



GEH-6668A
Supersedes GEH-6668

GE Industrial Systems



AV-300iTM

575V

User's Guide

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Safety Symbol Legend / Légende des Signes de Sécurité

WARNING!

Commands attention to an operating procedure, practice, condition, or statement which, if not strictly observed, could result in personal injury or death.

Attire l'attention sur les modes d'utilisation et les procédés et conditions d'exploitation qui, en cas d'inobservation, pourraient entraîner des blessures corporelles ou la mort.

CAUTION!

Commands attention to an operating procedure, practice, condition, or statement which, if not strictly observed, could result in damage or destruction of equipment.

The seriousness of the injuries and of the damages which could be caused by the non-observance of such indications, depends on the different conditions. Anyway, the instructions given below should always be followed with the highest attention.

Attire l'attention sur les modes d'utilisation et les procédés et conditions d'exploitation qui, en cas d'inobservation, pourraient entraîner la détérioration ou la destruction des appareils.

La gravité des blessures et des dommages matériels possibles dépendent de différents facteurs. Toutefois, les instructions mentionnées ci-dessous devraient être toujours suivies avec la plus grande attention.

NOTE!

Commands attention to an operating procedure, practice, condition, or statement that must be highlighted.

Attire l'attention sur les modes d'utilisation et les procédés et conditions d'exploitation qui présentent un intérêt particulier.

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Chapter 0 - Safety Precautions / Precautions de Sécurité

NOTE!

The terms “Inverter”, “Controller” and “Drive” are sometimes used interchangeably throughout the industry. We will use the term “Drive” in this document

Les mots “Inverter”, “Controller” et “Drive” sont interchangeables dans le domaine industriel. Nous utiliserons dans ce manuel seulement le mot “Drive”.

WARNING! / ATTENTION!

- According to the EEC standards the AV300i and accessories must be used only after checking that the machine has been produced using those safety devices required by the 89/392/EEC set of rules.

Drive systems cause mechanical motion. It is the responsibility of the user to insure that any such motion does not result in an unsafe condition. Factory provided interlocks and operating limits should not be bypassed or modified.

- Never open the device or covers while the AC Input power supply is switched on. Minimum time to wait before working on the terminals or internal devices is listed in section 5.11 of this instruction book.
- If the front plate has to be removed because the ambient temperature is higher than 40 degrees, the user has to ensure that no occasional contact with live parts will occur.
- Always connect the Drive to the protective ground (PE) via the marked connection terminals (PE2) and the housing (PE1). Adjustable Frequency Drives and AC Input filters have ground discharge currents greater than 3.5 mA. EN 50178 specifies that with discharge currents greater than 3.5 mA the protective conductor ground connection (PE1) must be fixed type and doubled for redundancy.
- The drive may cause accidental motion in the event of a failure, even if it is disabled, unless it has been disconnected from the AC input feeder.

- *Selon les normes EEC, les drives AV300i et leurs accessoires doivent être employés seulement après avoir vérifié que la machine ait été produit avec les mêmes dispositifs de sécurité demandés par la réglementation 89/392/EEC concernant le secteur de l'industrie.*

Les systèmes provoquent des mouvements mécaniques. L'utilisateur est responsable de la sécurité concernant les mouvements mécaniques. Les dispositifs de sécurité prévues par l'usine et les limitations opérationnelles ne doivent être dépassés ou modifiés.

- *Ne jamais ouvrir l'appareil lorsqu'il est sous tension. Le temps minimum d'attente avant de pouvoir travailler sur les bornes ou bien à l'intérieur de l'appareil est indiqué dans la section 5.11 (this instruction book).*
- *Si la plaque frontale doit être enlevée pour un fonctionnement avec la température de l'environnement plus haute que 40°C, l'utilisateur doit s'assurer, par des moyens opportuns, qu'aucun contact occasionnel ne puisse arriver avec les parties sous tension.*
- *L'appareil peut redémarrer de façon accidentel en cas d'anomalie, sauf s'il a été déconnecté du réseau.*
- *Effectuer toujours des connexions de terre (PE) par le biais des bornes (PE2) et du châssis (PE1). Le courant de dispersion vers la terre est supérieur à 3,5 mA. Selon EN 50178 il faut prévoir dans ces cas une double connexion à terre.*

