Troubleshooting guide for MIS and MAC

Instructions for solving common issues

Important User Information



Warning

The MAC and MIS series of products are used to control electrical and mechanical components of motion control systems. You should test your motion system for safety under all potential conditions. Failure to do so can result in damage to equipment and/or serious injury to personnel.

Please contact your nearest JVL representative in case of technical assistance. Your nearest contact can be found on our web site www.jvl.dk

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1.2	Partially rewrote section 5. Minor changes to section 9.	2025-01-30	JLN
1.3	Added sections 10-12. Slightly modified 5. Slight changes to layout.	2025-08-08	JLN
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1.5	Added section “MAC: The motor is not behaving as expected” (register checklist / load default).	2026-07-07	KT

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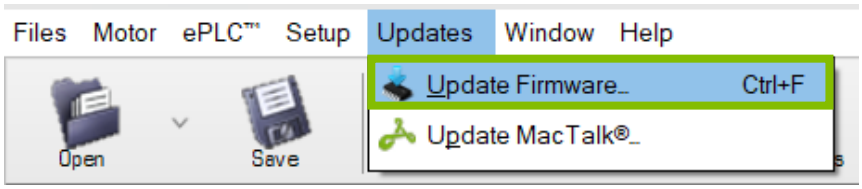
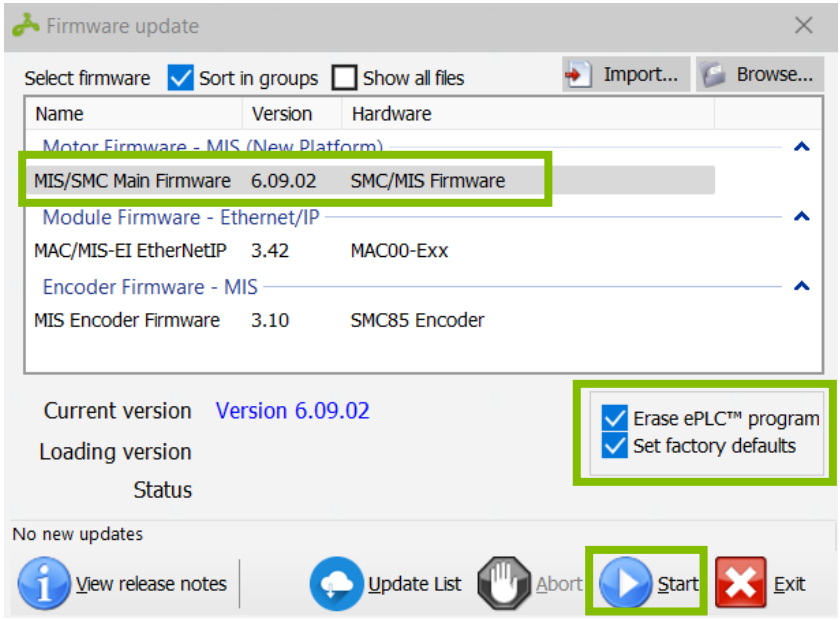
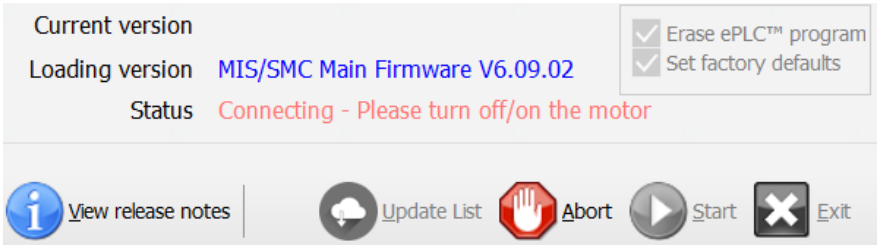
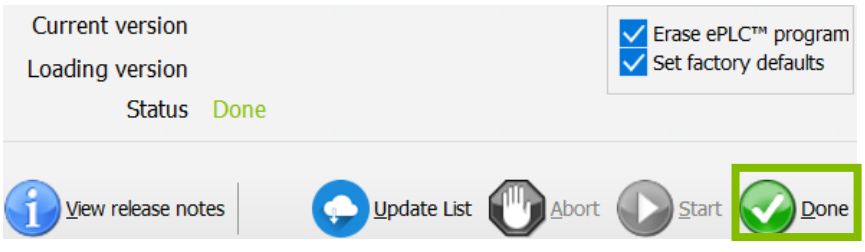
Introduction

