One step at a time.

Grinder Tunes Help & Tutorials

Windows tutorial release 0.1.90 • November 27, 2026

Read it. Tune it. Own it.

Numbered instructions for the actual workflows, with expected results and troubleshooting. Open the same help beside your work using Help / Tutorial or F1.

Build it right the first time.

Start with the right job

• Connect and read: preserve a verified original before editing.

• Remote tuning: edit supported files without the PCM; the customer performs the separate physical write.

• Cam Tuning: confirm the card and build, enter reviewed targets, save and verify.

• Programming: Test Write does not install the tune. Wait for the separate verified programming result.

Read the current online instructions at grindertunes.com/help. Hardware capability depends on the actual controller, exact OS, reviewed definitions, adapter and operation.

Find your walkthrough

01 Choose a job

02 Install Grinder Tunes

03 Connect your interface

04 Check PCM and vehicle identity

05 Understand read and write coverage

06 Read and save the original PCM

07 Find original and edited tune files

08 Open and edit a supported tune

09 Review calibration tables

10 Import and save an HP Tuners HPT copy

11 Save or reopen a GTF project

12 Remote tuning without the PCM

13 Record the installed build

14 Cam Tuning: inspect, ask AI and save a customer file

15 AI tune conversation: ask about the imported settings

16 Confirm injector flow data

17 Review VATS/security

18 Set gear and tire calibration

19 Configure and check cooling fans

20 Set supported idle targets

21 Review A/C compressor cutout

22 Review calibration DTC configuration

23 Record and save a scan

24 Play back a saved scan

25 Log and review a cammed idle

26 Keep a tuning session

27 Record boost-related evidence

28 Read diagnostic codes and evidence

29 Clear recorded faults

30 Use Guided Diagnostics

31 Use Harness Monitor

32 Review oxygen-sensor data

33 Use Vehicle Module Scan Preview

34 Test and observe cooling fans

35 Use GM Factory Service handoff

36 Save a factory Window Test Trace

37 First Start / No Start recorder

38 Capture a crank attempt

39 Use Swap Tune Builder

40 Use Turbo Setup

41 Test, write and verify a tune

42 Transfer a reviewed tune to a target

43 Search the controller catalog

44 Activate a serial and manage vehicles

45 Install an approved update

46 Disconnect and exit safely

47 Use Help / Tutorial and Ask AI

48 DOD / AFM: choose ON or OFF and program a supported E38

49 Race Tune: record, revise and compare

50 T42 Bench Lab (read-only beta)

51 Engine Tune: review and program supported settings

52 Transmission Tune: gear and tire calibration

53 P59 engine, transmission and fan workbench

54 E92 VATS and calibration programming

55 Open, save and close tune files

56 No Crank and bench checks

57 Match the PCM VIN to the vehicle

01 Choose a job

Start with the task you need, then follow the matching walkthrough.

1. Choose your starting point

Choose Tune a vehicle, Find a problem or Manage customer files on Home. Build & Tune, Scan & Test and Customer Files are also in the sidebar.

What you should see
The selected workspace opens; no flash write starts from navigation.

2. Check the controller and file

For hardware work, confirm the actual controller and OS. For a saved tune, check the file identity in Tune Editor.

What you should see
You can tell whether you are viewing a connected PCM or an offline file.

3. Open help for that section

Select Help / Tutorial beside the section title, or press F1. Use Next step after you complete each step.

What you should see
The help panel opens beside your work and remembers your place for this session.

4. Keep a job record

Keep the original backup, build sheet, changed copy and result log together.

What you should see
You can return to the unchanged original and explain the changes.

Current online tutorial: grindertunes.com/help#start

02 Install Grinder Tunes

Use the current Windows x64 Setup from the official website.

1. Finish the current job

Save your files and use Disconnect & Exit before starting Setup. Keep your original tune folders and activation files.

What you should see
The app has closed and no PCM operation or recovery is pending.

2. Download the complete Setup

Download the complete Windows x64 Setup. This private 0.1.90-beta.3 is a manual Setup installer; it has not been promoted to the customer update feed. Keep the previous stable Setup for rollback.

What you should see
Setup opens without an installer integrity error.

3. Complete Setup

Follow the installation prompts, then use the Grinder Tunes desktop shortcut. If Windows shows a reputation warning, follow the illustrated Windows installation guide after checking the official source and filename.

What you should see
License & Settings shows the installed version. Windows publisher signing is still pending.

4. Activate your license

Open Serial Code & Vehicles, enter your serial and choose Activate Serial. Save the signed license download from your order page privately.

What you should see
Your plan and vehicle allowance are shown.

If something goes wrong

Installer integrity check failed

Close Setup, remove only the incomplete downloaded installer, and download a fresh copy from the official site. Do not bypass NSIS integrity checking.

Old application could not uninstall

Close the running app and older Setup, then run the current official Setup from the same Windows account. Keep tune and activation files. If it still fails, send the exact message to support.

Current online tutorial: grindertunes.com/help#install

03 Connect your interface

Use the always-visible Controller connection panel to select an adapter, connect and read the PCM.

Before you start

• Controller connection stays expanded across connection changes and workspace tabs. Adapter selection and supported Read/Review/Save/Test/Write controls are visible without an arrow.

• Install the adapter manufacturer’s Windows J2534 driver.

1. Prepare the correct bench

Use the harness and reviewed wiring for the exact controller. Connect fused battery, ignition and grounds as instructed for that harness. Use a regulated supply appropriate for the job.

What you should see
The PCM has the required power feeds; a USB adapter alone does not power the PCM.

2. Select your adapter

In Controller & Comms select your installed OBDX Pro GT J2534 driver. If using a supported COM path, select the actual enumerated COM port.

What you should see
Your actual driver or COM port appears; a missing port is not replaced with a made-up one.

3. Detect and connect

Use Detect & Connect / Check & Connect as shown by the current workspace. Let one request finish before trying another. Close other scanners using the same adapter.

What you should see
The connection status and actual identity replies arrive.

4. Confirm the identity

Check controller, operating system and available voltage. A donor VIN may describe the original vehicle rather than the installed swap.

What you should see
The controller and OS match the PCM you intend to work on.

5. Choose the next task

Use the supported read, logger or diagnostics action. A reader may close diagnostics temporarily to take exclusive control.

What you should see
One engine owns the interface and the operation log names its current stage.

If something goes wrong

Check & Connect appears stuck

Keep the error stage and elapsed time. Do not launch another connection while the first hardware request is active. If no programming or recovery is active, use the app’s cancel/disconnect controls and reconnect once the port is released.

