

Getting Started

Look here to see some helpful info on machine readiness and the first steps of installation and power-up.

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MachMotion Standard Operating Conditions

STANDARD OPERATING CONDITIONS FOR ELECTRICAL AND CONTROL EQUIPMENT

This document specifies conditions within which MachMotion electrical and control equipment products can operate. Other conditions may be accommodated with additional engineering.

ENVIRONMENTAL

1. **Enclosure type:** NEMA/UL type 1 (Where enclosure is provided by MachMotion)
 - a. Indoor use only. Enclosure “provides a degree of protection against: a) incidental contact with the enclosed equipment, and b) against falling dirt”.
2. **Ambient temperature range:** 5°C to 40°C (41°F to 104°F)
3. **Humidity range:** 0% to 85% Relative Humidity (RH) maximum, non-condensing
4. **Altitude:** 1000 meters (3280 feet) maximum above mean sea level
5. **Environment:**
 - a. Pollution Degree 2
 - b. Free of flammable or corrosive gases or mists
 - c. Minimal non-conductive dusts (1 ppm or less) in ambient air
 - d. Free of salts or iron dust
 - e. Free of water (including rain and snow), oil, or chemical mists
6. **Environmental radiation:**
 - a. Free of strong electromagnetic or magnetic fields
 - b. Free of static electricity
 - c. Free of ionizing radiation
 - d. Not located in direct sunlight
7. **Vibration and Mechanical shock:**
 - a. Vibration: 4.9 m/s² (0.5 G) maximum
 - b. Shock: 19.6 m/s² (2 G) maximum
8. (Reserved for future use)

ELECTRICAL POWER SUPPLY

9. **Voltage fluctuation** from nominal: +10%, -10% maximum
10. **Frequency fluctuation** from nominal: +2%, -2% maximum
11. **Prospective short circuit current:** Standard: 5,000 amps, RMS.

12. **Voltage, phase, frequency:** Standard: 230 volts $\pm 10\%$ AC, 3 phase, 60 Hertz.

- a. Other supply characteristics available upon request:
- b. 230 volts $\pm 10\%$, 1 phase, 50 or 60 Hertz
- c. 120 volts $\pm 10\%$, 1 phase, 50 or 60 Hertz
- d. 400Y/231 volts $\pm 10\%$, 3 phase, 50 Hertz (grounded Y connection only)
- e. 480Y/277 volts (440-480 volts), 3 phase, 60 Hertz (grounded Y connection only)
- f. 480 volts Delta, 3 phase – Not directly supported. A suitable transformer is required.

13. **Neutral connection:**

- a. Connection to the grounded supply conductor (i.e., the Neutral) is not required, unless noted by a decal at the power supply terminals or the manufacturer's name plate.
- b. The Neutral connection and the Ground connection are for distinct functions. They are not intended to be connected together (except at the premises power supply grounding point.)

14. **Grounding:**

- a. Grounded Power supply. The equipment is designed for connection to a solidly grounded power supply. See **Voltage and Phase**, above.
- b. Frame grounding. The non-current carrying parts of the frame shall be effectively grounded, by connection to the premises equipment grounding (protective earthing) conductor. An equipment grounding connection point is provided near the supply circuit connection point. Isolated ground rods shall not be used. If local ground rods are used, there shall still be a connection to the premises equipment grounding (protective earthing) conductor.

15. **Overcurrent protection of supply conductors:** not provided (standard). Data for selection of the overcurrent device(s) is located on the manufacturer's name plate.

16. (Reserved for future use)

17. Type of **disconnecting device:** Standard: Non-fusible panel disconnect, UL 508, IEC 60947-3. Selector style external operator handle, lockable, prevents opening door when energized, defeatable with a tool.

18. (Reserved for future use)

19. (Reserved for future use)

20. **Operator station power supply:** Operator station requires 100 to 264 volts, 1.5 ampere max, single phase AC. The operator station can be powered from the main electrical panel (by connecting to the operator station power cable), or it can be powered separately, e.g., from a wall outlet or uninterruptible power supply.

