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.

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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.

Fuel System Check

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.

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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.

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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 volts

Values should be approximately correct for a cold engine.

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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.

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5 Sensor Calibration

Set the following parameters:
• maximum RPM limit
• MAP sensor type and range
• 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
• Water
• Air

The Map sensor should read your barometric pressure.

Save the calibration.

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6 Cranking Signal Test

Enable the **Crank Sensor Test**.

Press “C” to clear all DTC codes.

Crank the engine with only the input connector connected.

Expected RPM signal:
200 – 300 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 centre on the vacuum bar.

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7 Relay and Output Tests

Reconnect the other ECU connectors.

Switch ignition **ON**.

Relays should activate for **three seconds** and then switch off.
If not:
• check relay wiring
• verify relay control circuits

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8 Ignition and Fuel System Tests

Important:
Do not attempt to start the engine until ignition timing has been verified using a timing light.

Incorrect timing may cause severe engine damage.

Insert the fuses gradually:

1. Insert Coil fuses (Size depends in Coil configuration) - Check spark timing with a timing light. Expected timing is Approximately 10° BTDC. If timing is incorrect or unstable, correct the problem before attempting to start the engine.
2. Disable the **Crank Sensor Test.**
3. insert Injector fuses – Listen for injector click when ignition is switched on. Fuel bar should indicate about 12 to 14 milliseconds of fuel depending on firmware and injector size.
4. Fuel pump fuse (start with **5A and work towards 10A**) – Fuel pump should run for 3 seconds then switch off

9 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.
These include:
• 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 for an injector prime pulse on all the injectors**.

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**.

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

Check for black smoke. If it is too rich you can adjust the Fuel Ratio in the main fuel graph.

Observe the lowest MAP value when adjusting the fuel ratio.

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10 Warm-Up and Idle Stabilisation

Allow the engine to warm up gradually.

Do not rev a cold engine because oil pressure may still be low.

During warm-up:
• occasionally blip the throttle
• check for flat spots

Flat spots usually indicate **lean mixtures**.

Adjust the **Fuel Graph** slightly if required.

Water temperature should go to about 85 degrees.

Make sure the fan comes on when over the high temperature limit. Lower this limit to test this function.

Save the map in the ECU and make yourself a startup map on the laptop.

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11 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 features during basic tuning:
• battery compensation
• lambda correction
• potentiometer input

These corrections may interfere with basic tuning adjustments.

Timing Settings

Set safe timing limits to prevent excessive ignition advance.
If unsure, start with conservative values.

Fuel Settings

Disable any functions that may influence fueling unexpectedly.

Examples:
• accelerator pump compensation
• MAP compensation if the signal is unstable

Start with **minimum values**.

Sensor Settings

If using a **lambda sensor**, ensure it is enabled and functioning correctly.

If the sensor is not connected, disable it in the software.

Turbo Settings

Set the boost limit slightly above the planned boost level.

Example:
Boost limit = planned boost + 0.1 Bar

This protects the engine during tuning.

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12 Ready for Basic Tuning

Once these steps are complete:
• the engine should start easily
• idle should be stable
• sensor readings should be correct

At this point the ECU is ready for **basic fuel and ignition tuning**.