A native operation is already in progress

The reader, writer or diagnostic exchange still owns the interface. Wait for its result or supported cancellation and clean port closure. Help remains available while you wait.

Current online tutorial: grindertunes.com/help#connect

04 Check PCM and vehicle identity

Separate stored donor information from the actual installed parts.

1. Read the identity

Connect and review Connected PCM or Vehicle & Controller.

What you should see
Controller, OS and VIN are reported only when actual responses are available.

2. Compare the installed build

Confirm engine RPO, throttle, transmission, injectors and harness physically. Enter these in Build Sheet.

What you should see
The build record describes the installed swap rather than a VIN assumption.

3. Review feature coverage

Read the coverage status for the exact controller and OS before editing or programming.

What you should see
Unavailable features remain unavailable even with an activated license.

Current online tutorial: grindertunes.com/help#identity

05 Understand read and write coverage

Identification, diagnostics, flash reads and programming are separate capabilities.

1. Use the exact controller and OS

Connect or open a verified image, then inspect Read and write coverage.

What you should see
The app reports the capability for this specific image and path.

2. Check the operation you need

Review read, edit, test and write support separately. P01/P59 support depends on the exact OS and reviewed layout. E38 VATS has a specific OS 12614088 path.

What you should see
You know which operation is available before preparing a tune.

3. Respect a blocked action

If a definition, identity, recovery state or hardware check blocks an action, keep the message and use the relevant tutorial.

What you should see
A profile selection alone cannot enable a missing implementation.

What this feature supports

• Cam Tuning editing is reviewed for P01 OS 12202088 and P59 OS 12587603 only.

• E92 OS 12677878 retains its private calibration-only writer. OS 12710466 has a verified same-image calibration-write baseline and an exact-reference VATS On/Off definition. Its VATS Off patch was installed and confirmed by independent complete PCM read-back on the reference controller. Other edits, boot, VIN, slave and shadow operations remain outside its scope.

• MPVI3 native flashing and ACES/Holley tune editing are not implemented in this release.

• The current hardware engine retains third-party components and their notices; reader branding does not change that.

Current online tutorial: grindertunes.com/help#coverage

06 Read and save the original PCM

Save a verified backup before you change calibration values.

1. Connect and confirm the target

Confirm the actual controller, exact OS, selected adapter and stable bench power.

What you should see
The identity matches the PCM on the bench.

2. Start the supported reader

Choose Read Selected Controller / Read PCM on the supported path. Leave power and the interface connected.

What you should see
The log advances through setup, permission, reader upload and flash blocks.

3. Watch actual read progress

Reader upload at 100% means the small RAM program was sent. Flash reading still has to finish.

What you should see
Transferred flash-byte progress advances separately from reader upload.

4. Read the plain-language status

Read progress uses labels such as Reading controller memory or Reading the anti-theft (VATS) setting. After the completed backup is decoded, VATS: On or VATS: Off appears only for a verified setting. Open Technical Details for the original reader messages and memory locations.

What you should see
You can follow the read without interpreting hexadecimal addresses. Unknown or incomplete data remains VATS: Not verified.

5. Confirm completion

Wait for the final verified backup result and saved filename. A partial read, sequence gap or refused block is not a verified backup.

What you should see
The app reports a complete image and successful file checks.

6. Keep the original

Open Stock Tunes and preserve the original BIN plus its fingerprint and read log. Save later edits separately in Tune Files.

What you should see
You retain an unchanged original that can be compared with edited copies.

7. Read and verify the E92

Select Gen 5 E92 and your J2534 adapter, then choose Read & Verify E92. The app pauses 35 seconds after closing diagnostics and between the two independent reads. Keep power and the adapter connected through both captures.

What you should see
Passed appears only after two complete images match, their OEM sums validate, and stock diagnostics reconnect. Open Read Report contains the files, coverage and any failure address.

8. Follow the named Read Progress view

Use Read Progress above Technical Details. For the reviewed E38 OS 12614088 layout, memory reads are named Operating system, Engine settings, Engine diagnostic settings, Fuel system settings, System settings or Speedometer settings. The live status uses the current named region.

What you should see
You see names in the main progress view. The original reader messages, component version and memory addresses remain under Technical Details. Other controller/OS layouts use a generic memory label until reviewed.

9. Follow the timestamped activity console

Read & scan activity is visible above Technical Details in Hardware session. During an identified E38 OS 12614088 read, the timestamped lines name the current reviewed memory region. Open Technical Details — original communication log only when the original addresses or replies are needed.

What you should see
The timestamped console shows Reading operating system for addresses in the operating-system region. Unknown layouts use Reading controller memory. Original timestamps, raw messages and saved session evidence stay intact.

If something goes wrong

E92 ISO-TP sequence gap

A CAN response frame was missed or arrived out of sequence. Keep the full stage, address, adapter and log. Retrying the same failed read does not establish a backup; do not write from an incomplete image.

Memory-read service refused with code 0x11

The selected read service was rejected in that session. Save the exact controller, OS and reader details. This is different from a successful read or a missing Windows file.

Reader file failed to download

Check internet access during first setup. A verified cached reader works offline on implemented paths. Do not substitute an unverified reader binary.

The E92 bench test stops or the two reads differ

Open Test Report. Keep both captures and the bench log. An unexpected missing block, mismatched OS/VIN, checksum failure or failed stock reconnection cannot pass. The report includes the failed address and receive evidence when available.

Current online tutorial: grindertunes.com/help#read

07 Find original and edited tune files

Keep backups, revisions and reports easy to identify.

1. Open Stock Tunes

Use Open Stock Tunes for the unchanged backups created by supported completed reads.

What you should see
The original BIN and related evidence remain together.

2. Open Tune Files

Use Open Tune Files for saved edited copies, HPT extraction reports and GTF projects.

What you should see
Edited files are separate from their source backup.

3. Name each revision

Use a useful customer/job name and revision. Keep the controller, OS, build sheet and requested changes with it.

What you should see
You can identify the correct file without guessing from a filename alone.

4. Reopen before sending

Reopen the saved copy and check its actual identity and validation result.

What you should see
The file you send is the saved, revalidated copy.

Current online tutorial: grindertunes.com/help#files

08 Open and edit a supported tune

Review the actual file and mapped settings before saving a revision.

1. Open your source

Use Open Backup BIN, Open HPT Tune or Open GTF Project. Check the actual controller, OS and validation result.

What you should see
Tune Editor identifies the opened file; unsupported ranges are explained.

2. Find the setting group

Choose Engine, System, Speedometer or the relevant editor group. Select a named mapped table or setting.

