

Spitronics - ECU - First Start and Basic Setup - Guide

Important Safety Notice

This procedure is critical when installing a Spitronics ECU.

The ECU is a universal engine management system and can be configured for many engine types. Incorrect configuration or wiring may permanently damage the ECU or engine components.

Maps supplied by agents are only guidelines and may not be correct for your specific engine.

Typical failures caused by incorrect setup include:

- Short-circuited wiring
- Incorrect coil driver configuration
- Injector flooding of cylinders
- Bent connecting rods
- Incorrect fuse ratings damaging components

👉 Always verify the installation before starting the engine.

1. Engine and System Preparation

Before connecting the ECU, perform the following checks:

1. Install new spark plugs if the engine has been standing for a long period.
 2. Service and test injectors to ensure equal fuel delivery and clean filters.
 3. Verify installation according to the Hardware Installation Manuals.
 4. Test all wiring using a multimeter according to the Installation Testing Procedure.
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Fuel System Check

Disconnect the ECU completely from the harness.

Disconnect the fuel pump positive from the relay and connect it directly to battery positive.

Check:

- Fuel pressure approximately 3.5 Bar
- No fuel leaks

Reconnect the fuel pump to the relay afterwards.

2. ECU First Power-Up Procedure


If any step behaves differently than described, stop and find the fault before continuing.

1. Remove all fuses.
2. If using an easy-install harness, disconnect:
 - Coils
 - Injectors
 - Fuel pump
3. Verify the ECU jumper settings.

4. Connect only the P1 input connector.
5. Switch ignition ON (do not start engine).

Expected result:

- Yellow Power LED on the ECU must illuminate
- Blue LED on idle stepper unit must illuminate (if installed)

 If the Power LED does not illuminate, switch off immediately.
A short on the 5V sensor supply may damage the ECU.

3. Laptop Connection and Sensor Verification

1. Switch ignition OFF.
2. Connect the laptop using the USB cable.
3. Switch ignition ON.
4. Start the ECU software and connect.

Verify that sensor readings appear:

- MAP sensor
- TPS
- Water temperature
- Air temperature
- Battery voltage
- Altitude Sensor
- Fuel Pressure Sensor
- POT Sensor

Temperature values should be approximately correct for a cold engine.
Switch off sensors that are not connected to the system.
Save the settings in the ECU.

4. Initial ECU Setup

Check all setup pages and confirm the following:

- Crank and cam sensors configured correctly
- Correct trigger angle
- Correct rising/falling edge selection

If using a distributor ignition system, verify rotor phasing.

 Incorrect rotor phasing may cause electrical interference with the ECU or laptop.

5. Sensor Calibration

Set the following parameters:

- Maximum RPM limit
- Coil charge time

If unknown, start with:

- Minimum dwell: 1.5 ms
- Maximum dwell: 2.0 ms

Calibrate the following sensors under Active Sensors:

- TPS
- MAP sensor range and calibration
- Water
- Air
- Altitude Sensor

The MAP and Altitude sensors should read your barometric pressure.

Save the calibration.

6. Cranking Signal Test

Enable the Crank Sensor Test.

Press “**C**” to clear all DTC codes.

Crank the engine with only the P1 input Coms connector connected.

Expected RPM signal:

- 100 – 200 RPM

The RPM signal must be stable.

Check if there are any crank error DTC codes.

If the RPM reading is erratic, stop and find the fault.

During cranking, the MAP indicator should move slightly left of atmospheric pressure on the vacuum bar.

7. Relay and Output Tests

Reconnect the other ECU connectors.

Switch ignition ON. Do not start.

Relays should activate for three seconds and then switch off.

If not:

- Check relay wiring
 - Verify relay control circuits
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8. Starting the Engine for the First Time

Important

Verify oil pressure during cranking before allowing the engine to start.

The ECU uses several functions to start the engine correctly:

- Start Prime Pulse
- Throttle Priming
- Flood Control
- Cranking Fuel
- Start Enrichment

These functions are automatically influenced by the water temperature compensation map.

Start Prime Pulse

When the engine reaches approximately 100 RPM during cranking, the ECU opens the injectors for about 15–20 ms.

This ensures fuel is present when ignition begins.

If black smoke appears during starting, reduce the value slightly.

If the pulse is too large, the engine may flood.

Throttle Priming

If the throttle is pressed more than 25% before cranking, the ECU injects additional fuel equal to half the prime pulse value.

The fuel pump will run for 1 second to restore fuel pressure.

This can be repeated if additional starting fuel is required.

Flood Control

Flood control activates when the throttle is pressed more than 80% during cranking.

The ECU will disable injector pulses, allowing the engine to clear excess fuel.

Releasing the throttle restores normal fueling.

Start Enrichment

After the engine reaches 500 RPM, the ECU applies extra fuel for a short period.

Typical value:

- +0.5 ms injector time

This enrichment gradually fades within about 4 seconds at idle.

If the engine stalls immediately after starting, increase this value slightly.


Check for black smoke. If too rich, adjust the Fuel Ratio in the main fuel graph.

Observe the lowest MAP value when adjusting the fuel ratio.

9. Ignition System Check

Verify ignition timing before attempting to start the engine.

- Set base timing to $\pm 10^\circ$ BTDC
- Check with timing light
- Ensure timing is stable and matches ECU

 Do not proceed if timing is incorrect.

i Detailed Guide:

[Spitronics - ECU - Ignition Timing Setup - Guide](#)

10. Fuel System Check

Verify fuel system operation before starting:

- Injectors active and clicking
- No ECU errors present
- Fuel pump primes correctly (± 3 seconds)

 Do not enable fuel pump if injector time is incorrect.

i Detailed Guide:

[Spitronics - ECU - Fuel System Test - Guide](#)

11. Idle Stabilisation

Once the engine starts:

- Keep engine running with light throttle
- Adjust fueling to achieve stable idle
- Monitor vacuum and engine response

 Do not proceed to tuning until idle is stable.

i Detailed Guide:

[Spitronics - ECU - Idle Setup and Stabilisation - Guide](#)

12. Preparing the Engine for Tuning

Once the engine runs smoothly and reaches operating temperature, prepare the ECU for tuning.

Before tuning:

- All sensors must be calibrated
- The engine must idle easily

Disable Corrections

Disable the following during basic tuning:

- Battery compensation
- Lambda correction
- Potentiometer input

Timing Settings

Set safe timing limits.

If unsure, start with conservative values.

Fuel Settings

Disable functions that may influence fueling:

- Accelerator pump compensation
- MAP compensation (if signal is unstable)

Start with minimum values.

Sensor Settings

If using a lambda sensor:

- Ensure it is enabled and working

If not connected:

- Disable it in the software

Turbo Settings

Set boost limit slightly above planned boost:

Example:

- Boost limit = planned boost + 0.1 Bar
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13. Ready for Basic Tuning

At this stage:

- Engine should start easily
- Idle should be stable
- Sensor readings should be correct

👉 The ECU is now ready for basic fuel and ignition tuning.