MECADEMIC

Firmware Update Manual

Meca500 (R3)

Robot firmware: 7.0.4

Document version: A

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Contents

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1   Introduction

This document describes the procedure to follow in order to update the firmware of your Meca500. It also enumerates the modifications in each firmware version.

> ⚠️ **NOTICE:**
> Make sure that your Meca500 robot is deactivated and disconnected from the web interface.

> ⚠️ **WARNING:**
> To avoid a potential injury or damages to your robot and your equipment, make sure you've read completely this document and applied the necessary changes to your program.

2   How to update the robot's firmware

Complete these steps in order to update the firmware on your robot:

1. Download the firmware update file.

2. Connect to the robot's web interface with your browser (preferably Google Chrome or Firefox). The default IP address is **192.168.0.100**.

3. Click on the *Options menu*, click on *Update*. A new page will open.
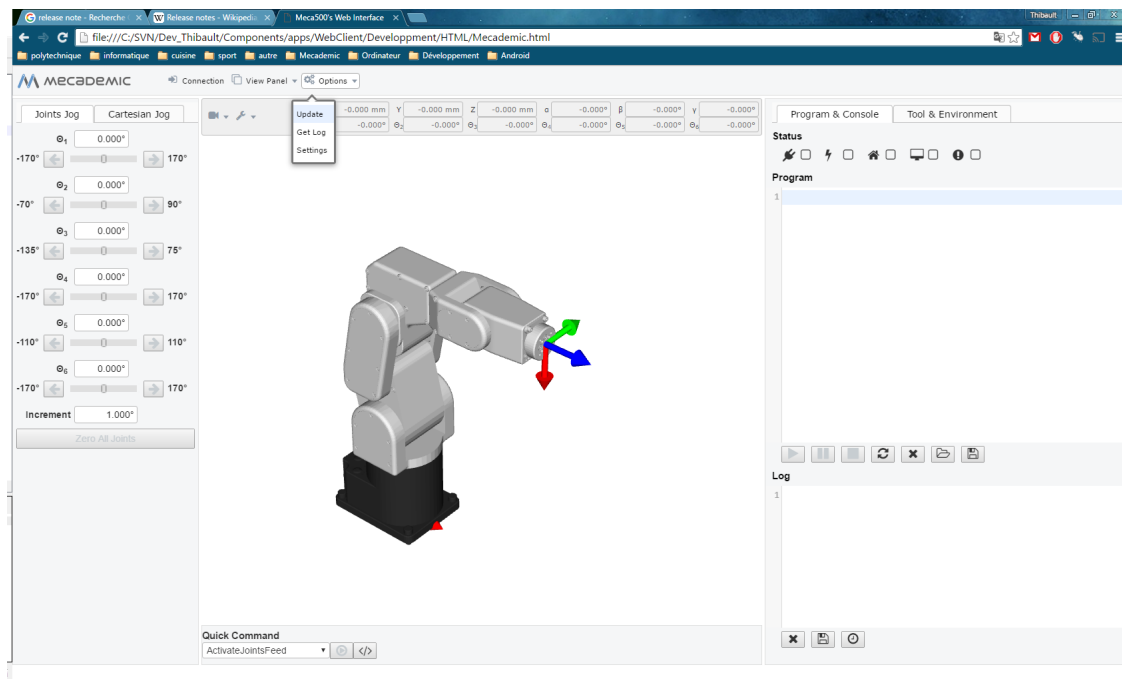
4. Select the downloaded file and click *Upload.*