What you should see
Original values and units are visible where a reviewed definition exists.

3. Review proposed changes

Enter only the intended values. Compare original and proposed cells and check any supported range or condition.

What you should see
Pending changes describe the exact edits.

4. Save a separate copy

Use the save control for that workflow. Reopen and revalidate the copy before preparing a write.

What you should see
A new file is saved; the PCM has not been programmed.

What this feature supports

- A displayed section without a reviewed definition is unavailable for editing.
- A valid checksum checks file consistency; it does not prove the tune suits the engine.

Current online tutorial: grindertunes.com/help#tune-editor

09 Review calibration tables

Use named, mapped rows and units for the exact OS.

1. Choose a mapped table

Open the supported tune and select a table in the appropriate editor group.

What you should see
The row and column labels, units and original values appear.

2. Edit the intended cells

Enter a single value or select the intended range. Confirm the row, column and any RPM, temperature or load conditions.

What you should see
Only the intended cells are staged.

3. Review or undo

Compare the pending changes with the original. Use Undo where needed.

What you should see
The staged list matches your requested changes.

4. Save and verify

Save the tune copy and review its validation. Prepare a transfer only on a supported target.

What you should see
The saved revision is distinct from both the original and a physical write.

5. Compare and reuse mapped values

Choose Compare Another BIN for a matching controller, OS and code layout. Inspect Comparison file or Working minus comparison. Select a rectangle and Copy from comparison file to stage values. Export Table and Import Table exchange matching Grinder table JSON.

What you should see
The comparison shows differences without changing the tune. Copy/import changes only mapped words and remains undoable.

6. Interpolate, smooth and redo

Select at least three cells in a numeric axis direction. Interpolation uses the actual axis coordinates. Smoothing uses a strength above zero and up to 100 percent, retaining the selected endpoints or perimeter. Use Undo and Redo before saving.

What you should see
Invalid ranges, categorical axes and out-of-range values leave the tune intact. Save Edited Tune produces a separately validated BIN.

Current online tutorial: grindertunes.com/help#tables

10 Import and save an HP Tuners HPT copy

Decode locally, edit supported calibration and save a real HPT using its original template.

1. Keep the customer’s original HPT

Retain an unchanged copy of the received file and its job details.

What you should see
The original source remains available.

2. Choose Open HPT Tune

Select the HPT file. Choose the controller and original/current image when the importer offers a choice.

What you should see
The local reader reports its supported format and decoded ranges.

3. Check the imported image

Read the extraction report, controller, exact OS, size and image checks. Partial or unsupported images may be saved for inspection without becoming editable.

What you should see
A usable BIN opens only when the implemented checks pass.

4. Save in the customer’s format

After saving supported calibration edits, choose Tune Editor > Save As HP Tuners (.hpt) and select the reviewed saved tune if asked. In Cam Tuning, Save Customer HPT Copy saves the reviewed plan directly. The original imported HPT or its GTF-preserved source is required.

What you should see
A separate HPT is rebuilt and reopened locally. Its selected controller image must equal the reviewed BIN; unrelated controller records and original-image records are retained.

5. Open and check the HPT in VCM Editor

Open the exported HPT in VCM Editor and check the controller, OS and changed settings before sending it to the customer. Local checks do not establish acceptance by VCM Editor or compatibility with the physical vehicle.

What you should see
Your opening check verifies the recipient’s software can read the exported file. Programming still follows that tool’s normal requirements.

What this feature supports

• A customer who will flash only through HP Tuners needs a valid supported HPT workflow; do not promise that a revised BIN can simply be loaded there.

• HPT saving supports recognized family 0x50 revisions 13/14 with a complete zero-based P01, P59 or E38 image and valid OEM checks. E38 also requires all six CVNs. Unrecognized or partial images remain unavailable.

• Only calibration-region changes are accepted. Operating-system code, identity regions, controller layout and unrelated container records cannot change through this export. An E38 VATS operation that changes OS code is outside this HPT export scope.

• A standalone BIN cannot create an HPT without the matching original template. Renaming an extension does not convert a file. No online converter or provider upload is used by native HPT saving.

• VCM Editor opening/compatibility and physical Windows installation were not tested in the development environment. Open-check the exported HPT before customer use.

Current online tutorial: grindertunes.com/help#hpt-import

11 Save or reopen a GTF project

Keep the source, saved revisions, build sheet and notes in one project.

1. Save calibration changes first

Use Save Tune Copy or the relevant workflow save control before saving the project.

What you should see
The tune revision has passed its file validation.

2. Choose Save GTF Copy

Include the build sheet and useful job notes. Keep customer details limited to what the job needs.

What you should see
A Grinder Tunes project is saved with supported source and revision information.

3. Open GTF Project later

Choose the saved project and review its imported sources and selected revision. Declared HPT relationships are decoded and checked again.

What you should see
The project’s actual tune and build information reopen.

4. Continue from the right revision

Review changes before saving another copy or preparing programming.

What you should see
Earlier source files remain available.

Current online tutorial: grindertunes.com/help#gtf

12 Remote tuning without the PCM

The customer reads and flashes the PCM; you edit a supported saved file.

1. Customer: read the PCM

The customer uses supported software and hardware to make a complete verified read. Ask for that file, exact controller/OS, build sheet and requested changes.

What you should see
You receive a real source tune rather than a blank template.

2. Shop: open the file

Choose Customer file in Cam Tuning. Import a supported HPT or open a verified BIN/GTF, then inspect its current calibration. Keep the received file untouched. No PCM connection is needed.

What you should see
You can inspect and edit supported calibration without a PCM attached.

3. Shop: review the changes

Enter the requested values only where reviewed definitions exist. For Cam Tuning, confirm the cam card, installed parts and entered targets.

What you should see
The original-to-proposed review shows the exact changes.

4. Shop: save the right customer format

For a customer who sent HPT, use Save Customer HPT Copy in Cam Tuning or Save As HP Tuners (.hpt) in Tune Editor. Keep the original; save a GTF work order and Customer Change Sheet if needed.

What you should see
The new HPT is reopened locally and must contain the exact reviewed calibration. BIN/GTF remain separate choices, not HPT aliases.

5. Shop: check the returned HPT in VCM Editor

Open the exported HPT and compare the requested settings before delivery. This manual check is required because local reconstruction/checksum checks do not prove VCM Editor accepts the file.

What you should see
The recipient receives a checked HPT rather than a renamed BIN. No PCM is needed to edit or save the supported file.

