

Instruction Bulletin

Altivar[®] 31 Adjustable Speed Drives Supplementary Instructions to Altivar 31C IP54 Type 12 Installation Manual

Retain for future use.

Overview

NOTE: You can download the *Altivar[®] 31C Installation Manual* from the Technical Library at www.us.Telemecanique.com.

This bulletin is a supplement to the *Altivar[®] 31C Installation Manual* (atv31C_installation_manual_EN_V3). It contains important installation instructions for the following Altivar 31C IP54 Type 12 adjustable speed drives:

- 0.18 kW (0.25 hp) to 8 kW (40 hp) / 380–480 V
- 0.25 hp to 3 hp 240 V, and 0.5 hp to 20 / hp 480 V

Read this document carefully and store it with the Altivar 31C Installation Manual for future reference. To facilitate cross referencing, the section headings in this bulletin are worded to match the section headings in the installation manual.

Before You Begin

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Altivar 31 drive controller. 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 controller, including the printed circuit boards, operate at 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 controller:
 - 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. Then follow the DC bus voltage measurement procedure on page 4 to verify that the DC voltage is less than 45 V. The drive LED is not an accurate indicator of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the drive controller.

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

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Before turning on the drive controller or upon exiting the configuration menus, ensure that the inputs assigned to the Run command are in a state that will not cause the drive controller to run. Otherwise, the motor can start immediately.

Failure to follow this instruction will result in death, serious injury or equipment damage.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.¹
- Each implementation of an Altivar 31C drive controller must be individually and thoroughly tested for proper operation before being placed into service.

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

¹ For 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 controller, ensure that the line voltage is compatible with the line voltage range specified on the drive controller nameplate. The drive controller can be damaged if the line voltage is not compatible.

Failure to follow this instruction can result in injury or equipment damage.

⚠ CAUTION

IMPROPER DRIVE CONTROLLER OPERATION

- If the drive controller is de-energized for a prolonged period, the performance of the **electrolytic capacitors** will be reduced.
- If the drive controller is stopped for a prolonged period, turn it on every two years for at least 5 hours to restore the performance of the capacitors, then check its operation.
- Do not connect the drive controller to the line voltage. Gradually increase the voltage using an adjustable AC source.

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

Receiving and Preliminary Inspection

⚠ WARNING

DAMAGED PACKAGING

If the packaging appears damaged, it can be dangerous to open it or handle it. Handle with care.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

⚠ WARNING

DAMAGED EQUIPMENT

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

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Before installing the ATV31C drive controller, read *Altivar® 31C Installation Manual* (atv31c_installation manual_EN_V3), this bulletin, and follow all precautions.

Before removing the drive controller 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.

Storing and Shipping

If the drive controller 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 controller must be shipped to another location, use the original shipping material and carton to protect the drive controller.

Lifting and Handling

⚠ WARNING

HANDLING AND LIFTING HAZARD

Keep the area below any equipment being lifted clear of all personnel and property.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

- Altivar 31C drive controllers can be removed from their packaging and installed without a handling device.
- After removing the drive controller from its packaging, inspect it for damage. If any damage is found, notify the carrier and your sales representative.
- Verify that the drive controller nameplate and label conform to the packing slip and corresponding purchase order.

Bus Voltage Measurement Procedure

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in “Before You Begin” on page 1 of this bulletin before performing this procedure.

Failure to follow this instruction will result in death or serious injury.

Before working on the drive controller, remove all power and wait 15 minutes to allow the DC bus to discharge. Then measure the DC bus voltage between the PA/+ and PC/- terminals.

The DC bus voltage can exceed 1,000 Vdc. Use a properly rated voltage-sensing device when performing this procedure. To measure the DC bus voltage:

1. Disconnect all power.
2. Wait 15 minutes to allow the DC bus to discharge.
3. Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 45 Vdc.
4. If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive controller.

Mounting

Dimensions and Weights

Refer to Table 1 and Table 2 on page 5 for dimensions and weights of the ATV31C drive controllers.

