Spitronics ECU - Setting Rotor Phasing for Distributors - Guide

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Rotor Phasing is the mechanical alignment between the distributor rotor and the correct distributor-cap terminal.

Correct Rotor Phasing ensures that the rotor remains suitably aligned with the terminal over the normal ignition timing range.

Incorrect Rotor Phasing can cause:

- Reduced spark energy.
- Excessive spark gap inside the distributor.
- Electrical interference.
- Erratic misfires.

A practical reference is approximately 25° BTDC as the centre position for a typical operating range of approximately 14° to 36° BTDC.

Why Rotor Phasing Is Important

The ECU controls when the spark occurs.

The distributor rotor must still be physically close enough to the correct cap terminal when that spark is commanded.

If the rotor is too far away from the terminal, the spark must jump a larger internal gap before it can travel to the spark plug.

This can:

- Reduce the energy reaching the spark plug.
- Increase electrical interference.
- Cause unstable ignition.
- Create erratic misfires.

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Typical Timing Range

A typical distributor ignition system may operate over an ignition timing range of approximately:

14° BTDC to 36° BTDC

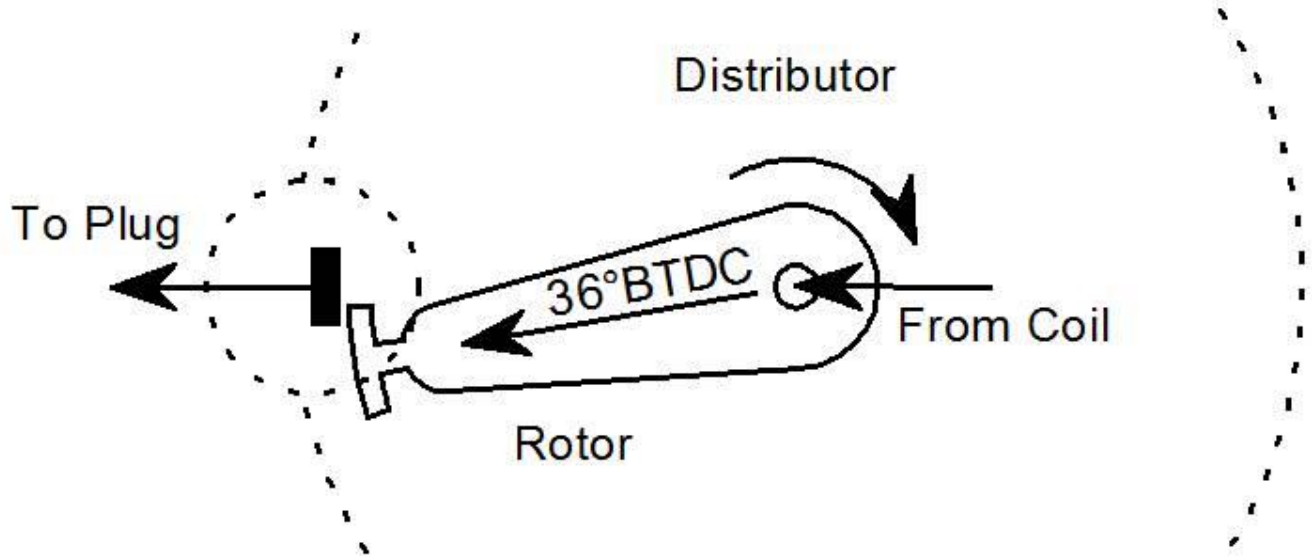
The rotor must remain adequately aligned with the distributor terminal throughout this range.