The following document is a guide to troubleshooting problems on MAC motor® Integrated Servo Motors and MIS ServoStep™ Integrated Stepper Motors. It contains step-by-step instructions to diagnosing and/or solving common issues one might encounter while using the motors.

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1 Force updating firmware

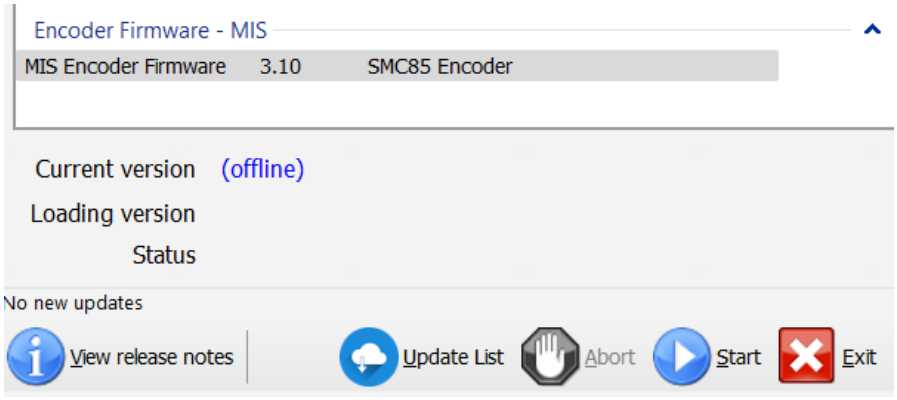
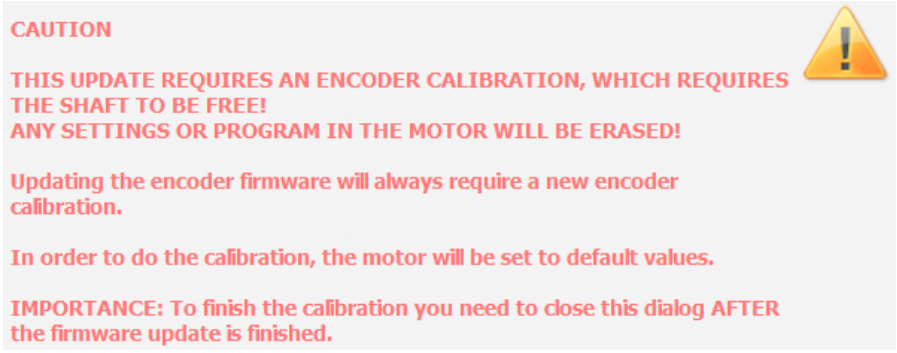
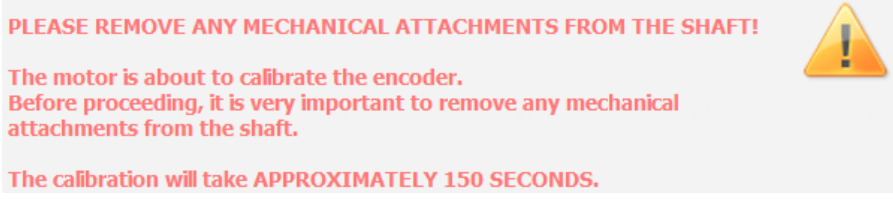
If the motor is unresponsive after a firmware update, please attempt the following. Before performing this, please make sure that you are using serial communication.
We recommend using our adapters: **RS485-USB-ATC-820**, **RS232-USB2.0-1** or **USB-RS232/485-OPTO**, as you might otherwise encounter issues.

