

# Safety and Standards

## Safety Overview

Only qualified persons may perform the installation procedures. You do not need to be an expert in motion control to install and operate the drive system. However, you must have a basic understanding of electronics, computers, mechanics, and safety practices.



**The MAXTUNE utilizes hazardous voltages. Be sure the drive is properly grounded.**



When connecting the MAXTUNE to other control equipment, be sure to follow two basic guidelines to prevent damage to the drive:

- The MAXTUNE must be grounded via the earth ground of the main AC voltage supply.
- Any motion controller, PLC or PC that is connected to the MAXTUNE must be grounded to the same earth ground as the MAXTUNE.

Before you install the MAXTUNE, review the safety instructions in the product documentation. Failure to follow the safety instructions may result in personal injury or equipment damage.

## Safety Symbols

Safety symbols indicate a potential for personal injury or equipment damage if the recommended precautions and safe operating practices are not followed.

The following safety-alert symbols are used on the drive and in the documentation:

	<b>Caution</b>	ISO 7000-0434 (2004-01)
	<b>Warning.</b> Dangerous voltage.	IEC 60417-5036 (2002-10)
	Protective earth; functional ground	IEC 60417-5019 (2006-08)
	Caution, hot surface	IEC 60417-5041 (2000-10)

## Safety Instructions


- Read all available product documentation before assembling and commissioning. Incorrect handling of this product may cause personal injury and/or damage to equipment. Adhere strictly to the installation instructions and requirements.

- All system components must be connected to ground. Electrical safety is provided through a low-resistance earth ground connection. (Protective Class 1 according standard EN/IEC 618005-1.) Motor should be connected to protective earth by independent earthing conductor rated not less than the motor wire. This product contains static sensitive components that can be damaged by incorrect handling. Avoid contact with high insulating materials (artificial fabrics, plastic film, etc.). Place the product on a conductive surface. Ground yourself (discharge any possible static electricity build-up) by touching an unpainted, metal, grounded surface.
- Keep all covers and cabinet doors shut during operation. Otherwise, potential hazards may cause personal injury and/or damage to equipment.
- During operation the product has electrically charged components and hot surfaces. The heat sink can reach temperatures of 90°C. Control and power cables can carry a high voltage, even when the motor is not rotating.
- To avoid electric arcing and hazards to personnel and electric contacts, never disconnect or connect the product while the power source is energized.
- After removing the power source from the equipment, wait at least 5 minutes before touching or disconnecting sections of the equipment that normally carry electrical charges (e.g., capacitors, contacts, screwed connections). For safety, measure the electrical contact points with a meter before touching the equipment. Wait until the voltage drops below 30 VAC before handling components.
- Provide a power mains disconnect device in according with local regulations.
- Before testing and setting up, the manufacturer of the machine must generate a hazard analysis for the machine, and take appropriate measures to ensure that unforeseen movements cannot cause injury or damage to any person or property.
- Since the drive meets IP20 according to IEC 60529, and type 1 according to UL 50, the end user must select an enclosure that permits safe operation of the drive. The enclosure must meet at least IP54 according to IEC 60529, and at least type 2 according to UL 50, and be made of metal or material with rating flammability of 5 VA, and not have any openings in the bottom.
- Since the leakage current to PE is greater than 3.5 mA, compliance with IEC61800-5-1 and UL 508C requires either doubling of the PE connection (by one grounding connection through the mains power cable earthing wire, and another connection through the heat sink connection to the grounded machine base), or the use of a copper connecting cable with a cross-section greater than 10 mm<sup>2</sup>. Use the drive mount screws and the PE connection screws to meet this requirement.
- Wiring of green color with or without one or more yellow stripes must not be used except for protective bonding.
- Power cables should be rated at least 600V, 75°C.
- The STO input is functional in all MAXTUNE models but not yet independently certified in certain models. Refer to the *MAXTUNE Functional Safety Reference Manual*.
- Drives with a suspended load must have an additional mechanical safety block (such as a motor-holding brake). The drive cannot hold the load when STO is active. Serious injury could result if the load is not properly safeguarded.

## Standards Compliance

The MAXTUNE has been tested and according to the following standards. **Table**

### Standards Compliance

Standard	Directive/Description	Certif. Mark
<b>IEC 61800-5-1</b>	<b>Low Voltage Directive 2014/35/EU</b> Adjustable speed electrical power drive systems.	
<b>EN 61800-3</b>	<b>Electromagnetic Compatibility (EMC) Directive 2014/30/EU</b> Electromagnetic Compatibility (EMC)	
<b>EN 50581</b>	<b>DIRECTIVE 2015/863/EU RoHS3</b> Restriction of the Use of Certain Hazardous Substances	
<b>SJ/T 11364</b>	<b>Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products</b> (China RoHS 2.0) Hazardous substances in electronic and electrical products; environmental protection use period and recyclability.	
<b>UL 508C</b>	<b>Power Conversion Equipment</b> Open or enclosed equipment that supplies power to control a motor or motors operating at a frequency or voltage different than that of the input supply.	
<b>CSA C22.2 NO. 14-10</b>	<b>Industrial Control Equipment</b> Control and protective devices, and accessory devices, rated at not more than 1500V, for starting, stopping, regulating, controlling, or protecting electric motors, generators, heating apparatus, or other equipment used to control an industrial process that is intended to be installed and used in non-hazardous locations.	
<b>EU REACH</b>	<b>Regulation (EC) 1907/2006 Concerning the Registration, Evaluation, Authorization and Restriction of Chemicals.</b> The production and use of chemical substances, and their potential impacts on both human health and the environment.	

**IEC** International Electrotechnical Commission

**EN** European Standard (Euro Norm)

**UL** Underwriters Laboratory

**CSA** Canadian Standards Association

**EU** European Parliament and Council of the European Union

**Note:** CE and UL certification is pending for MT-33/67 (400/480 VAC) models; they are currently undergoing testing.

## STO Certification and Reliability Data

For complete details, refer to *MAXTUNE Functional Safety Reference Manual*.

## Material Safety Data

The MAXTUNE is marked is in accordance with SJ/T 11364, which applies to electronic and electrical products sold in the People's Republic of China.

The data in the Hazardous Substances table below is in accordance with China RoHS 2.0: Administrative Measures for the Restriction of Hazardous Substances in Electric Appliances and Electronic Products; released January 21, 2016.



MAXTUNE contains certain hazardous substances, and can be used safely for 20 years, after which it should enter the recycling system.

**Table 2-2. Hazardous Substances**

Part Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr (VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Metal parts	X	O	O	O	O	O
Plastic parts	O	O	O	O	O	O
Electronic	X	O	O	O	O	O
Contacts	O	O	O	O	O	O
Cables and cabling accessories	O	O	O	O	O	O

**O:** Indicates that the concentration of hazardous substance contained in all of the homogeneous materials for this product is below the limit stipulated in GB/T 26572.

**X:** Indicates that the concentration of hazardous substance contained in at least one of the homogeneous materials used for this product is above the limit stipulated in GB/T 26572.