OTHER CONSIDERATIONS

21. (Reserved for future use)

22. **Markings:** MachMotion control and electrical products have hazard markings that generally meet US federal and Canadian standards, and have MachMotion brand marks. Other markings available.

23. **Certification markings** are available for an additional fee.

24. **Technical documentation** is furnished in paper form, with electronic copies (PDF format) on the system's operator station PC. Further documentation is available on our website – machmotion.com/support.

Can the system run on 230VAC?

All MachMotion controls (X15-110, X15-250 and X15-200) as well as the Interpreter 1000 motion controller can be powered with using 110VAC or 230VAC. Nothing has to be changed. Just plug them in.

Customers may have 208 3-phase power, also referred to as a wild leg or high leg.

They can attach the high leg to L3.

See attached image. Top is the delta type (wild leg), and bottom is a more common/standard setup now days.

If the control is being installed internationally the installer can use a local computer cable.

Keyword: 208, 210, 220, wild, high leg

Quick-Start Tips

To view additional documentation or for support from a MachMotion Support Representative, visit:

<http://support.machmotion.com>

White Box: Most controls will ship with a smaller white cardboard box. This box may contain manuals, cables, and more that would make for a good starting point of your install.

Keys: Some controls use barrel keys to turn on the computer. Barrel keys are included and are usually located in the white box. Keep one key as a spare, and take to locksmith to make additional copies if needed. More information at:

<https://support.machmotion.com/books/knowledge-base/page/control-onoff-key-switch>

Backups: For all series controls, copy the entire c:\Mach4\ folder to the USB drive after setup is complete and anytime configuration changes are made after that. If the hard-drive ever needs replacing, this backup will save you lots of time and money so be sure to keep it in a safe and known location.

Configuration Changes : Settings in the Mach software are saved each time you exit the software. When doing initial setup, it is good practice to exit the software every so often as it creates a backup file of the settings from that point. This way if you make a mistake in a settings change, you can go back to previous point without having to start all over. Taking notes of what was changed since last exit can help you know where to pick back up as well.

Shutdown: Shutdown the Mach software and wait 3 seconds before shutting down windows or turning power off to the control. This gives the software time to save the settings to the backup file. Corrupted data can occur if machine is shut off while the Mach software is still open.

Verify Motion: Your system has been tested and verified to run without errors just before being packaged and shipped. Unless MachMotion is doing your install, verify motion of the motors before routing the motor cables to verify good motion after shipping and configure motor direction before mounting to the machine. This is especially important if there is a slave axis to prevent gantry "twisting" by the two motors working against each other.

Internet and Antivirus: While this is a Windows based computer, it should be considered as a dedicated control for the machine and not be used for surfing the web, checking email, etc. Internet access should be used so LAN access on company network and Remote Support can be done.

Many antivirus programs can cause problems with the machine performance. We are not able to provide a list of ones to use and due to the dynamic nature of such software it can always change at any update. While we understand the concern for wanting such software on the computer, it shouldn't be needed if being used as a machine control and for remote support. You can use it, but we are unable to guarantee or support the service.

3rd Party Programs/Applications (spotify, dropbox, etc): Do not use 3rd party software such as spotify, dropbox, etc. Consider this computer as a control for the machine, not as a desktop computer. Performance can be impacted by use of such services.

Limit-Switches / Homing Switches (Only for Apollo III Systems): MachMotion recommends the use of limit switches. The limit switches can also be used as a homing switch. If you need to install or replace limit switches the following information may be helpful:

<https://support.machmotion.com/books/knowledge-base/page/helpful-parts-software-links>

Post-Processor: Additional information on post-processors for generating g-code from CAM software is located at:

<https://support.machmotion.com/books/knowledge-base/page/post-processors-for-cam-software>