Step	Text	Image
1	**Without power** (CVI/24 VDC control voltage), go to “Updates” – “Update firmware”	
2	Select the correct firmware for your motor type. **Note:** Check the motor model. If it is incorrect, you can check the “Show all files” option and choose the correct firmware for your motor.	
3	Once the pictured status message shows, turn on the 24 VDC supply.	
4	Once the update is complete, your motor will be back to default settings. Press “Done”	

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2 Restoring encoder firmware

In the case that the encoder loses its firmware, perform the following steps:

Step	Text	Image
1	Issue command 999 and then 345. To verify that the command has worked, there should be no negative values in the P1/P2 registers.	
2	Update the encoder to the latest version.	
3	The following message will appear. Read it and press “Next”. The motor now updates the firmware, performing a factory reset of the motor in the process.	
4	After the update is completed, the motor will restart and give you the following message. Press “Next” and wait a few minutes for the auto calibration to finish.	**Note: Remove any mechanical attachments from the shaft.** 

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3 Common connection issues

3.1 Power

The motors require Control Voltage (24 VDC) to communicate. Please make sure this is connected to the correct pins and include proper grounding.

On a MAC motor: If there are LEDs on your module, please make sure these are illuminated.
On a MIS motor**:** The LEDs should illuminate when power is attached, L3 should stay turned on.

3.2 Communication

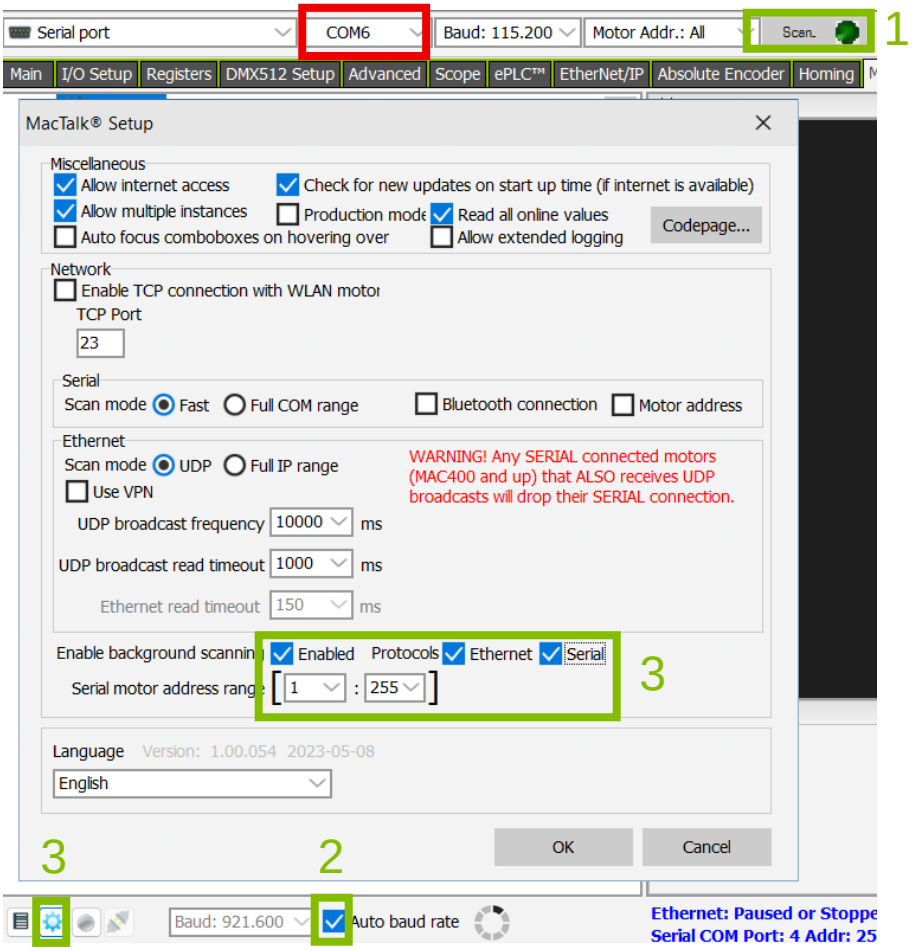
3.2.1 Ethernet connection

Make sure that the cables are connected according to the respective wiring diagram, and that the correct IP is used (depending on protocol, this may not be applicable). The motor should respond to pings.