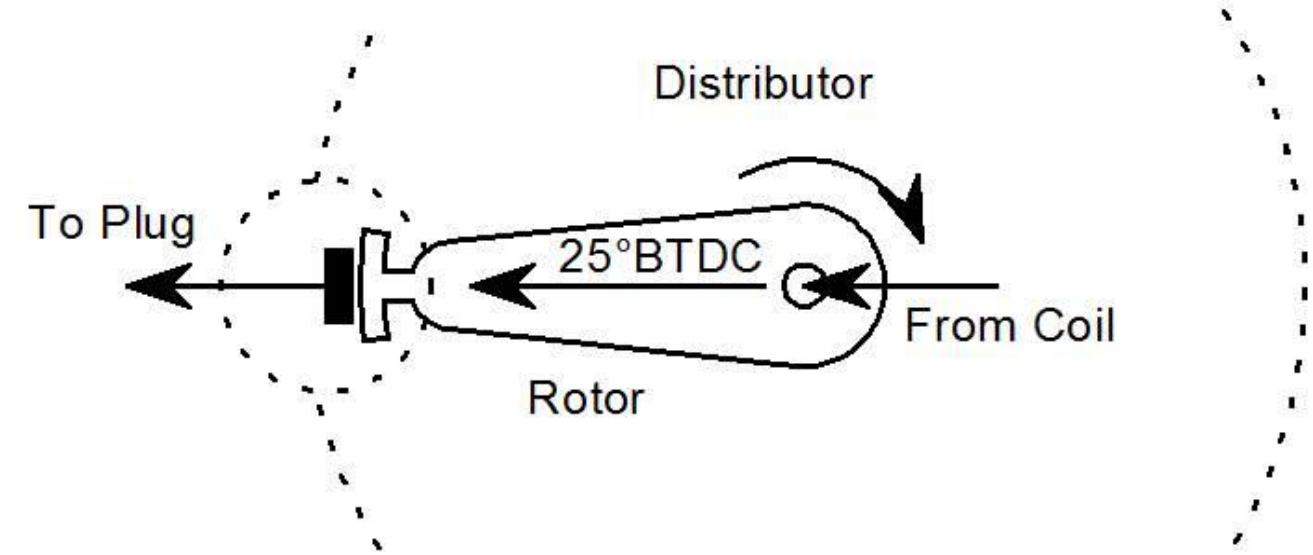
A practical centre position is:

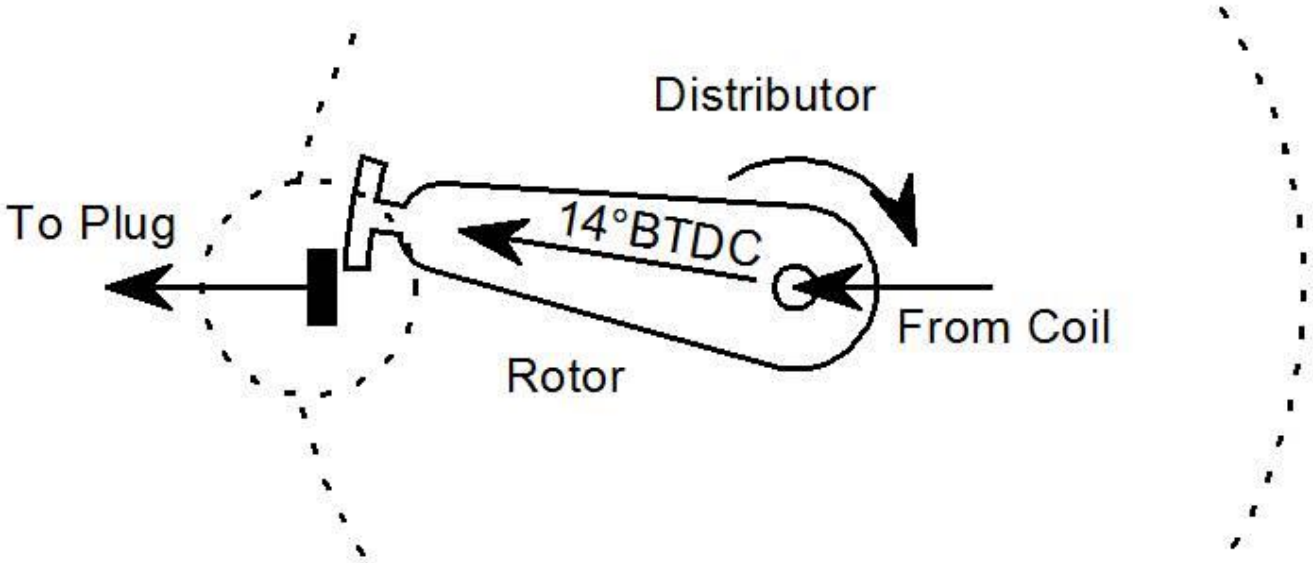
25° BTDC

This gives approximately:

- 11° advance from 25° to 36° BTDC.
- 11° retard from 25° to 14° BTDC.







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Set the Engine Position

Rotate the engine to approximately:

25° BTDC

on Cylinder 1 compression stroke.

Use an accurate crankshaft timing mark.

