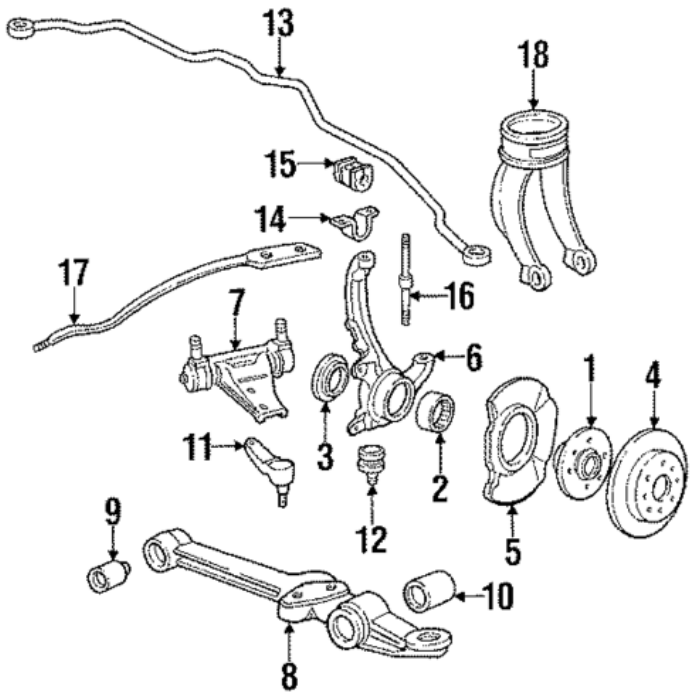
ENGINEERING SPECIFICATION DOCUMENT

EF/EK Civic Time Attack Program
Chassis, Suspension, and Alignment Specification



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Contents

1 Purpose

This document defines the **chassis setup, suspension geometry, alignment targets, ride height, corner weighting, and brake/tyre thermal strategies** for a **time-attack focused EF/EK Civic AWD**.

The build philosophy:

- Engine may be underpowered initially; lap time is gained via **cornering, braking, consistency, and thermal management**.
- Car must be capable of **sustained high load** without fade or geometry shift.
- Setup should support future turbocharging without requiring full chassis redesign.
- Suspension tuning prioritizes **responsiveness, rotation on entry, stability on exit**, and maximum tyre usage.

2 System Overview

2.1 Intended Use

- **Discipline:** Time Attack / Lapping Events.
- **Track Characteristics:** Medium–high speed circuits (e.g., CTMP, Cayuga).
- **Driving Style:** Aggressive corner entry, heavy trail braking, high sustained lateral G.
- **Power Level:** Initially NA or mild turbo; future potential 350–500 whp.

2.2 Setup Priorities

1. Front-end grip and turn-in.
2. Mid-corner stability with predictable rotation.
3. High braking stability with no rear lock.
4. Tyres run hot but controlled ($\approx$ 70–100 °C operating).
5. Brakes run extremely hot — must not fade.

3 Suspension Hardware Platform

3.1 Coilovers

- Brand/Model: _____
- Spring Rates:
  - **Front:** 12–16 kg/mm recommended.
  - **Rear:** 10–14 kg/mm depending on aero and AWD balance.
- Top Hats:
  - Pillowball camber plates (front).
  - Spherical bearings (rear).

3.2 Control Arms and Bushings

- Front LCAs: reinforced or tubular aftermarket.
- Rear LCAs: spherical/heim joint recommended for time attack.

- All compliance bushings replaced with spherical for consistency.

3.3 Anti-Roll Bars (ARBs)

- Front Bar: 22–26 mm (hollow or solid).
- Rear Bar: 16–22 mm depending on rotation desired.

3.4 Wheels & Tires

- Recommended Tire Compound: 200TW Extreme Performance or Semi-Slick.
- Tire Sizes:
  - **Baseline:** 225/45R15 or 235/40R17.
  - **Future Wide Body:** 255–275 front.
- Hot Pressures:
  - **Front:** 30–34 psi.
  - **Rear:** 28–32 psi.

4 Ride Height Targets

4.1 Hub-to-Fender Measurements (preferred)

Location	Target (mm)	Notes
Front (hub to fender)	_____	Slight nose-down rake
Rear (hub to fender)	_____	Higher for anti-squat + AWD diff clearance

Table 1: Ride height baselines (to be measured on vehicle).

4.2 Rake Philosophy

- 5–15 mm of rake (front lower) improves:
  - Turn-in,
  - Aero balance,
  - Weight transfer forward for braking stability.

5 Alignment Specifications

5.1 Time Attack Baseline Setup

Parameter	Front	Rear
Camber	-3.0° to -4.0°	-1.5° to -2.0°
Caster	$+6.0^\circ$ (max achievable)	N/A
Toe	0 to 0.5 mm out	0–0.5 mm in

Table 2: Time Attack alignment baseline.

5.2 Notes on Behaviour

- More front camber = better mid-corner grip but more inside-edge heat.
- Slight toe-out front = razor turn-in response.
- Slight toe-in rear = stability under braking and in high-speed sweepers.

6 Corner Weight Targets

6.1 Cross Weight

- Target: **49–51% cross** with driver in seat.
- Avoid $> 52\%$ unless setup requires specific rotation traits.

6.2 Front/Rear Distribution

- K-series AWD EF/EK typically ends around:
  - **Front:** 59–63%
  - **Rear:** 37–41%
- Aero and diff placement can shift this.

7 Braking System Thermal Strategy

7.1 Brake Hardware

- Front: 4-piston BBK with 280–330 mm rotor.
- Rear: OEM or upgraded single piston with performance rotor.

7.2 Pads

- Track pads with 600–800 °C fade resistance.
- Examples: Winmax, PFC, Endless, G-Loc.

7.3 Cooling

- Ensure ducts aimed at rotor hat or caliper bridge.
- Remove fog lights for duct inlet if needed.

8 Tyre Thermal Management

- Time attack tyres operate best at 70–100 °C.
- Inner-outer temps:
  - Target 8–15 °C inner ¿ outer for correct camber.
- If outer overheats:
  - Add camber or reduce corner entry speed.

9 Aero Assumptions (Future-Proofing)

- Front splitter down to 75–90 mm ride height.
- Side skirts optional for underbody sealing.
- Rear wing with 6–12° AoA.
- Aero balance tuned via rake + rear wing pitch.

10 Setup Sheets (Quick Reference)

10.1 Dry Track – Qualifying

- Max front camber.
- Toe-out front, small toe-in rear.
- Firm ARB settings.
- Highest allowable rake.

10.2 Race / Long Session

- Slightly reduced camber to avoid thermal runaway.
- Softer front ARB to preserve tyres.

11 Future Revisions

- Add exact corner weights after scale session.
- Add damper clicks (compression/rebound).
- Add tire temp/pressure charts from track days.
- Add aero balance data once wing/splitter installed.