If the motor is not reachable, try connecting to it via serial connection. Then, connect via MacTalk and navigate to the relevant protocol tab. Press the button “Apply and save” (under the read/write words) and restart the motor. Note the IP. Then, reattempt connection.

3.2.2 Serial connection

Please make sure that you have a functioning USB-RS485 (MIS) or USB-RS232 (MAC) converter, and that the correct COM port is chosen. Look for a gray dot in the COM port selector (red box in the picture).



Ensure that no other programs on the PC is trying to use the chosen COM port. Choose the search radar icon in the top right corner [1]. Select the auto baud rate checkbox [2]. If this does not work, click the cog icon [3], and select the widest address range [3]. Then click OK.
If the issue persists, follow the instructions in section *1: Force updating firmware.*

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4 Low bus voltage

MIS/SMC
Is the correct bus voltage (same as supply) shown in "Bus Voltage (P+)" register 97?

Yes: Clear error register 35 and status register 36.
No: Are both CVI and P+ connected to the power source?
  Yes: Replace unit or contact JVL technical support.
  No: The unit needs both CVI and P+ to function

MAC
Is the correct bus voltage (AC: $V_{AC} \cdot \sqrt{2}$, DC: same as supply) shown in "Bus Voltage" register 198?

Yes: Clear error register 35 and status register 36.
No: Is the Main Power Connector, connected to the power source?
  Yes: Replace unit or contact JVL technical support.
  No: The motor needs supply voltage to function.

MAC050...141-A
Is correct supply voltage (same as supply) shown in "Supply Voltage" register 151?

Yes: Clear error register 35 and status register 36.
No: Is the main connected to the power source?
  Yes: Replace unit or contact JVL technical support.
  No: The motor needs DC supply to function.

Applicable to all
Before replacing the unit or contacting JVL support, please make sure the external fuse is intact by unplugging the power cable and measuring the voltage from the connector.

5 No LEDs light up despite power being connected

First, ensure that the motor is connected to 24 V control voltage (CVI) and is drawing current. Then,

- **If the problem occurred during module update**: Attempt to update the module.
- **Else:** Attempt force updating the firmware by using the instructions in section *1: Force updating firmware.*

6 MIS: Encoder Com Error

Is the encoder firmware version read as “0.00”?

Yes: Update the H3/H4 encoder firmware.
No: Contact technical support.

To verify that the H3 calibration data is saved, issue command 355 and check register P1. If P1=1, OK

7 MIS: Closed Loop Error

The H2 encoder needs to be calibrated, please follow the instructions in the link below:
http://www.jvl.dk/files/me/mis_cl_error_guide.pdf

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8 MIS: Encoder Lost Position

Click “Reset Position” and “Clear Errors”



If the error is cleared:
Use any active mode to make the motor move for a while. Verify that the error does not return. Disconnect the power and turn the shaft by hand for a couple of revolutions. Wait five minutes. Connect the power again. If the error is still gone, the motor should function normally again.

If the error is still present:
Update the encoder firmware and perform the automated calibration. Then, perform the steps from “If the error is cleared” above.

If the problem is still present, please contact JVL technical support.