WARNING! - ELECTRICAL SHOCK AND BURN HAZARD / ATTENTION! – DÉCHARGE ÉLECTRIQUE ET RISQUE DE BRÛLURE :

When using instruments such as oscilloscopes to work on live equipment, the oscilloscope's chassis should be grounded and a differential amplifier input should be used. Care should be used in the selection of probes and leads and in the adjustment of the oscilloscope so that accurate readings may be made. See instrument manufacturer's instruction book for proper operation and adjustments to the instrument.

Lors de l'utilisation d'instruments (par exemple oscilloscope) sur des systèmes en marche, le châssis de l'oscilloscope doit être relié à la terre et un amplificateur différentiel devrait être utilisé en entrée.

Les sondes et conducteurs doivent être choisis avec soin pour effectuer les meilleures mesures à l'aide d'un oscilloscope. Voir le manuel d'instruction pour une utilisation correcte des instruments.

WARNING! - FIRE AND EXPLOSION HAZARD / ATTENTION! – RISQUE D'INCENDIES ET D'EXPLOSIONS:

Fires or explosions might result from mounting Drives in hazardous areas such as locations where flammable or combustible vapors or dusts are present. Drives should be installed away from hazardous areas, even if used with motors suitable for use in these locations.

L'utilisation des drives dans des zones à risques (présence de vapeurs ou de poussières inflammables), peut provoquer des incendies ou des explosions. Les drives doivent être installés loin des zones dangereuses, et équipés de moteurs appropriés.

WARNING! - STRAIN HAZARD / ATTENTION À L'ÉLEVATION:

Improper lifting practices can cause serious or fatal injury. Lift only with adequate equipment and trained personnel. Une élévation inappropriée peut causer des dommages sérieux ou fatals. Il doit être élevé seulement avec des moyens appropriés et par du personnel qualifié.

WARNING! - POWER SUPPLY AND GROUNDING / ATTENTION ! ALIMENTATION PUISSANCE ET MISE À LA TERRE

In case of a three phase supply not symmetrical to ground, an insulation loss of one of the devices connected to the same network can cause functional problem to the drive, if the use of a delta /star transformer is avoided.

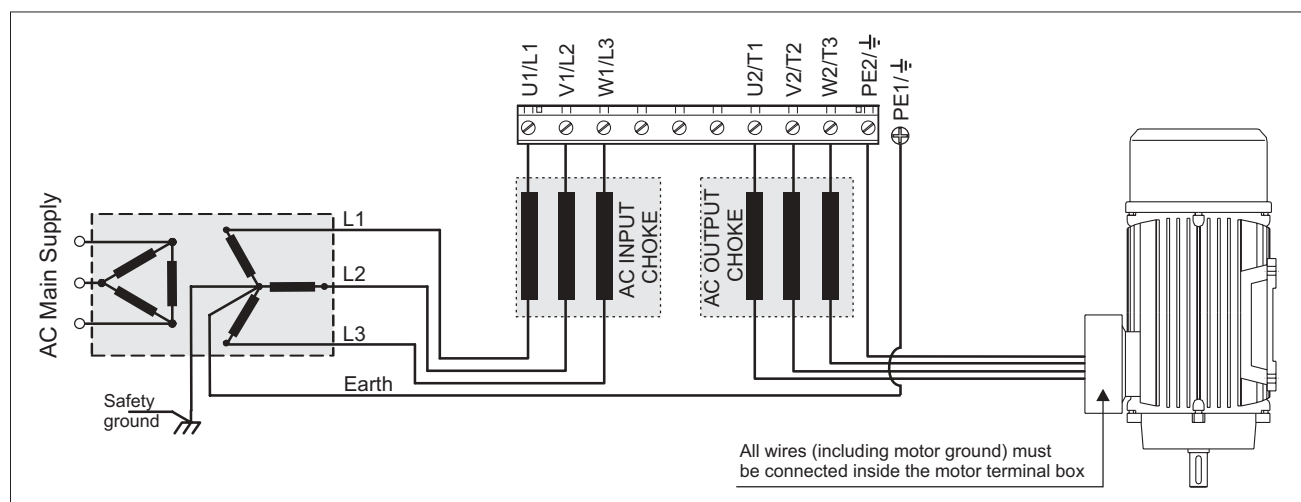
- 1 The drives are designed to be powered from standard three phase lines that are electrically symmetrical with respect to ground (TN or TT network).
- 2 In case of supply with IT network, the use of wye/delta transformer is mandatory, with a secondary three phase wiring referred to ground.