6. Customer: confirm compatibility

The customer connects the original target, keeps a fresh verified backup, confirms identity and license, and follows the supported no-erase test.

What you should see
The software confirms the actual target and programming prerequisites.

7. Customer: write and verify

The customer performs the separate supported Write/Transfer action, waits for verified read-back, then logs actual engine behavior.

What you should see
A verified write installs the file; vehicle measurements determine how it runs.

What this feature supports

• No physical PCM is needed to edit a supported file. Physical access to the PCM is required to read or program it.

• HPT export requires the matching original HPT and recognized image format. Check VCM Editor acceptance before sending it; no new controller flashing engine is added.

• A file-only edit cannot confirm idle quality, fuel pressure, spark at a plug or road behavior.

Current online tutorial: grindertunes.com/help#remote-tuning

13 Record the installed build

Good input details keep the tuning job tied to the actual engine.

1. Confirm the controller

Read or open the actual tune and check its exact identity.

What you should see
The controller data is distinguished from the installed build.

2. Enter physical parts

Record engine RPO/displacement, cable or wire throttle, transmission, converter, intake, exhaust, injector part number, gear and tire size.

What you should see
The sheet describes the installed parts.

3. Record cam and fuel details

Use the actual manufacturer cam card, measured fuel pressure, regulator behavior and fuel type. Leave unknown values unconfirmed rather than inventing them.

What you should see
Facts and unconfirmed details are clear.

4. Save with the job

Save a GTF or Tune Session containing the build sheet and notes.

What you should see
The next person can understand the assumptions behind the tune.

Current online tutorial: grindertunes.com/help#build-sheet

14 Cam Tuning: inspect, ask AI and save a customer file

Follow six visible steps for a customer file job. Inspect actual calibration, ask follow-ups and save a reviewed HPT or BIN without a PCM.

Before you start

• Reviewed editing: P01 OS 12202088 or P59 OS 12587603 with the required code/layout checks.

1. Import and inspect the customer tune

Choose Customer file and the recipient software. Import a supported HPT, or open a BIN/GTF. The first step shows actual warm-idle RPM, running airflow and a read-only table selector. Use Idle, Airflow, Fuel or Spark shortcuts for direct Tune Editor inspection.

What you should see
File values are visible before editing. Unsupported controller/OS definitions show an explicit reason and no invented values.

2. Record the cam if known

Choose Next: Pick Cam, find the exact manufacturer/part or enter the actual cam card. For manual idle-only edits, continue without cam details. Masked values stay unknown; advertised duration is not duration at .050.

What you should see
Choosing a cam records facts and does not alter calibration. Numeric AI suggestions require confirmed cam and build facts.

3. Confirm the actual build

Use the dropdowns to confirm engine, throttle, transmission, converter, intake, headers, injectors, fuel and measured pressure. File-derived fields are labelled and do not prove the installed hardware. Next opens Values / AI.

What you should see
Back and Next preserve entries. A similar cam or a nominal fuel-pressure selection is not a measurement.

4. Ask AI or set targets

Ask AI About This Imported Tune opens the conversation beside the inputs. Ask what the imported settings mean, supply missing facts and follow up. Select approved starting idle suggestions, or enter exact targets yourself. Leave a target blank to keep its opened values.

What you should see
Current values are shown beneath idle/airflow targets. Numeric AI proposals cover only reviewed warm-idle RPM. Asking AI does not change a file.

5. Review every cell and save the customer format

Choose Next: Review Changes. Compare original/proposed cells, tables, axes and units. For an imported HPT choose Save Customer HPT Copy. The app keeps a verified working BIN for GTF continuation; you do not need a separate manual BIN save first. BIN and GTF buttons remain available.

What you should see
The HPT is a real rebuilt container with the exact reviewed image and verified checksums. The original file stays untouched; no PCM is required or written.

6. Check and deliver the HPT

Choose Next: Deliver Customer File. Open the exported HPT in VCM Editor and check the requested settings. Mark the review checkbox only after doing that check, then save the Customer Change Sheet and send through your usual customer workflow. Select Program a physical PCM only for a separate supported hardware job.

What you should see
The app’s local verification and your VCM Editor review are distinct. Native HPT export does not add calibration definitions or prove running-engine behavior.

If something goes wrong

I imported an HPT. What is next?

Step 1 shows its current calibration. Next leads through optional cam details, build confirmation, targets/AI, cell review and Save Customer BIN Copy. Customer file mode does not lead to a PCM write. Check the HPT delivery-format limitation before accepting an HP Tuners job.

I cannot find my cam.

Clear brand/family filters, search the part number or use Custom cam. Enter only the actual card values and a manufacturer source. Do not substitute a similar stage name.

An HPT decodes but editing is unavailable.

The file may use an unsupported controller, OS or executable layout. Read the import result. An extracted BIN does not establish a reviewed editing definition.

The AI button reports setup is unavailable.

The owner must save and enable the API connection privately at grindertunes.com/admin/ai-help. Customers need internet and an activated serial. Dropdowns, import and tutorials work without live AI.

What this feature supports

• Reviewed Cam Tuning edits require P01 OS 12202088 or P59 OS 12587603 and the exact required code/layout checks. A broader cam catalog does not add write support.

• The initial catalog has 281 sourced entries across eight manufacturers. It includes catalog references and current product pages, not every custom or discontinued cam ever made. Confirm the supplied card and application.

• Numeric dropdowns offer useful presets and all numeric values published by included cam entries; custom entry preserves any valid exact value. Selecting a value does not recommend it.

• A tune cannot identify the installed cam, actual converter, springs, injector part number or measured fuel pressure. Published cam-card centerline is not a degreeing measurement.

• Native HPT saving requires an original imported HPT template, recognized image format and calibration-only changes. A BIN alone cannot become an HPT; unrecognized formats are refused.

Current online tutorial: grindertunes.com/help#cam-tuning

15 AI tune conversation: ask about the imported settings

Ask follow-up questions grounded in the imported calibration and confirmed build, then select reviewable warm-idle starting values.

Before you start

• Internet, an activated live license and the owner-enabled AI service are required.

• Keep the original tune and confirm the physical build; cam specs alone do not define finished fuel or spark maps.

1. Open the tune and ask a question

From Inspect Tune, choose Ask AI About This Imported Tune. Explain the customer request in the question box. You can ask about current idle settings or the workflow before knowing the cam.

What you should see
The reply uses actual mapped calibration summaries and asks for facts it cannot infer.

2. Continue the conversation

Reply in the same question box. The last six conversation messages accompany the current build and calibration summary. A new source file clears the conversation; Clear Conversation starts fresh.