Μ ΜΕCΑDΕΜΙC   Update Meca500 Firmware

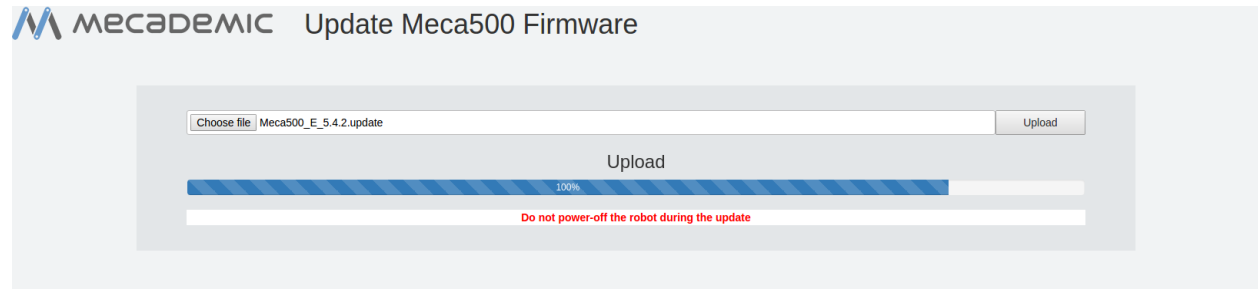| Choose file | Meca500_E_5.4.2.update | | Upload |

Upload

100%

Do not power-off the robot during the update

5. Wait for the update to complete. This could take several minutes.

Μ ΜΕCΑDΕΜΙC   Update Meca500 Firmware

| Choose file | Meca500_E_5.4.2.update | | Upload |

Update

19.99%

Do not power-off the robot during the update
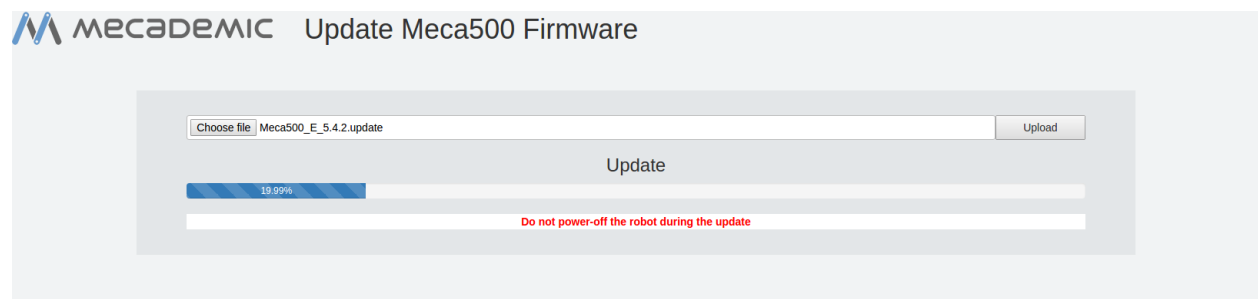
6. When the update is finished, a message will appear. Follow the instructions.

Μ ΜΕCΑDΕΜΙC   Update Meca500 Firmware

| Choose file | Meca500_E_5.4.2.update | | Upload |

Unplug and reconnect the power supply.
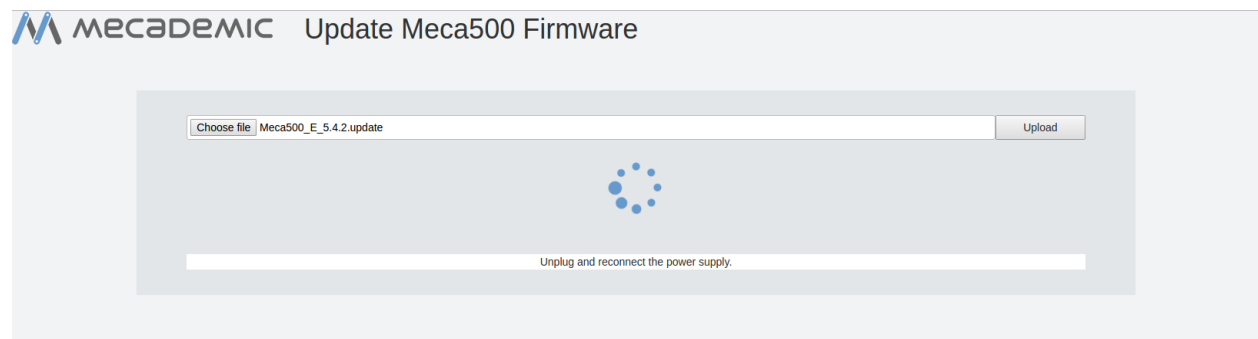
3   What's new

Version 5.4.2

New features

- The robot can now execute a preloaded program (see the Programming Manual);

- It is now possible to install and operate the robot upside-down.

