

# **Spitronics ECU - Coolant Sensor Connection - Quick Guide**

## **Index**

[Standard Coolant Sensor](#)

[Standalone Sensor Connection](#)

[Tap-In Connection](#)

[Important - Only One Pull-Up](#)

[Tap-In Requirements](#)

[Do Not Tap Into a Single-Wire Gauge Sender](#)

[Ground Reference](#)

[Product Jumper](#)

[Quick Check After Connection](#)

[Reading Changes When Second Device Is Connected](#)

[Quick Decision](#)

[Final Connection Check](#)

This Quick Guide explains the correct standalone and Tap-In connection methods for the Spitronics coolant temperature input.

Use this guide when:

- Fitting a dedicated Spitronics coolant sensor.
- Sharing an existing coolant sensor with another ECU or Device.
- Diagnosing incorrect coolant readings after a second Device has been connected.

For calibration, tuning and fault finding, use the main:

## **Spitronics ECU - Coolant Temperature Sensor - Guide**

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### **Standard Coolant Sensor**

The standard Spitronics coolant input is designed for an isolated two-wire:

#### **2 k $\Omega$ NTC temperature sensor**

The normal Spitronics circuit uses:

- 1 k $\Omega$  internal pull-up.
- Regulated 5 V sensor supply.
- Coolant Temperature Input.
- ECU Sensor Ground.

The NTC sensor and internal pull-up form the voltage divider used by the ECU to calculate coolant temperature.

[Back to Top](#)

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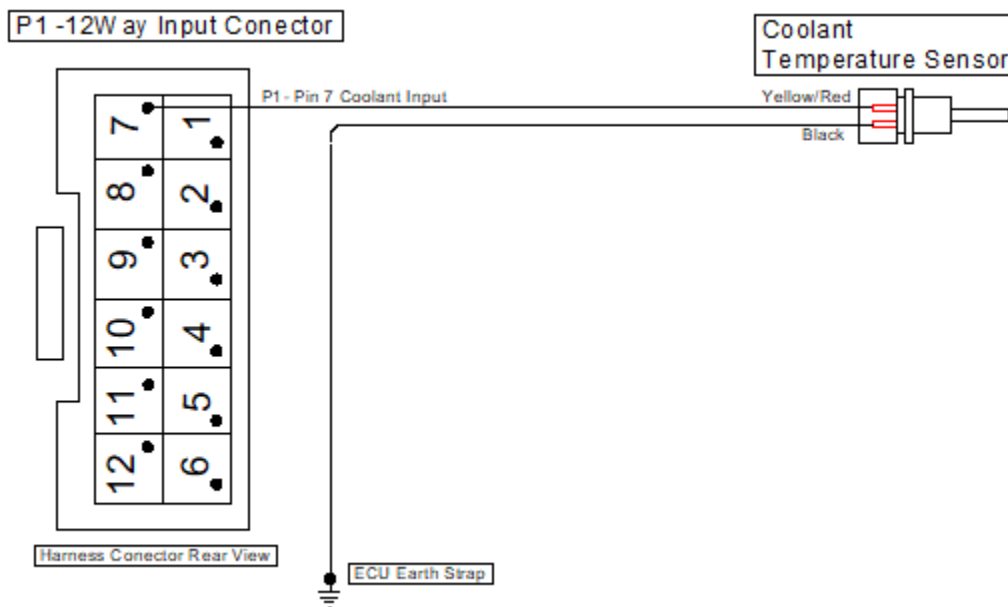
## **Standalone Sensor Connection**

Use the standalone connection when the Spitronics ECU is supplying and reading its own coolant sensor.

The internal pull-up remains active.

Typical circuit:

**5 V Sensor Supply → Internal Pull-Up → Coolant Input → 2 kΩ NTC Sensor → ECU Sensor Ground**



## **Requirements**

- [ ] Use an isolated two-wire 2 kΩ NTC sensor.
- [ ] Connect the sensor signal to the Coolant Temperature Input.
- [ ] Connect the second sensor wire to ECU Sensor Ground.
- [ ] Keep the internal pull-up active.
- [ ] Verify the temperature reading before normal operation.