Do not rely on an unverified pulley mark where timing accuracy is uncertain.

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Align the Rotor

With the engine positioned at approximately 25° BTDC:

1. Fit the distributor in its operating position.
2. Position the rotor directly under the centre of the correct distributor-cap terminal.
3. Confirm that the rotor points to the terminal for Cylinder 1.
4. Tighten the distributor enough that it cannot move accidentally.

At this position, the rotor is centred within the expected ignition timing range.

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Check the Operating Range

The rotor should remain sufficiently aligned with the same distributor terminal as ignition timing moves through the normal operating range.

Using the example range:

- At approximately 36° BTDC, the rotor will be toward one side of the terminal.
- At approximately 25° BTDC, the rotor will be near the centre.
- At approximately 14° BTDC, the rotor will be toward the opposite side.

The rotor must not move so far away that the spark has to jump an excessive internal gap.

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Lock the Distributor

Once the rotor is correctly phased:

1. Tighten the distributor locking nut securely.
2. Check that the distributor cannot rotate.
3. Route the wiring so that engine movement does not pull on the distributor or sensor wiring.

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Do Not Use the Distributor to Set ECU Timing

Once Rotor Phasing has been completed:

Do not rotate the distributor to correct ignition timing.

Rotating the distributor changes the Rotor Phasing and can move the rotor away from the correct cap terminal.

ECU ignition timing must instead be aligned electronically.

Use:

- **Gear Teeth** for coarse timing alignment.
- **Timing Sensor** for fine timing alignment.

Then verify actual timing with a timing light.

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Ignition Timing Calibration

After Rotor Phasing is complete:

1. Set the ECU to a known fixed ignition timing value.
2. Check actual engine timing with a timing light.
3. Adjust **Gear Teeth** for coarse correction where required.
4. Adjust **Timing Sensor** for fine correction.
5. Continue until actual timing matches ECU timing.
6. Recheck at more than one RPM.

Refer to:

Spitronics ECU - Spark and Timing - Guide

for the full ignition timing calibration procedure.
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Distributor Cap and Rotor Condition

Rotor Phasing cannot compensate for worn ignition components.

Inspect:

- Rotor tip.
- Distributor-cap terminals.
- Carbon tracking.
- Cracks.
- Excessive corrosion.
- Excessive rotor-to-terminal gap.

Replace damaged or badly worn components before final setup.
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Electrical Interference

An excessive internal spark gap can generate electrical interference.

This may affect:

- Crank Sensor signals.
- Cam Sensor signals.
- ECU communication.
- Other electronic systems.

If unexplained interference or erratic misfires occur on a distributor engine, Rotor Phasing should be included in the diagnostic checks.

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Common Problems

Symptom	Possible Cause	Check
Weak spark	Rotor too far from terminal	Check Rotor Phasing
Erratic misfire	Excessive internal spark gap	Check rotor alignment
Electrical interference	Spark jumping excessive gap	Check phasing and cap condition
Timing correct but engine misfires	Rotor not aligned with terminal	Check mechanical position
Engine worked before timing adjustment	Distributor was rotated	Re-phase rotor
Spark jumps to wrong terminal	Rotor alignment badly incorrect	Check distributor installation

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Setup Procedure

1. Confirm engine timing marks are accurate.
2. Rotate engine to approximately 25° BTDC on Cylinder 1 compression stroke.
3. Position distributor correctly.
4. Align rotor under the centre of the Cylinder 1 cap terminal.
5. Check that the rotor will remain aligned across the normal timing range.
6. Lock the distributor securely.
7. Route wiring correctly.
8. Do not rotate the distributor again.
9. Set ECU ignition timing electronically using Gear Teeth and Timing Sensor.
10. Verify actual timing with a timing light.

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Setup Check

Before considering Rotor Phasing complete, verify:

[ ] Engine is positioned at approximately 25° BTDC.

[ ] Cylinder 1 is on the correct compression stroke.

[ ] Rotor is centred under the correct distributor-cap terminal.

[ ] Rotor remains suitably aligned across the required timing range.

[ ] Distributor is securely locked.

[ ] Wiring is free from strain.

[ ] Distributor is not used afterward to adjust ECU timing.

[ ] Gear Teeth is used for coarse timing alignment.

[ ] Timing Sensor is used for fine timing alignment.

[ ] Timing light confirms ECU timing.

[ ] Distributor cap and rotor are in good condition.

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