What you should see
The provider receives bounded, redacted text and summaries, not raw HPT/BIN data, local paths, VINs or license codes. API credentials stay on the website server.

3. Confirm parts for numeric starting suggestions

Choose the exact cam, displacement, throttle, transmission and fuel; confirm the cam and build checkboxes. Add measured RPM, coolant, MAP, pressure, wideband readings and symptoms when available.

What you should see
Unknown cam specs and actual measurements are never filled by guessing.

4. Select targets to review

Inspect the proposed original/current comparison and reason. Check only the idle suggestions you want, then Use Selected Idle Suggestions. The selected starting RPM fills step 4 for mapped 176–241 °F rows.

What you should see
Only supported P01 OS 12202088 or P59 OS 12587603 used idle conditions are transferable. Values are integers 600–1100 RPM and within 200 RPM of the opened value. Fuel, airflow, VE, spark and injector edits require measured data and manual review.

5. Review and save a separate customer file

Use Next: Review Changes, then Save Customer HPT Copy when the original HPT template is available. Otherwise save the supported BIN/GTF. Open and check the HPT in VCM Editor before delivery.

What you should see
AI only fills selected targets. It does not save a file or program a PCM. File checks do not validate the running engine.

If something goes wrong

AI suggestions disappeared.

The source tune or relevant cam/build facts changed. Ask again for the current combination. Editing a follow-up question does not by itself invalidate a selected proposal.

AI returned advice but no selectable values.

Read the missing-facts questions. Unsupported definitions, unconfirmed hardware or uncertain combinations intentionally receive review without numeric proposals.

AI is unavailable or timed out.

Read the reason beside Ask AI. The owner can check the private AI Help setup; customers can activate their license, check internet or use the offline tutorial. Cancel AI Review cancels only that network request.

What this feature supports

• Proposed idle targets are integers from 600–1100 RPM, within 200 RPM of the opened warm value, only for used conditions. Unsupported/unknown builds receive review and questions without transferable values.

• Advanced fuel, spark, VE, airflow and injector changes stay under the separate measured, explicit tuning workflow.

• AI gives starting advice. Confirm mechanical and fuel conditions and validate changes on the actual running engine.

Current online tutorial: grindertunes.com/help#cam-advisor

16 Confirm injector flow data

Preview flow scaling only when the injector and pressure information are confirmed.

1. Identify the injector

Use the exact part number and supplier characterization data. Enter rated flow and the differential pressure at which that flow was measured.

What you should see
The rating belongs to the actual injector.

2. Enter measured pressure and regulation

Confirm measured base pressure and select fixed rail pressure or manifold-referenced regulation as actually installed.

What you should see
The calculation uses the intended differential-pressure behavior.

3. Preview the curve

Choose Calculate Flow and inspect vacuum, differential pressure and flow units. Include the curve only after confirming that the remaining characterization is appropriate.

What you should see
The proposed curve is visible before any tune changes.

4. Review the saved change

Review the injector table alongside the other proposed cells before saving.

What you should see
The requested table is included only if you deliberately enabled it.

What this feature supports

- Changing a software field does not adjust a mechanical fuel-pressure regulator.
- Flow conversion alone does not supply complete injector characterization.

Current online tutorial: grindertunes.com/help#cam-injectors

17 Review VATS/security

Read the supported setting from the actual file and review the intended change.

1. Open the exact tune

Read the target or open its supported verified file. Open System → General → Security.

What you should see
The original VATS state is shown only where an exact reviewed definition exists.

2. Choose the intended setting

Review the available VATS control for this layout. A mode such as serial, PWM or none describes the implemented control mode; use the named state and exact OS explanation shown by the app.

What you should see
The pending change names the actual setting.

3. Save a separate copy

Save the edited tune and confirm its checksum/reopening evidence.

What you should see
The saved file has the intended setting; the physical PCM is still unchanged.

4. Program only through the supported path

Use Test Write and the separate guarded programming action as required for that controller. Verify the resulting read-back state.

What you should see
The physical write result is recorded separately from the offline file state.

If something goes wrong

E92 backup is loaded but VATS is not mapped

Check the exact OS and image fingerprint. This build maps only the owner’s OS 12710466 On/Off reference pair. Repeated reading or same-image calibration writing does not map another image. Open E92 Read & Write for the supported workflow.

What this feature supports

• Supported security changes do not add support for a different controller or OS.

• E38 OS 12614088 has its own reviewed VATS and recovery path; do not substitute a Gen 3 workflow.

• E92 OS 12710466 adds an exact-reference VATS definition and targeted OS programming. Use Save Tune As, Review Saved Tune, Test Write and Write Saved Tune. VATS Off installation was confirmed

by independent PCM read-back on the reference controller. Unmapped E92 images still show no On/Off switch and their VATS actions stay blocked.

Current online tutorial: grindertunes.com/help#security

18 Set gear and tire calibration

Use actual rear-axle ratio and tire dimensions in a supported definition.

1. Confirm the actual driveline

Record axle ratio, tire size or measured rolling height and transmission.

What you should see
The build data matches the installed vehicle.

2. Open Gear / Tire Calibration

Use Setup Wizard or Tune Editor → Speedometer → Calibration. Review supported source values.

What you should see
The correct mapped settings and units appear.

3. Enter and review

Enter actual measurements and review the original/proposed values. Save a separate validated tune copy.

What you should see
Only the intended supported fields change.

4. Program and validate

Use the supported write workflow, then compare measured vehicle speed and shifting behavior.

What you should see
Real measurements confirm the result.

What this feature supports

• Transmission Tune edits only supported gear/tire settings; transmission selection and stall notes do not establish a compatible conversion. T42 Bench Lab is separate.

Current online tutorial: grindertunes.com/help#gear-tire

19 Configure and check cooling fans

Keep tune settings and physical fan-output testing separate.

1. Confirm the fan wiring

Check the actual relay wiring and fan configuration for the harness and controller.

What you should see
The controlled outputs match the installed system.

2. Open Cooling fans

Use Setup Wizard or Tune Editor → System → Fans. Review the mapped activation and deactivation conditions and units.

What you should see
Available settings belong to the exact tune.

3. Review and save

Enter intended settings, review the proposed changes and save the separate tune copy.

What you should see
The copy passes the file checks.

4. Validate after programming

Open Scan & Test > Cooling fan tests. Use the supported live test or capture observations; verify operation after programming.

What you should see
Observed fan behavior is recorded; a software setting alone does not prove the relay or motor operates.

Current online tutorial: grindertunes.com/help#fans

20 Set supported idle targets

Review temperature, gear and A/C conditions individually.