Please refer to the following connection sample.

Si le réseau n'est pas équilibré par rapport à la terre et qu'il n'y a pas de transformateur triangle/étoile, une mauvaise isolation d'un appareil électrique connecté au même réseau que le variateur peut lui causer des troubles de fonctionnement.

- 1 Les variateurs sont prévus pour être alimentés par un réseau triphasé équilibré avec un régime de neutre standard (TN ou TT).
- 2 Si le régime de neutre est IT, nous vous recommandons d'utiliser un transformateur triangle/étoile avec point milieu ramené à la terre

Vous pouvez trouver ci-après des exemples de câblage.



WARNING! - ELECTRIC SHOCK HAZARD / ATTENTION! - CAS DE DECHARGE ELECTRIQUE:

- Drives and motors must be grounded according to NEC and local codes.
- Replace all covers before applying power to the Drive. Failure to do so may result in death or serious injury.
- Adjustable frequency drives are electrical apparatus for use in industrial installations. Parts of the Drives are at high voltage during operation. The electrical installation and the opening of the device should therefore only be carried out by qualified personnel. Improper installation of motors or Drives may therefore cause the failure of the device as well as serious injury to persons or material damage. Follow the instructions given in this manual and observe the local and national safety regulations applicable.
- *Tous les moteurs et les drives doivent être mis à la terre selon le Code Electrique National ou équivalent.*
- *Remettre tous les capots avant de mettre sous tension le drive. Des erreurs peuvent provoquer de sérieux accidents ou même la mort.*
- *Les drives à fréquence variable sont des dispositifs électriques utilisés dans des installations industriels. Une partie des drives sont sous tension pendant l'opération. L'installation électrique et l'ouverture des drives devrait être exécuté uniquement par du personel qualifié. De mauvaises installations de moteurs ou de drives peuvent provoquer des dommages matériels ou blesser des personnes. On doit suivre les instructions données dans ce manuel et observer les règles nationales de sécurité.*

CAUTION! / PRECAUTION!:

- Do not connect power supply voltage that exceeds the standard specification voltage fluctuation permissible. If excessive voltage is applied to the Drive, damage to the internal components will result.
- Do not operate the Drive without the ground wire connected. The motor chassis should be grounded to earth through a ground lead separate from all other equipment ground leads to prevent noise coupling.
- The grounding connector shall be sized in accordance with the NEC or Canadian Electrical Code. The connection shall be made by a UL listed or CSA certified closed-loop terminal connector sized for the wire gauge involved. The connector is to be fixed using the crimp tool specified by the connector manufacturer.
- Do not perform a megger test between the Drive terminals or on the control circuit terminals.
- Because the ambient temperature greatly affects Drive life and reliability, do not install the Drive in any location that exceeds the allowable temperature. Leave the ventilation cover attached for temperatures of 104° F (40° C) or below.
- If the Drive's Fault Alarm is activated, consult the TROUBLESHOOTING section of this instruction book, and after correcting the problem, resume operation. Do not reset the alarm automatically by external sequence, etc.
- Be sure to remove the desiccant dryer packet(s) when unpacking the Drive. (If not removed these packets may become lodged in the fan or air passages and cause the Drive to overheat).
- The Drive must be mounted on a wall that is constructed of heat resistant material. While the Drive is operating, the temperature of the Drive's cooling fins can rise to a temperature of 194° F (90°C).
- Do not touch or damage any components when handling the device. Changing of isolation gaps or removing the isolation covers is not permissible.
- Protect the device from disallowed environmental conditions (temperature, humidity, shock etc.)
- No voltage should be connected to the output of the frequency inverter (terminals U2, V2, W2). The parallel connection of several frequency inverters via the outputs and the direct connection of the inputs and outputs (bypass) are not permissible.
- A capacitive load (e.g. Var compensation capacitors) should not be connected to the output of the frequency inverter (terminals U2, V2, W2).
- The electrical commissioning should only be carried out by qualified personnel, who are also responsible for the provision of a suitable ground connection and a protected power supply feeder in accordance with the local and national regulations. The motor must be protected against overloads.
- No dielectric tests should be carried out on parts of the frequency inverter. A suitable measuring instrument (internal resistance of at least 10 k Ω /V) should be used for measuring the signal voltages.