9 MIS: Encoder Counting Error

Usually, this issue is caused by a hardware issue. It is normally unrecoverable. In the manual, it is known as “Encoder Reed Error”:

Message no. / Message	**9 / ’Encoder Reed error’**
Type / Motor action	Unrecoverable error / Motor is set in Passive mode.
Error condition	• The absolute multi turn encoder (H3/H4) has detected a wrong sequence in the positioning algorithm. • This error also occurs after firmware update.
Possible cause of this error	• This can be caused by a mechanical shock on the shaft or an external magnetic field. • Because the encoder has been reset during a firmware update.
Solutions to avoid error	• Do not place the motor inside a strong magnetic field. • Do not expose the shaft or the motor for mechanical shocks.
How to return to normal operation	• Reset the position (special command 354 in register 24), clear the error bit(s) in register 35 or cycle the power.
Error bit / Firmware name	Bit 9

In addition to the solutions outlined above:

- Ensure that the motor is running firmware v. 7.0.0 or later
- Check the grounding and ensure that all cables are properly shielded.
- Consider mounting a direct wire from the motor chassis to the machine it is used in.

Does the error occur at any time, or only when running at high speeds (over 500 RPM)?

At all times:	Ensure that there is no mechanical stress put on the shaft; excess pulling or pushing can cause the issue to occur.
Only at +500 RPM:	The encoder needs to be serviced.

If none of the above helps solve the error, perform an encoder calibration as described in the manual. The section is called “Encoder calibration”.

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10 Module not visible or “Internal error”

In the case a there is an issue in updating the firmware, the communication between the ethernet module and the motor can become corrupted. On a MAC motor, this can happen to any module with firmware. To fix this,

- Update the module firmware.

If the correct module is not shown, press “Show all files” in the firmware update menu and select the proper firmware. If this does not work, force a firmware update by using the instructions in section *1: Force updating firmware.*

11 MAC: The motor is not behaving as expected

If the motor powers up and communicates normally, but does not move as expected, check that the following registers are set to proper values in MacTalk:

- Torque: 300 %
- Velocity: greater than 0
- Acceleration: greater than 0
- Load: 1.00 (see also the section about oscillations below)
- In position window: if set too low, it can cause the motor to remain stationary.

If the setup is in doubt, load the factory defaults using “Motor” – “Load default” in MacTalk. Alternatively, the complete memory can be cleared by re-installing the firmware – see the section Force updating firmware. Remember to press “Save in flash” afterwards, so the corrected setup is stored permanently in the motor.

12 MAC: The motor oscillates or shakes

Under certain conditions, the movement of the motor can become unstable and/or oscillating when stationary.

- Ensure that the LOAD parameter is properly adjusted. Default is 1.00, but when a load is added to the motor, it can be set to a higher value. If the LOAD parameter is set to a value that is too high (or low), the motor can be very unstable.
- Check that the maximum speed is set within the allowable range specified for the supply voltage.
- If none of the above solves the problem, the filter used in the MAC motor may not be set according to the load. See the section *Servo filter adjustment* in the MAC manual, or contact your nearest JVL representative.

This can also occur upon powerup, where it will not be possible to establish communications to it. This is because the LOAD parameter is set too high, which causes the total supply current to rise above the power supply’s limit. This can typically occur if the load changes significantly.

- In that case, the only solution is to update the firmware on the motor to reset it. See above instructions “Force updating firmware”.

13 Parameters are lost after reset

The parameters must be saved permanently in the motor using the “Save in flash” button at the top of the main window. After 5-10 seconds the motor will restart with the new parameters. If the motor still starts up with the default setup or a setting made at a much earlier stage, the save procedure has failed.

- Ensure that the motor has the latest firmware. The firmware version can be seen in the status bar. Use “Update Firmware” in the “Updates” menu to update.
- Ensure that MacTalk is the latest version.

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- If the flash has been saved to more than a few thousand times throughout the motor's lifetime, it might be worn out.

14 Downgrading the firmware

Under some circumstances it may be necessary to downgrade the firmware of the motor and/or module. In general, this is not recommended. However, if you wish to do this:

- Ensure that you are using the latest version of MacTalk. This is important as the list of compatible versions is updated with MacTalk releases.
- To choose older firmware versions, press "Show all files" under the Firmware Update window. Make sure you choose the correct firmware for your hardware.
- MacTalk may warn you if you are updating your motor or module in the wrong order and would thus lose connection. In that case, follow MacTalk's instructions and switch the order.

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