Do not use a single-wire dashboard gauge sender.

## Tap-In Connection

Tap-In is used when another ECU or controller already operates the coolant sensor and the Spitronics Device only needs to read the existing sensor voltage.

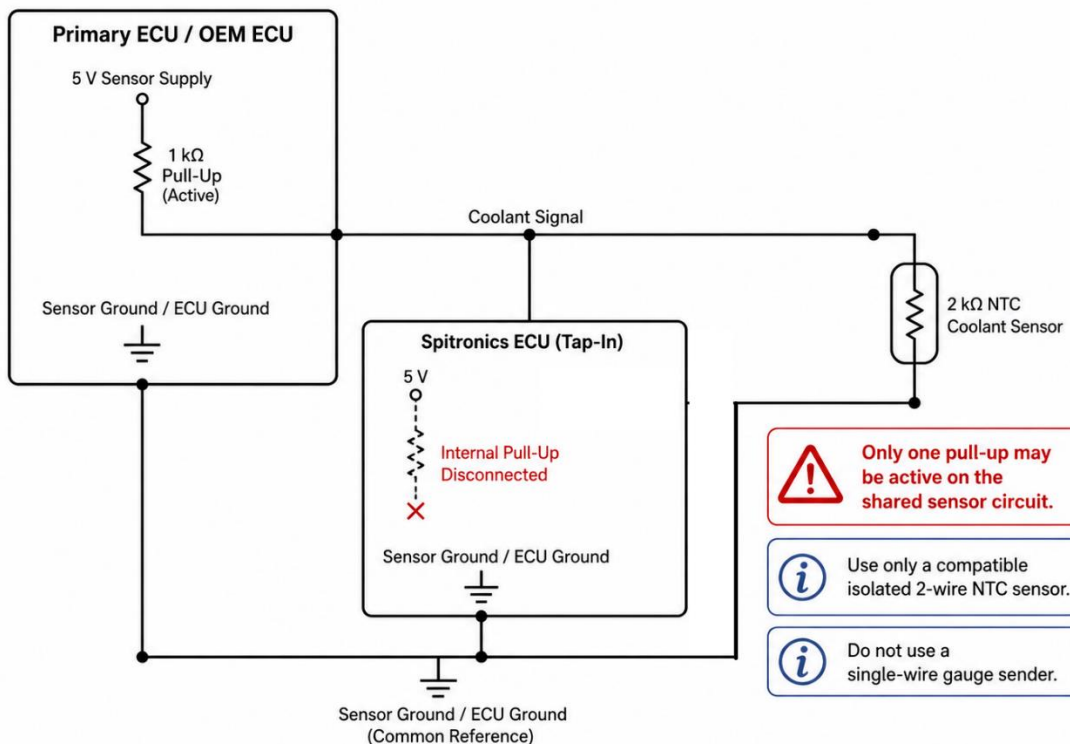
Examples may include:

- OEM ECU + Spitronics ECU.
- Spitronics ECU + standalone ETC.
- Other compatible controller combinations.

In Tap-In mode:

- The primary ECU or controller keeps its pull-up active.
- The Spitronics coolant input connects to the same sensor signal.
- The Spitronics internal pull-up is disconnected.
- The input filtering and protection circuitry remain active.

### Coolant Sensor Tap-In



## Important - Only One Pull-Up

Only one compatible pull-up should normally be active on a shared NTC sensor circuit.

If both controllers leave their pull-ups connected, the two pull-ups operate in parallel.

This changes the sensor circuit and can cause incorrect temperature readings on one or both Devices.