- *Ne pas raccorder de tension d'alimentation dépassant la fluctuation de tension permise par les normes. Dans le cas d'une alimentation en tension excessive, des composants internes peuvent être endommagés.*
- *Ne pas faire fonctionner le drive sans prise de terre. Le châssis du moteur doit être mis à la terre à l'aide d'un connecteur de terre séparé des autres pour éviter le couplage des perturbations. Le connecteur de terre devrait être dimensionné selon la norme NEC ou le Canadian Electrical code. Le raccordement devrait être fait par un connecteur certifié et mentionné à boucle fermée par les normes CSA et UL et dimensionné pour l'épaisseur du câble correspondant. Le connecteur doit être fixé à l'aide d'un instrument de serrage spécifié par le producteur du connecteur.*
- *Ne pas exécuter un test megger entre les bornes du drive ou entre les bornes du circuit de contrôle.*
- *Étant donné que la température ambiante influe sur la vie et la fiabilité du drive, on ne devrait pas installer le drive dans des places où la température permise est dépassée. Laisser le capot de ventilation en place pour températures de 104°F (40°C) ou inférieures.*
- *Si la Fault Alarm du drive est activée, consulter la section du manuel concernant les défauts et après avoir corrigé l'erreur, reprendre l'opération. Ne pas réinitialiser l'alarme automatiquement par une séquence externe, etc....*
- *Lors du déballage du drive, retirer le sachet déshydraté. (Si celui-ci n'est pas retiré, il empêche la ventilation et provoque une surchauffe du drive).*
- *Le drive doit être monté sur un mur construit avec des matériaux résistants à la chaleur. Pendant le fonctionnement du drive, la température des ailettes du dissipateur thermique peut arriver à 194°F (90°).*
- *Manipuler l'appareil de façon à ne pas toucher ou endommager des parties. Il n'est pas permis de changer les distances d'isolement ou bien d'enlever des matériaux isolants ou des capots.*
- *Protéger l'appareil contre des effets extérieurs non permis (température, humidité, chocs etc.).*
- *Aucune tension ne doit être appliquée sur la sortie du convertisseur (bornes U2, V2 et W2). Il n'est pas permis de raccorder la sortie de plusieurs convertisseurs en parallèle, ni d'effectuer une connexion directe de l'entrée avec la sortie du convertisseur (Bypass).*
- *Aucune charge capacitive ne doit être connectée à la sortie du convertisseur (bornes U2, V2 et W2) (par exemple des condensateurs de mise en phase).*
- *La mise en service électrique doit être effectuée par un personnel qualifié. Ce dernier est responsable de l'existence d'une connexion de terre adéquate et d'une protection des câbles d'alimentation selon les prescriptions locales et nationales. Le moteur doit être protégé contre la surcharge*
- *Il ne faut pas exécuter de tests de rigidité diélectrique sur des parties du convertisseurs. Pour mesurer les tensions, des signaux, il faut utiliser des instruments de mesure appropriés (résistance interne minimale 10 kΩ/V).*

NOTE!

If the Drives have been stored for longer than two years, the operation of the DC link capacitors may be impaired. Before commissioning devices that have been stored for long periods, connect them to a power supply for two hours with no load connected in order to regenerate the capacitors, (the input voltage has to be applied without enabling the inverter).

