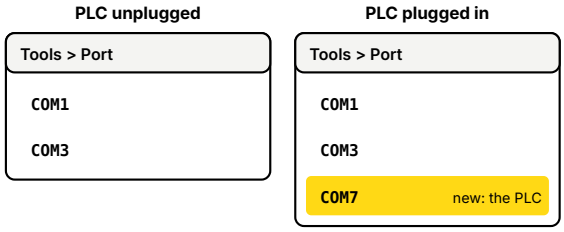
Upload failed? 6 checks before blaming the code

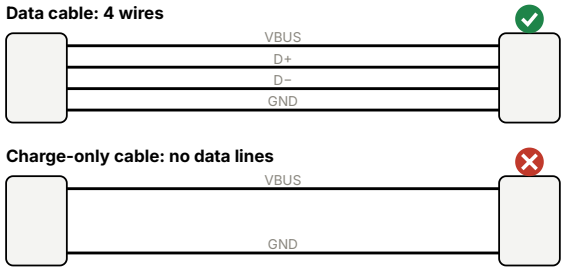
When the upload fails with "not in sync" or "Failed to connect", the code is rarely the cause. Check the cable, the port, the USB driver, the boards, the ESP32 boot sequence and any program holding the port, in this order. For Arduino PLCs (M-Duino, Ardbox) and ESP32 PLCs programmed over USB with the Arduino IDE.

Find the right port, with the right cable



Port names vary: COMx on Windows, /dev/tty... on Linux and macOS

Find the port: open Tools > Port with the PLC unplugged, plug it in and open the list again. The new entry is the PLC.



Use a data cable: some USB cables only carry power. The PLC may light up, but no port appears and nothing uploads.

The error text helps

"not in sync" usually comes from an Arduino PLC (AVR) upload; "Failed to connect to ESP32" from an ESP32 PLC. Read the last lines of the output window before changing anything.

USB is enough to upload

The USB connection is enough to upload the program. To use the inputs and outputs, power the PLC with 12-24 Vdc, as its datasheet states.

Six checks, in this order

Check	What to do	Good result
1. Cable	Use a USB cable you know carries data.	A new port appears in Tools > Port when you plug in the PLC.
2. Port	Unplug the PLC, see which port disappears, plug it back in and select that one.	The selected port is the PLC.
3. Driver	No port at all? Install the USB driver your PLC needs. Its manual says which one.	The port appears after the installation.
4. Boards	Install the Industrial Shields boards in the Boards Manager and select your exact model in Tools > Board.	Your model appears in the list and is selected.
5. ESP32 boot	On an ESP32 PLC, if the upload does not start, follow the boot sequence in its manual.	The upload starts and finishes.
6. Port busy	Close anything else using the port: another Serial Monitor, Node-RED, a terminal.	The IDE can open the port.

What the symptoms tell you

Symptom	Possible causes	Next step
No new port appears	Charge-only cable, missing USB driver, faulty USB port on the computer.	Checks 1 and 3; try another USB port.
"not in sync" (Arduino PLC)	Wrong port selected, wrong model selected, port busy.	Checks 2, 4 and 6.
"Failed to connect to ESP32"	The ESP32 did not enter upload mode, wrong port, port busy.	Checks 5, 2 and 6.
"Access denied", "port busy" or "permission denied"	Another program holds the port; on Linux, the user may lack access to serial ports.	Check 6; on Linux, check the serial port permissions.
Your PLC is not in Tools > Board	The Industrial Shields boards are not installed.	Check 4.
Upload OK, but the I/O do nothing	The PLC is powered only by USB.	Power it with 12-24 Vdc as its datasheet states.

Before blaming the code

- Upload the Blink example or an empty sketch. If that fails too, the cause is not your code.
- Change one thing at a time and upload again.
- Read the last lines of the output, not the first ones.

The boards

Install the Industrial Shields boards in the Boards Manager: industrialshields-avr for Arduino PLCs, industrialshields-esp32 for ESP32 PLCs.

Then select your exact model: a similar model can compile but fail to upload or run.

If it still fails

- Try another USB port on the computer, without hubs.
- Close and reopen the Arduino IDE.
- Try another computer to rule out drivers and permissions.

Where to find the details

The USB driver, the boot sequence of ESP32 PLCs and the power supply are in the user guide and datasheet of your PLC.

The boards installation, step by step, is in the Industrial Shields blog.

References: Industrial Shields user guides and datasheets; "How to install the Industrial Shields boards in the Arduino IDE" (Industrial Shields blog). Device manuals take precedence over this general guide.