1. Open the actual tune

Use a reviewed file and open Target idle speed or Engine → Idle.

What you should see
Original mapped targets and conditions appear.

2. Choose conditions and values

Confirm Park/Neutral, in gear, A/C and temperature conditions. Enter only the intended targets.

What you should see
The proposed values match the selected conditions.

3. Review and save

Compare original/proposed cells and save the separate verified copy.

What you should see
The original remains unchanged.

4. Check a warm engine

After a supported write, log actual and desired RPM, airflow, spark and fuel trims where available.

What you should see
Repeatable data can guide the next revision.

What this feature supports

• Easy Engine Tune changes only mapped fields on a supported exact OS. Blank fields retain the original values.

Current online tutorial: grindertunes.com/help#idle-settings

21 Review A/C compressor cutout

Use mapped conditions for the installed A/C system.

1. Confirm the installed system

Record the actual A/C wiring and compressor control arrangement.

What you should see
The build sheet describes how the controller is used.

2. Open A/C compressor cutout

Use Setup Wizard or Tune Editor → System → A/C and review the supported units and conditions.

What you should see
Mapped original values appear for the exact tune.

3. Review and save

Enter intended values, review the changes and save a separate copy.

What you should see
The tune copy passes validation.

4. Check operation after programming

Use appropriate measurements and the supported logger to observe the relevant conditions.

What you should see
The physical result is confirmed separately.

Current online tutorial: grindertunes.com/help#ac-settings

22 Review calibration DTC configuration

A DTC reporting setting is separate from a sensor-control strategy.

1. Open the mapped DTC settings

Open Engine Diagnostics → DTCs or the Setup Wizard DTC configuration for a supported tune.

What you should see
Editable codes are distinguished from unavailable entries.

2. Review the requested reporting change

Use the named checkbox or reporting option for the exact code and OS. Confirm the original and proposed state.

What you should see
The pending list contains only the requested codes.

3. Save and verify

Save a separate tune copy and check validation before programming.

What you should see
The reporting changes are retained in the saved file.

4. Diagnose the underlying system

Use actual code and sensor evidence to confirm the installation. Follow applicable requirements for the vehicle’s use.

What you should see
A hidden warning is not mistaken for a repaired circuit or changed fueling strategy.

What this feature supports

• Disabling DTC/MIL reporting alone does not disable oxygen feedback, heater control or other operating strategies.

Current online tutorial: grindertunes.com/help#dtc-settings

23 Record and save a scan

Record timestamped PCM readings and save a scan for playback.

1. Connect diagnostics

Select the supported interface and complete the diagnostic connection.

What you should see
Actual PCM replies arrive; adapter-ready alone is not sample evidence.

2. Choose the channel group

Open Scan & Test, choose Record & play back scans, select channels and units, then press Record Scan.

What you should see
RPM, temperatures, voltage and other supported values update with timestamps.

3. Mark the conditions

Use manual markers at the time of gear, A/C, fan or test events. Distinguish a measured zero from unavailable data.

What you should see
The log has enough context to interpret its readings.

4. Stop and save

Press Stop Recording, then Save Recording. Keep the JSON file with the customer job. CSV export is available under Recording options.

What you should see
A saved Grinder Tunes JSON recording can be loaded and played back without a truck connected.

5. Read named scan results

Read & scan activity shows each requested channel label with its decoded value and status. Original TX/RX commands and replies are available under Technical Details — original communication log.

What you should see
Supported values retain their units. A reply without a decoder is identified as decoding unavailable; no sensor value is invented.

What this feature supports

• Supported channels depend on actual PCM replies. Adapter voltage and PCM-reported voltage are different sources.

• Logs record history and do not change when a tune is edited.

Current online tutorial: grindertunes.com/help#logging

24 Play back a saved scan

Load a recording, play or pause, change speed, and inspect a point on the timeline.

1. Stop and save the scan

Press Stop Recording, then Save Recording to keep the JSON file. Older Grinder Tunes logger JSON files remain supported.

What you should see
The stopped recording and its timestamps are retained.

2. Open playback

Press Playback for the last scan, or Load Recording to select a saved Grinder Tunes JSON recording. A vehicle connection is not required.

What you should see
The Scan Playback panel shows the recorded channels and timeline.

3. Play, pause and inspect

Press Play or Pause. Choose 0.25×, 0.5×, 1×, 2× or 4× speed, drag the timeline, or choose Back to Start. Select the channel to graph.

What you should see
Recorded values follow their original reply times. Missing replies remain unavailable.

4. Review the conditions

Read your gear, A/C and fan markers beside the timeline. Open the RPM / MAP histogram and file details when needed. Keep the original recording with the job.

What you should see
Playback makes no commands to the truck and cannot change the tune.

5. Analyze captured operating cells

Open Scanner Workbench below Scan Playback. Choose horizontal, vertical and measured channels, base-unit bins, statistic, minimum hits and time window. Apply Analysis. Optional expressions use [channel IDs].

What you should see
The grid shows qualified cells and counts, with the numbers of cycles excluded for invalid data, raw evidence, time window, sample spread, filters or bins.

6. Keep or export the analysis

Use Remember Settings for this computer. Stop recording and disconnect before exporting analysis CSV or JSON. Reapply after changing any setting.

What you should see
JSON retains settings, cell counts, channel units and evidence limits; CSV leaves underfilled cell values empty.

What this feature supports

- Load Recording accepts Grinder Tunes JSON logs, not HP Tuners HPL files or CSV exports.
- Channels are sampled sequentially. Playback displays each reply at its recorded timestamp.
- Starting a live recording pauses offline playback. Stop recording before loading another file.

Current online tutorial: grindertunes.com/help#log-review

25 Log and review a cammed idle

Compare repeatable warm idle conditions before changing the next revision.

1. Confirm the build and tune

Record the actual cam, injectors, fuel system, throttle and current tune revision.

What you should see
The baseline has a known build and calibration.

2. Open Cammed Engine Idle

In Tune Session select the cammed-idle workflow and open Live Logger. Warm the engine and keep the vehicle secured in Park/Neutral.

What you should see
Supported readings settle into a repeatable warm condition.

3. Record a baseline

Log an accelerator-released interval and mark the observed gear, A/C and fan events at the time they occur. Record other load conditions only when appropriate and safely secured.

What you should see
The baseline includes actual samples and condition markers.

4. Review and compare

Stop logging, choose Use as Baseline, and read Idle Review. After a supported revision, repeat the same conditions and choose Use as Follow-up.