*En cas de stockage des convertisseurs pendant plus de deux ans, il faut tenir compte du fait que les condensateurs du circuit intermédiaire gardent leurs caractéristiques d'origine seulement s'ils sont alimentés avant trois ans, à partir de leur date de fabrication. Avant la mise en service des appareils, qui sont restés stockés aussi longtemps, il est conseillé d'alimenter les convertisseurs pendant au moins deux heures, pour récupérer les caractéristiques d'origine des condensateurs: appliquer une tension d'entrée sans activer le convertisseur (**Disable**).*

Chapter 1 - Function and Features (Overview)

The AV-300i is a field-oriented vector Drive with excellent speed control properties and a high torque.

Available control modes are:

- Field oriented with speed sensor
- Field oriented without speed sensor (Sensorless vect mode)
- V/f control

Space vector modulation keeps the noise level to a minimum.

- Output voltage up to 98% of input voltage
- Self tuning procedure for current, flux and speed regulators

The Drives are fitted with IGBTs (insulated gate bipolar transistors).

The output is protected against ground fault and phase to phase output short.

Regulator power supply via switched-mode power supply unit from the DC Bus circuit. Power supply backup in the event of short-term voltage dips.

Galvanic isolation between control section and command terminals.

Analog inputs designed as differential inputs.

Simple operation of the drive

- via the terminal strip
- via the user-friendly keypad
- via the PC program supplied and the RS485 serial interface
- via a fieldbus connection (optional): PROFIBUS-DP or GENIUS.
- Toolbox configuration tool

Fault register storing the last ten fault alarms with the associated lifetime.

Overload control

Engaging a running motor

Three freely configurable analog inputs on the standard device

Expansion of the analog / digital outputs and analog / digital inputs via option cards

Reference value entry and actual value display as a percentage of a user-defined dimension

Speed and torque current regulation possible

Adaptive speed regulation

Speed-related alarms

Motor potentiometer function (Increase/Decrease speed by command)

Jog operation

8 internal speed reference values

4 internal ramps

PID control

Controlled stop in case of AC mains power loss.

Notes:

Chapter 2 - Inspection Procedure, Component Identification and Standard Specification

2.1. Upon Delivery Inspection Procedures

2.1.1. General

A high degree of care is taken in packing the AV-300i Drives and preparing them for delivery. They should only be transported with suitable transport equipment (see weight data). Observe the instructions printed on the packaging. This also applies when the device is unpacked and installed in the control cabinet.

Upon delivery, check the following:

- the packaging for any external damage
- whether the delivery note matches your order.

Open the packaging with suitable tools. Check whether:

- any parts were damaged during transport
- the device type corresponds to your order

In the event of any damage or of an incomplete or incorrect delivery please notify the responsible sales offices immediately.

The devices should only be stored in dry rooms within the specified temperature ranges .

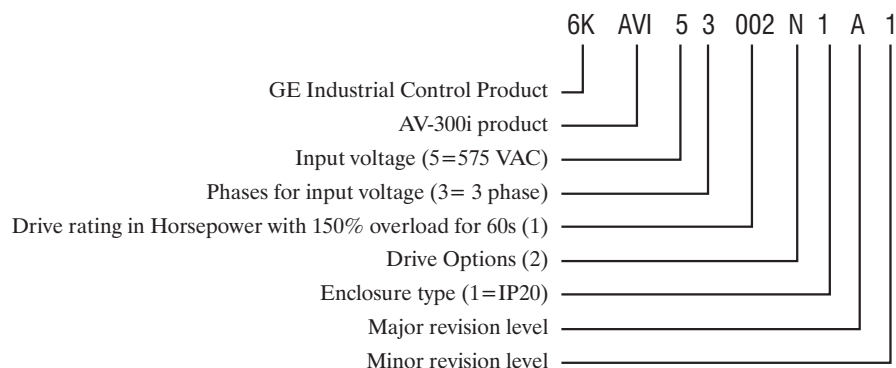
NOTE!

A certain degree of moisture condensation is permissible if this arises from changes in temperature (see section 2.4.1, “Permissible Environmental Conditions”). This does not, however, apply when the devices are in operation. Always ensure that there is no moisture condensation in devices that are connected to the power supply!

2.1.2. Inverter Type Designation

The technical specification of the AV-300i Drive is stated in the type code. Example:

Figure 2.1.2.1: Inverter type designation





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