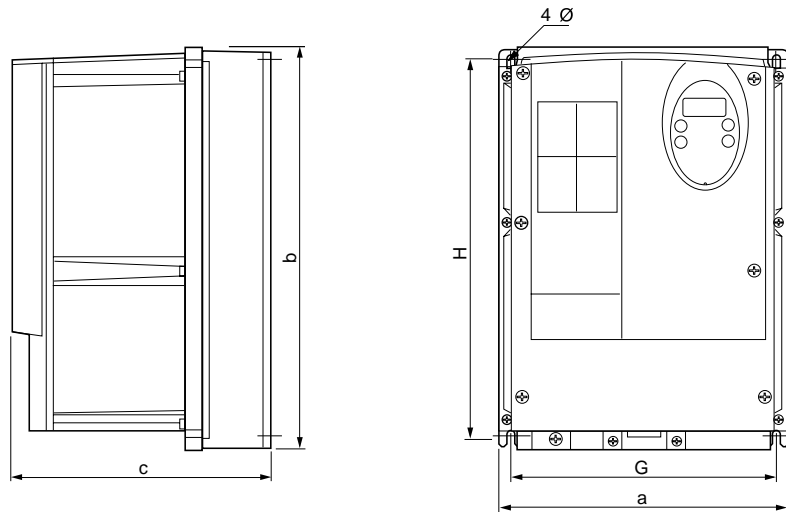


Table 1: Size 1–3 Dimensions and Weights

ATV 31C****		a mm (in.)	b mm (in.)	c mm (in.)	G mm (in.)	H mm (in.)	Ø mm (in.)	For screws	Weight kg (lb.)
018M2, 037M2, 055M2, 075M2	Size 1	210 (8.268)	240 (9.449)	163 (6.417)	192 (7.559)	218 (8.583)	5.5 (0.217)	M5	6.300 (13.889)
U11M2, U15M2, 037N4, 055N4, 075N4, U11N4, U15N4	Size 2	215 (8.465)	297 (11.693)	192 (7.559)	197 (7.756)	277 (10.905)	5.5 (0.217)	M5	8.800 (19.401)
U22M2, U22N4, U30N4, U40N4	Size 3	230 (9.055)	340 (13.386)	222 (8.740)	212 (8.346)	318 (12.520)	5.5 (0.217)	M5	10.700 (23.589)

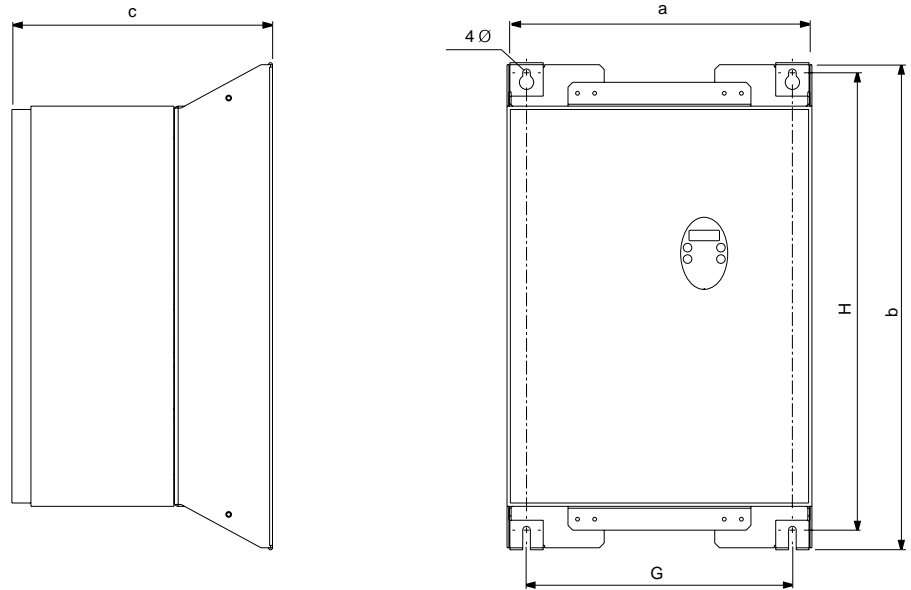


Table 2: Size 4-5 Dimensions and Weights

ATV 31C****		a mm (in.)	b mm (in.)	c mm (in.)	G mm (in.)	H mm (in.)	Ø mm (in.)	For screws	Weight kg (lb.)
U55N4, U75N4	Size 4	320 (12.598)	512 (20.157)	276.5 (10.886)	279 (10.989)	480 (18.898)	8 (0.315)	M6	23.600 (52.029)
D11N4, D15N4	Size 5	440 (17.323)	625 (24.606)	276.5 (10.886)	399 (15.710)	594 (23.386)	8 (0.315)	M6	32.500 (71.650)

Wiring

Wiring Recommendations

Good wiring practice requires the separation of control circuit wiring from all power (line) wiring. In addition, power wiring to the motor must have the maximum possible separation from all other power wiring, whether from the same drive controller or other drive controllers. Do not run power and control wiring, or multiple power wiring, in the same conduit. This separation reduces the possibility of coupling electrical transients from power circuits into control circuits or from motor power wiring into other power circuits.

