



HONDA F4 ENGINE OPERATING INSTRUCTIONS

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HONDA PERFORMANCE DEVELOPMENT
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Introduction

This document provides the instructions for proper starting, break-in, and operation of the Honda K20 engine used in the United States F4 Championship. It also identifies the proper fuel, lubricants, coolants, and normal operating parameters for the engine.

Engine Operating Specifications

Oil type	0W20 synthetic (Mobil1 or equivalent)
Oil capacity	Approximately 10 quarts
Oil pressure at idle	No lower than 3 Bar (45 PSI)
Oil pressure at 5000 RPM	No lower than 5 Bar (72 PSI) and not to exceed 7.5 Bar (110 PSI)
Oil Temperature Standard Operating Range*:	60°C (140°F) - 110°C (230°F)
Oil Maximum Operating Temperature:	115°C (239°F).
Oil Minimum Operating Temperature*:	40°C (104°F).
Coolant Type:	Demineralized water. HPD recommends MoCOOL water additive at a 5% mixture.
Coolant capacity:	Fill to approximately 1" above the bottom of the expansion tank while running. Occasionally verify that the level did not drop. If so, inspect for leaks. Install the cap while engine / coolant is cool.
Coolant Temperature Standard Operating Range*:	70°C (158°F) - 100°C (212°F)
Coolant Maximum Temperature:	105°C (221°F)
Coolant Minimum Temperature*:	60°C (140°F). Avoid any high engine load until the engine has reached operating temperature.
Spark Plug Gap:	0.7-0.8 mm (.0275"-.0315")
Fuel type:	91 Octane
Fuel Supply Pressure:	45-65 psi

*NOTE: Avoid high engine load until the engine has reached operating temperature.

Start-up Procedures

Dry Engine Start-Up Procedure

NOTE: Before performing dry engine start-up procedure, ensure that the proper type and amount of coolant has been added, and monitor coolant level as the engine temperature increases.

To start an engine that has no lubricants:

1. Add about 3/4 capacity of oil to the dry sump tank and add a quart to the engine itself to prime the scavenge pump.
2. Open the oil supply line to the bottom rear fitting on the dry sump pump and allow oil flow out, then close and retighten.
3. Crank the engine **without ignition** for 5 seconds. Inspect the oil pressure reading on display. If the oil pressure reading did not change, the pump is still priming, repeat this procedure until you see oil pressure.
4. Turn the ignition back on and start the engine. Let engine idle to normal operating temperature.
5. While the engine is running, inspect for leaks.
6. Shut down the engine and immediately check the oil tank level. The sump and oil tank level will gradually equalize as the engine sits. If the oil level is inspected after the engine has not been running for some time, the reading will be inaccurate, and too much oil might be added to the system.
7. Top up the tank with oil to the proper operating level, if necessary.

Wet Engine Start-Up Procedure

To start an engine that contains oil:

1. Confirm that there is oil in the dry sump tank.
2. Crank the engine **without ignition** for five seconds. Inspect the oil pressure reading on display. If the oil pressure reading did not change, the pump is still priming, repeat this step until you see a change in oil pressure.
3. Turn the ignition back on and start the engine. Let engine idle to normal operating temperature.
4. While the engine is running, inspect for leaks.
5. Shut down the engine and immediately check the oil tank level. The sump and oil tank level will gradually equalize as the engine sits. If the oil level is inspected after the engine has not been running for some time, the reading will be inaccurate, and too much oil might be added to the system.
6. Top up the tank with oil to the proper operating level, if necessary.

Engine Break-In Procedure

After adding lubricants and coolant to proper specifications, follow the steps below to properly break-in the engine. Following these procedures will ensure the proper break-in of the engine, if these are not followed, the limited mileage engine warranty will be void.

1. Bring engine to temperature (minimum 60°C coolant temperature)
2. On the first outing, keep RPM below 4000 RPM and throttle at 50%. Bring the engine to stable temperature. Cover a distance of 20 miles. Vary load and engine speed as much as possible and avoid steady states for prolonged periods. Do not exceed 4000 RPM under engine load. Only exceed 4000 RPM for a momentary period under no load conditions (downshifting).
3. Stop and inspect oil level and for leaks.
4. On the second outing, keep RPM below 6000 RPM and throttle at 75%. Bring the engine to stable temperature. Cover a distance of 20 miles. Vary load and engine speed as much as possible and avoid steady states for prolonged length of time.
5. Stop and inspect oil level and check for leaks.
6. Your engine is now ready for an outing at race pace. Although the engine is now broken-in, it is advisable to monitor dash warning lights, including oil pressure, oil temperature, and water temperature indicators.

Dash Warning Indicator Parameters

The sensor indicators will illuminate if any of the following conditions occur:

- Water temperature exceeds 105°C
- Oil Temperature exceeds 115°C
- Oil Pressure is below 45psi and RPM exceeds 3000
- Oil Pressure is below 30 psi and RPM exceeds 800
- Battery voltage is below 11.5 V and RPM exceeds 2000

For any engine related inquiries, please contact:

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