- In the web interface, the color of the *Activation* and *Homing* icons becomes yellow when the corresponding procedure is in progress and then black when the procedure is completed.

- In the web interface, a context menu (right click) has been added to the program editor.

- Comments are now supported in the program editor of the web interface, using the C/C++ style (symbols "//" and "/* */").

Fixed issues

- Now, it's possible to reconnect with the robot after a hard disconnection (cable disconnected, browser forced to close, etc.).

- Unachievable movements when approaching near boundary conditions of Euler angles (e.g., 180° and −180° are now equivalent).

- Potential failure in the homing of joint 4 fixed. There was a risk of it being misaligned at the end of the homing procedure without placing the robot in error mode.

- Units are no longer present when inserting a command from the *Quick Command Panel.*

- *Import existing program from text file* feature now works.

- It is now possible to get system logs from Firefox.

- It is now possible to export a program to text file from Firefox.

Changes

- The new message *End Of Block* was added. It replaces the default *End Of Movement* message. At each boot, the *End Of Block* message is **enabled** and the *End Of Movement* message is **disabled**. Both can be enabled/disabled via commands (see the Programming Manual).

- Path precision is improved.

- When connecting to the robot, the choice of IP address in was removed.

Version 5.4.3

New features

- The membrane buttons on the robot's base are now active.

Fixed issues

- n/a

Changes

- Command StopMotion is now PauseMotion.
- Command RestartMotion is now ResumeMotion.
- The limits on some of the joints were changed (see the Programming manual).

Version 6.0.2

New features

- Reboot after firmware upgrade (when applicable).
- Deactivation possible when the robot is in error.
- Added GetMotionStatus command.
- Added GetSimulationMode command.
- Added GetJointVel, GetJointAcc, GetCartVel and GetCartAcc commands.
- Added GetTRF and GetWRF command.
- Added GetMoveLinDeltaRef command.
- Added GetAutoConf command.
- Added GetCornering command.
- Added new error messages.
- Mechanical and firmware versions are now showed in the connection message.

Fixed issues

- Improved WebSocket stability. Better handling of fragmented frame.
- Sending two MoveLin commands with the same pose, one after the other, no longer generates an error.
- Reachable poses with MoveLinDelta are now also reachable with MoveLin.
- The command Delay correctly generates an End Of Block message.
- The position is updated when the WRF or the TRF is changed.
- The web interface is now correctly updated when the WRF or the TRF is set.
- The correct error message is now returned for argument error.
- ResetError doesn't generate EOB message anymore.

Changes

- **Inversion of the third argument of the configuration, SetConf(1,1,1) becomes SetConf(1,1,-1).**
- Rename SetMoveCartDeltaRef to SetMoveLinDeltaRef.
- When play button on keypad is use, there is a 3 second of delay before the movement.
- Maximum linear velocity is now 500 mm/s.

- Maximum joints velocity is now 135°/s.

- Adding descriptions messages when the linear jog stop.

- Offline program handles up to 1,500,000 lines.

- Joints limits changed.

- Error management of offline program changed.

- Jogging with the interface now stops the running program.

- The robot reboots after changing Networks settings.

- PauseMotion behavior changed. ClearMotion clears the pause. In case of error, the pause is cleared.

- GetStatus now returns information about Pose Feed, End Of Block and End of Movement messages.

- DisableBrake and EnableBrake are now DisableBrakes and EnableBrakes

- Improved the homing and activation procedures.

Version 6.0.3

Requirements

- Controller must be at firmware version 6.0.2 prior to upgrading at 6.0.3. If not, it will be refused.

New features

- Scientific notation is now accepted for the command arguments, as in the command MoveJoints(1.900E+01, 0, 0, 0, 0, 0)

Fixed issues

- Fixed the configuration calculation when TRF and WRF are set.

