 used to offer 5 different cards:

- a standard I/O card,
- 4 dedicated cards for BACnet, METASYS, APOGEE and LonWorks fieldbuses.

ATV212 offers:

- as standard a communication card intended to Modbus, BACnet, METASYS and APOGEE fieldbuses,
- a LonWorks option card.

### Switches

ATV21 Standard I/O		ATV212 Modbus BACnet, METASYS, APOGEE	
Selection of logic type	SW4	Selection of logic type	SW102
FM voltage/ current selection	SW2	FM voltage/ current selection	SW101

ATV21 BACnet, METASYS, APOGEE		ATV212 Modbus BACnet, METASYS, APOGEE	
Selection of logic type	SW2	Selection of logic type	SW102
VIB function		VIB function	SW100
Selection of communication terminal resistor	SW4	Selection of communication terminal resistor	SW103

ATV21 LonWorks		ATV212 LonWorks	
Selection of logic type	SW1	Selection of logic type	SW100
VIB function		VIB function	

## Terminal and switches arrangement comparison