What you should see
Differences are tied to comparable samples rather than memory.

5. Save the session

Use Save Session to retain build sheet, recordings and notes.

What you should see
The next tuning decision has measured evidence.

Current online tutorial: grindertunes.com/help#idle-log

26 Keep a tuning session

Keep baseline, follow-up, build sheet and review together.

1. Choose a goal

Select the relevant Tune Session goal and confirm the build sheet.

What you should see
The session identifies the problem being investigated.

2. Capture the baseline

Record actual data before the change and choose Use as Baseline.

What you should see
The original conditions and evidence are retained.

3. Capture the follow-up

After a reviewed saved revision and supported write, repeat the same conditions and choose Use as Follow-up.

What you should see
Both records can be compared on a consistent basis.

4. Review and save

Use Log Evidence, Table Review and Verify to distinguish observations, proposed edits and completed validation. Save Session.

What you should see
The saved session explains what was changed and what was actually verified.

Current online tutorial: grindertunes.com/help#tune-session

27 Record boost-related evidence

A boost log is measurement support, not an automatic boost tune.

1. Confirm the installed system

Record the forced-induction hardware, MAP sensor, fuel system and current tune.

What you should see
Sensor range and units are known.

2. Select supported channels

Use Boost Log and available logger channels. Confirm actual replies and avoid assuming an unavailable channel is zero.

What you should see
The captured signals have a known source.

3. Record only appropriate conditions

Use an appropriate controlled test environment and record the conditions and observed behavior.

What you should see
The evidence describes the actual test.

4. Stop, review and save

Save the recording for a qualified review before making a calibration revision.

What you should see
A saved log exists; no boost setting or tune has been changed automatically.

Current online tutorial: grindertunes.com/help#boost-log

28 Read diagnostic codes and evidence

Save the evidence before clearing or changing anything.

1. Connect the correct controller

Use the supported diagnostic connection and confirm the actual identity.

What you should see
Requests are directed to the intended controller.

2. Run the scan

Use Full Scan and review stored, pending and permanent codes where supported.

What you should see
Each result is tied to an actual reply or a clear unavailable status.

3. Save freeze-frame and live data

Review available freeze frame, readiness and relevant logger signals. Keep the full error stage if a request fails.

What you should see
The original fault evidence is retained.

4. Follow the diagnostic checks

Use Guided Diagnostics for the relevant symptom. Verify electrical or mechanical conclusions with appropriate measurements.

What you should see
A clue is not treated as proof of a failed or unplugged component.

Current online tutorial: grindertunes.com/help#diagnostics

29 Clear recorded faults

Keep a copy of fault evidence before using the separate clear command.

1. Save the scan first

Record DTCs, available freeze frame and symptoms before clearing.

What you should see
The original evidence is available.

2. Review the consequence

Clearing can remove freeze-frame evidence and reset readiness. It does not repair a fault.

What you should see
You understand what information may be lost.

3. Use the explicit clear control

Choose the supported Clear Codes action and confirm the prompt.

What you should see
The app reports the actual command result.

4. Rescan

Check which faults return and record the new state.

What you should see
Returning active faults are distinguished from the earlier history.

Current online tutorial: grindertunes.com/help#clear-codes

30 Use Guided Diagnostics

Work from symptoms to supported tests and actual measurements.

1. Choose the symptom

Open Guided Diagnostics and select the relevant no-start or running concern.

What you should see
The workflow lists applicable observations and requests.

2. Collect the requested evidence

Read supported PCM values and enter what physically happened. Use Crank Capture for a starting attempt.

What you should see
Reported facts and missing evidence are identified.

3. Check the suggested circuit or system

Use an appropriate wiring reference and physical measurements to confirm the clue.

What you should see
A plausible cause is checked rather than assumed.

4. Save and reassess

Keep the report and repeat the relevant measurement after a repair.

What you should see
The result can be compared with the original symptom.

Current online tutorial: grindertunes.com/help#guided

31 Use Harness Monitor

Wiring and sensor clues recorded alongside the first crank and first idle.

1. Open First Start / No Start

Use Scan & Test, then First Start / No Start. Wiring & sensor clues is directly below the recorder.

What you should see
The recorder, selected sensor readings and wiring clues are in one workspace.

2. Record selected sensors

Start with First Start Basics and click Record First Crank before cranking. Choose additional channels through Channels to record.

What you should see
IAT limits, recovery, sudden changes and pending sensor codes can add timestamped clues, including key-on observations.

3. Review the evidence

Stop and save the recording. Use Playback and the event markers to inspect changes around the observed symptom. Confirm wiring against a circuit-specific diagram and measurements.

What you should see
The display describes reported evidence without declaring a ground, low reference, sensor or tune proven good or bad.

What this feature supports

• NO DATA is unavailable, not zero. PCM substitute values can be plausible. IAT is temperature; MAF is airflow.

• No universal 5 V reference voltage channel or crank/cam waveform is claimed. Use the correct external test equipment.

Current online tutorial: grindertunes.com/help#harness-monitor

32 Review oxygen-sensor data

Use the actual channel, sensor position and operating condition.

1. Identify the channels

Confirm which upstream/downstream oxygen channels the PCM actually returns.

What you should see
The sensor positions and available values are clear.

2. Record the right conditions

Use supported live logging with engine temperature and operating condition recorded.

What you should see
Oxygen data can be interpreted in context.

3. Compare with codes and trims

Review related faults, fuel trims and physical wiring as applicable.

What you should see
A missing value is distinguished from a valid reading.

4. Keep configuration separate

Use supported calibration definitions for a reviewed configuration change. A DTC checkbox alone is not an oxygen-control strategy switch.

What you should see
The diagnostic observation and proposed tune change remain distinct.

Current online tutorial: grindertunes.com/help#oxygen

33 Use Vehicle Module Scan Preview

A listed module is not proof that all of its functions are implemented.

1. Confirm the connection

Use the supported vehicle diagnostic path and current identity.

What you should see
The selected network and controller are shown.

2. Run the available scan

Choose the implemented module scan and review actual replies and unimplemented routes.

What you should see
Responsive modules are distinguished from catalog entries.

3. Review supported module live data

Open Module Live Data only for implemented routes and read its availability status.

What you should see
Values are based on actual module replies.

4. Save relevant evidence

Keep the reported route and results when seeking support.

What you should see
A preview does not become a general actuator-control feature.

Current online tutorial: grindertunes.com/help#module-scan

34 Test and observe cooling fans

Run a short supported PCM output test, then record physical fan movement.