Changes

- n/a

Version 6.0.4

Requirements

- Controller must have firmware version 6.0.2 or higher prior to upgrading to 6.0.4. Otherwise, the update will be refused.

New features

- Added three commands for Mecademic's electric gripper. They are described in the Programming manual.

Fixed issues

- n/a

Changes

- n/a

Version 6.0.6

Requirements

- Controller must have firmware version 6.0.2 or higher prior to upgrading to 6.0.6. Otherwise, the update will be refused.
- The gripper must have firmware version 1.4.1 installed.

New features

- You can now control the grip force of Mecademic's electric gripper, using the command SetGripperForce.

Fixed issues

- GetWRF now returns the correct values for the WRF.

Changes

- The argument of the SetGripperVel command is now in mm/s, from 0 to 95 mm/s.

Version 6.0.7

Requirements

- Controller must have firmware version 6.0.2 or higher prior to upgrading to 6.0.7. Otherwise, the update will be refused.
- The gripper must have firmware version 1.4.1 installed.

New features

- Added final check after homing to make sure the robot is indeed homed.
- Added calibration for the accelerometer in the base, enabling more robust homing.
- Added a self-check during homing and mastering. The robot will now fall in error mode if something is wrong, and it will not home. If this happens, contact Mecademic.
- Added support for new mechanical updates.

Changes

- It is now impossible to downgrade your robot's firmware
- The maximum allowable motor torques when homing and mastering are now higher.
- The mastering routine now starts with a verification of the base leveling.
- The homing and mastering routines are now adapted to new mechanical updates.

Fixed issues

- Joint limits are now updated after mastering without the need to poweroff.
- Fixed the Ethernet port bug, where the port would occasionally not boot properly and require a physical disconnection in order to reset it.
- Fixed default gripper values to fit the values given in the programming manual.
- Fixed the MAC address bug.
- Fixed the homing bug occurring when the base of the robot is installed on a slightly inclined surface.

Version 6.0.8

Requirements

- Controller must have firmware version 6.0.2 or higher prior to upgrading to 6.0.8. Otherwise, the update will be refused.
- The gripper must have firmware version 1.4.1 installed.

New features

- n/a

Changes

- When connecting to the robot, you can now select the address to connect, enabling port forwarding of the robot's web interface.

Fixed issues

- Fixed the message returned when self test-fails.

Version 6.0.9

Requirements

- Controller must have firmware version 6.0.2 or higher prior to upgrading to 6.0.9. Otherwise, the update will be refused.
- The gripper must have firmware version 1.4.1 installed.

New features

- n/a

Changes

- The robot homing procedure is now more robust.
- The logs are now more detailed.

Fixed issues

- The robot is now still usable when self-tests fail.
- The connection handling has been improved to prevent failures to connect.

Version 6.0.10

Requirements

- Controller must have firmware version 6.0.2 or higher prior to upgrading to 6.0.10. Otherwise, the update will be refused.
- The gripper must have firmware version 1.4.1 installed.

New features

- n/a

Changes

- n/a

Fixed issues

- Fix static IP address bug, where the robot would not always take the given address.
- Fix gripper update bug, where the gripper could not be updated via the web interface.

Version 7.0.3

Requirements

- Robot must be a Meca500 V3.
- The gripper must have firmware version 1.4.1 installed.

New features

- Adding acceleration control with commands SetCartAcc and SetJointAcc
- Adding the possibility to have multiple offline program.
- Adding scalable blending (previously cornering)
- Adding better control on the robot's linear speed.

Changes

Changes in behavior

- When the robots falls in error, it puts the robot in PauseMotion too.
- ClearMotion also puts the robot in PauseMotion. (In 6.0.10, it would correspond to sending ClearMotion and PauseMotion)
- The automatic joint feed and pose feed have been removed from the control port. You must now use the monitoring port for the joint and pose information.
- MoveLinRel[TRF/WRF] now take multiple arguments (i.e. MoveLinRelTRF(20,20,0,0,0,0) is possible.)
- Motion settings commands do not return setting acknowledgement anymore. They are part of a block and completeness is now signaled with the End of Block mechanism.