## **Rule**

**Standalone connection → Spitronics pull-up active**

**Tap-In connection → Spitronics pull-up disconnected**

[Back to Top](#)

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## **Tap-In Requirements**

Only use Tap-In when all of the following conditions are met:

- [ ] The sensor is an isolated two-wire NTC type.
- [ ] The sensor characteristic is compatible with the Spitronics calibration.
- [ ] The existing sensor circuit uses a compatible pull-up.
- [ ] Only one effective pull-up is active.
- [ ] The shared sensor signal never exceeds 5 V.
- [ ] Both control systems have a compatible Ground reference.
- [ ] The sensor Ground returns correctly through the ECU Ground system.
- [ ] The temperature reading has been verified after connection.

If these conditions cannot be confirmed, fit a separate Spitronics-compatible sensor.

[Back to Top](#)

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## **Do Not Tap Into a Single-Wire Gauge Sender**

Do not use a normal single-wire dashboard temperature sender as a shared ECU coolant sensor.

A single-wire sender normally Grounds through the engine and may:

- Use a different resistance curve.
- Have an unsuitable electrical reference.
- Produce an incorrect temperature reading.
- Create unwanted current paths.

Use an isolated two-wire sensor instead.

[Back to Top](#)

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## **Ground Reference**

When two Devices share the same analogue coolant signal, they must have compatible Ground references.

If the Grounds differ electrically, the same sensor voltage can be interpreted differently by each Device.

Check the Ground system if:

- The coolant reading changes when another Device is connected.
- Two controllers display different temperatures.
- The reading changes during cranking or high electrical load.

Do not add unnecessary sensor-Ground connections that create additional current paths.

[Back to Top](#)

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## **Product Jumper**

Some newer Spitronics products provide a hardware jumper that disconnects the internal coolant pull-up for Tap-In operation.

Opening this jumper removes only the internal pull-up.

The remaining input circuit, including filtering and protection, stays connected.

The jumper location depends on the Device.

Use the applicable Product information for the correct jumper position.

[Back to Top](#)

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## **Quick Check After Connection**

After wiring the sensor:

1. Switch the ignition on.
2. Do not start the engine.
3. Check the displayed coolant temperature.
4. Compare it with ambient or known engine temperature.
5. Start and warm the engine.
6. Confirm that the temperature rises smoothly.
7. Verify that the reading does not change abnormally when the second Device is connected.

A completely cold engine should normally read reasonably close to ambient temperature.

If the reading is obviously incorrect, correct the electrical connection before attempting software calibration.

[Back to Top](#)

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## **Reading Changes When Second Device Is Connected**

If the temperature reading changes when another Device is connected, first suspect sensor loading.

Check:

☐ Are both Devices supplying a pull-up?

☐ Is the Tap-In jumper correctly configured?

☐ Is the existing sensor circuit compatible?

☐ Are the controller Grounds compatible?

☐ Is the sensor really an isolated two-wire sensor?

Do not attempt to correct this problem with calibration offset.

Correct the electrical circuit first.

[Back to Top](#)

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## **Quick Decision**

### **Use Standalone Connection When:**

- A dedicated Spitronics sensor is fitted.
- The Spitronics ECU controls the sensor circuit.
- No other ECU is connected to that sensor signal.

### **Internal pull-up: ON**

### **Use Tap-In When:**

- Another compatible ECU already controls the sensor.
- The Spitronics Device only needs to read the voltage.

### **Internal pull-up: OFF**

### **Fit a Separate Sensor When:**

- The existing sensor type is unknown.
- The OEM pull-up is incompatible.

- The sensor is a single-wire gauge sender.
- The shared signal exceeds the acceptable range.
- Reliable readings cannot be achieved.

[Back to Top](#)

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## **Final Connection Check**

Before operating the engine normally:

- ☐ Correct two-wire sensor used.
- ☐ Correct connection method selected.
- ☐ Only one pull-up active.
- ☐ Sensor signal below 5 V.
- ☐ Ground references compatible.
- ☐ Coolant reading believable when cold.
- ☐ Coolant reading rises smoothly during warm-up.
- ☐ Temperature does not change when another Device is connected.
- ☐ Product-specific jumper position verified where Tap-In is used.

[Back to Top](#)