⚠ WARNING

IMPROPER WIRING PRACTICES

- Follow the wiring practices described in this document in addition to those already required by the National Electrical Code and local electrical codes.
- Do not apply input line voltage to the output terminals (U/T1, V/T2, W/T3).
- Check the power connections before energizing the drive controller.
- If replacing another drive controller, verify that all wiring connections to the ATV31C drive controller comply with all wiring instructions in this manual.

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

Follow the practices below when wiring ATV31C drive controllers:

- Verify that the voltage and frequency of the input supply line and the voltage, frequency, and current of the motor match the rating on the drive controller nameplate.
- Use metallic conduit for all drive controller wiring. Do not run control and power wiring in the same conduit.
- Separate the metallic conduits carrying power wiring from those carrying control wiring by at least 76 mm (3 in.).
- Separate the non-metallic conduits or cable trays carrying power wiring from the metallic conduit carrying control wiring by at least 305 mm (12 in.).
- Whenever power and control wiring cross, the metallic conduits and non-metallic conduits or trays must cross at right angles.
- Equip all inductive circuits near the drive controller (such as relays, contactors, and solenoid valves) with noise suppressors.

Branch Circuit Protection

Refer to NEC Article 430 for sizing of branch circuit conductors. Ensure that all branch circuit components and equipment (such as transformers, feeder cables, disconnect devices, and protective devices) are rated for the input current of the ATV31C drive controller, or for the rated output current, whichever value is larger. The input current of the controller depends on the impedance of the power distribution system and the available short-circuit current at the drive input terminals.

The tables in the Drive Reference section of the *Altivar® 31C Installation Manual* provide input current information to optimally size branch circuit conductors. Do not exceed the short-circuit current rating shown in the tables. The short-circuit current rating is the available short-circuit current capability on the line side of the fuses or circuit breakers.

A line reactor can be used to add impedance and reduce the available short-circuit current capability to the level allowed by the drive controller.

NOTE: Ensure that the branch circuit feeder protection rating is not less than the rated output current of the drive controller.

When more than two drive controllers are installed in parallel on a common power line voltage, regardless of voltage rating, an individual line reactor per drive controller is recommended. This provides filtering between controllers and reduces harmonic distortion when the system is partially loaded.

⚠ WARNING

INADEQUATE OVERCURRENT PROTECTION

- Overcurrent protective devices must be properly coordinated.
- The National Electrical Code and the Canadian Electricity Code require branch circuit protection. Use the fuses listed on the drive controller's nameplate to achieve published short-circuit current ratings.
- Do not connect the drive controller to a power feeder whose short-circuit capacity exceeds the drive controller short-circuit current rating listed on the drive controller nameplate.

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

If starting the drive controller from line power, limit operations of the line contactor to less than once per minute to avoid premature failure of the filter capacitors and precharge resistor. Use the logic inputs to command the drive controller.

Output Wiring

The drive controller is sensitive to the amount of capacitance (either phase-to-phase or phase-to-ground) present on the output power conductors. Excessive capacitance can cause an overcurrent trip. Follow these guidelines when selecting output cable:

- Cable type: The cable selected must have a low capacitance phase-to-phase and phase-to-ground. Do not use mineral-impregnated cable because it has a very high capacitance. Immersion of cables in water increases capacitance.
- Cable length: The longer the cable, the greater the capacitance. Cable lengths greater than 30.5 m (100 ft.) can affect the drive controller and motor performance.
- When the output cable is in close proximity to other output cables, the drive controller may fault under some conditions because of high frequency switching and increased capacitance.
- **Do not use lightning arrestors and/or power factor correction capacitors on the output of the drive controller.**

For proper drive controller short circuit protection, certain values of inductance may be required in the output power wiring. Inductance can be supplied by the power wiring or auxiliary inductors.

⚠ CAUTION

INSUFFICIENT OUTPUT INDUCTANCE

Provide at least 500 mm (20 in.) of cable at the drive controller output (U/T1, V/T2, W/T3) to help protect the drive controller output when short circuits occur.

Failure to follow this instruction can result in injury or equipment damage.

Logic Input Switch

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

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Prevent accidental grounding of logic inputs configured for Sink Logic. Accidental grounding can result in unintended activation of drive controller 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.

Product Support

For support and assistance, contact the Product Support Group. The Product Support Group is staffed from 8:00 am until 6:00 pm Eastern time to assist with product selection, start-up, and diagnosis of product or application problems. Emergency phone support is available 24 hours a day, 365 days a year.

Toll free: 888-SquareD (888-778-2733)

E-Mail: drive.products.support@us.schneider-electric.com

Fax: 919-217-6508

Schneider Electric USA
8001 Knightdale Boulevard
Knightdale, NC 27545
1-888-SquareD (1-888-778-2733)
www.us.telemecanique.com

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