Changes in command name or command syntax

- AutoConf is now renamed SetAutoConf.
- SetCornering is now SetBlending. It takes in argument values from 0 to 100.
- MoveLinDelta and SetMoveLinDeltaRef combination is now replaced by MoveLinRel-TRF and MoveLinRelWRF.
- Gripper command is now replaced by GripperOpen and GripperClose.
- SetCartVel has been splitted in two command: SetCartLinVel and SetCartAngVel
- SetJointVel now takes a percentage in argument, not a speed.

- StartSaving now has an argument to identify which in program you want to save the commands

- StartProgram now has an argument to identify which program you want to start.

- GetGripperStatus is now renamed GetStatusGripper to match GetStatusRobot.

- EnableBrakes and DisableBrakes are now BrakesOn and BrakesOff

- GetStatusRobot now has a flag for simulation and motion paused. Feed flag have been removed.

Removed commands

- ActivateMaster has been removed.

- MoveJointsDelta has been removed.

- GetTRF has been removed.

- GetWRF has been removed.

- GetSimulationMode has been removed.

- GetMovelinDeltaRef has been removed.

- GetMotionStatus has been removed.

- GetJointVel has been removed.

- GetCartVel has been removed.

- GetCornering has been removed.

- GetAutoConf has been removed.

Fixed issues

- n/a

Version 7.0.4

Requirements

- Robot must be a Meca500 V3.
- The gripper must have firmware version 1.4.1 installed.

New features

- n/a

Changes

- Robot now falls in error when there is a cable break (sudden disconnection)
- Robot now send PauseMotion if the robot is running and there is a clean disconnection (disconnect request received)
- Robot now limit the number of monitoring connection to 10.
- SetTRF and SetWRF now completely stop the motion when they are applied. This will trigger an End Of Movement (like SetCartAcc).
- Augmented the maximum number of command to be send in one stream from 1000 to 10000.
- Improved the WebInterface communication with the robot. Now, when sending big programs, the robot respond to independent ClearMotion much faster.

Fixed issues

- Fixed button usage disabled when in offline program.
- Fixed robot not actively disconnecting the user when control connection is received
- Fixed the Power LED that was flashing during homing.
- Fixed the blending not enabled by default.
- Fixed the EOM not received in between motion when Blending is not set.
- Fixed the ClearMotion command not setting the robot in pause when there is no motion.
- Fixed the issue where sending long command from the WebInterface disconnecting the interface.
- Fixed BrakesOn and BrakesOff command not recognize.

- Fixed the SetWRF and SetTRF command that were causing the next pose movement to be skipped.

- Fixed the SetWRF and SetTRF command that was causing the robot to move to invalid position in previous reference frame before doing the requested motion

- Fixed the GripperOpen/GripperClose command that needed to be followed by a motion command after them to actually open/close the gripper.

- Fixed issue where in some rare cases, robot would stop responding to inputs and was not returning EOB.

Version 7.0.5

Requirements

- Robot must be a Meca500 V3.
- The gripper must have firmware version 1.4.1 installed.

New features

- Added support for new power supply

Changes

- n/a

Fixed issues

- Bug occurring when reorienting the end-effector a lot fixed.
- Problem with reversed directions when jogging in reorientation mode (i.e., when using the commands MoveLinRelWRF and MoveLinRelTRF) fixed.
- Jerking motion near singularity eliminated
- Problems related to the presence of comments in the program (in the web interface) fixed.
- No more EOB/EOM after ClearMotion and ResetError.
- Problems with not receiving EOB after executing a program fixed.
- Message 3011 added to inform when a the command MoveLinRelTRF or MoveLinRel-WRF does not make the robot move (because of singularity or out of reach).

Version 7.0.6

Requirements

- Robot must be a Meca500 V3.
- The gripper must have firmware version 1.4.1 installed.

New features

- n/a

Changes

- n/a

Fixed issues

- Fixed the back-portability issue where the old Meca500 R3 and old power supply did not work together. Note, however, that older Meca500 R3 do not work with new power supply and new Meca500 R3 do not work with the old power supply.

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