1. Connect and check coverage

Connect the J2534 adapter. Live tests currently cover P01 OS 12202088, P59 OS 12587603 and the reviewed P59 custom OS 1283051. Keep ignition on, engine off and the vehicle stationary.

What you should see
The actual connected PCM and test availability appear.

2. Choose the installed fan setup

Select PCM-controlled electric fans only when the PCM relay outputs control the fans. Separate controllers and mechanical fans use the observation check. Keep the fan area clear.

What you should see
Test buttons become available only for a supported connected setup.

3. Run one short test

Test Fan 1 requests the low stage. Test Fan 2 requests both relay outputs for the high stage. The native helper checks fresh engine-off and zero-speed replies and requests automatic control after up to 10 seconds.

What you should see
A request and a valid PCM acknowledgement appear. Fan movement still needs to be observed.

4. Return to automatic and save the observation

Select Stop test / Automatic or allow the native timer to finish. Record whether the fan ran and save the test report. If automatic control is unconfirmed, check the vehicle and cycle ignition with the engine off.

What you should see
Automatic control is acknowledged separately from physical fan movement. A report contains the real request and reply.

What this feature supports

• The live command path has automated protocol and lifecycle tests; physical vehicle validation is still pending.

• Other operating systems, CAN controllers and COM adapters are not enabled for live fan commands.

• A live test does not change the saved fan type or temperatures in the tune.

Current online tutorial: grindertunes.com/help#cooling-check

35 Use GM Factory Service handoff

Open a separate factory workflow only after Grinder Tunes releases the interface.

1. Finish Grinder Tunes hardware work

Wait for read/write completion and required recovery. Keep power connected if programming or recovery is pending.

What you should see
No active programming work is interrupted.

2. Use the factory-service handoff

Select the implemented GM Factory Service control and follow its interface-release prompts.

What you should see
The diagnostic session is drained and closed before the other tool uses it.

3. Use a supported factory procedure

Complete only the supported module/procedure in that tool.

What you should see
Factory actions are not confused with Grinder Tunes features.

4. Close the other tool before returning

Release the adapter in the factory tool, then reconnect in Grinder Tunes.

What you should see
Only one program owns the interface.

Current online tutorial: grindertunes.com/help#factory-service

36 Save a factory Window Test Trace

Keep an observation trace from the supported factory-tool handoff.

1. Prepare the handoff

Finish current hardware work and use the factory-service workflow that offers trace collection.

What you should see
The interface is released before the external tool starts.

2. Perform the supported test

Use the actual factory tool and record what action and module were tested.

What you should see
The trace has a known source and time interval.

3. Save the trace

Return and use Save Window Test Trace where available.

What you should see
A trace file is saved for review.

4. Review the scope

Keep the trace with your observations.

What you should see
Recording a trace does not add a native window-control feature.

Current online tutorial: grindertunes.com/help#window-trace

37 First Start / No Start recorder

Choose First Crank or No Crank, connect diagnostics, capture the key attempt and review the ECM evidence. A tune file or flash read is not required.

Before you start

• Connect the OBDX Pro GT or a supported COM adapter. Park in Park or Neutral and turn ignition on with the engine off.

• A tune file and completed build sheet are not required for read-only recording. Make connector and wiring changes with ignition off.

1. Choose the test and connect

Choose First Crank when the starter turns the engine, or No Crank when it does not. Select Installed in a vehicle or ECM on the bench. Click Connect vehicle. If no adapter is selected, Adapter settings opens Controller & Comms.

What you should see
Connect vehicle opens the selected diagnostic adapter. A visible status explains missing settings, connection failure or a hardware/recovery lock.

2. Record key-on data

With ignition ON and engine stopped, click Record First Crank or Record No Crank. Wait for key-on readings and at least two complete polling cycles. The No Crank and bench presets use a focused set of RPM, voltage and sensor channels.

What you should see
The recorder retains valid zero RPM, raw replies, missing replies and per-request timestamps. ECM and adapter/DLC voltage remain separate sources.

3. Mark the attempt and release

Click Mark START Attempt immediately before trying the key. Click Key Released when you release it. Keep recording for two more complete cycles. For an ECM-only bench communication check, no START attempt is required.

What you should see
The capture has key-on, marked-attempt and after-release phases. Markers are your observations; the tool does not operate or sense the ignition switch.

4. Stop and confirm the result

Click Stop & Review. Choose Your observed result: starter did not turn, turned without starting, started and stalled, or kept running. Read the capture review, voltage comparison, sensor evidence and next checks.

What you should see
The report distinguishes confirmed no crank from zero ECM RPM while the starter actually turns. A bench capture reports ECM communication and unverified external sensor connections.

5. Save or replay

Save Recording retains the raw logger JSON. Save Diagnostic Report retains the recording, observed result and evidence review together. Playback replays the current recording; Load Recording opens saved logger JSON. Saved diagnostic reports also open with Open Capture JSON under Review a crank attempt.

What you should see
Saved evidence is available for the job without connecting hardware. Stop before starting a new recording if you need to save the previous run.

6. Expand channels only when needed

Channels to record offers First Start Basics, Select All Channels, discovery and Select All Responding. More channels slow each complete cycle. Use the focused starting-test preset for short key attempts.

What you should see
Selected channel counts and actual cycle durations remain visible. Unsupported, missing and zero values remain distinct.

If something goes wrong

Connect or Record is unavailable

Read the connection status on First Start. Select an adapter through Adapter settings, turn ignition on and click Connect vehicle. Stop an active scan/logger first. A PCM operation or recovery must finish before diagnostics can take the adapter.

IAT reads close to -38 degrees

Confirm the displayed unit and compare with actual intake temperature. If implausible, inspect the IAT signal, low reference, connector and circuit-specific wiring diagram. Do not confuse MAF airflow with the integrated IAT element.

Runs differently with throttle disconnected

Capture matched observations with the connector state noted and inspect both throttle/pedal signals and fault codes where supported. A changed response alone does not prove which part or calibration is responsible.

Finding channels is slow

Discovery is sequential and unsupported requests may time out. Use Stop Finding to retain partial results, or start with First Start Basics. Recheck with the engine running if needed.

What this feature supports

• ECM data can include substitute sensor values. A plausible reading, zero MAF with the engine stopped, or the absence of a DTC does not prove a sensor is plugged in correctly.

• These channels do not decode starter command, relay state, Park/Neutral, clutch interlock or security start-enable. Use the matching wiring diagram and direct circuit checks for these signals.

• Readings are polled sequentially. Samples crossing event markers are excluded from phase comparisons, and a short attempt may not contain a usable RPM or voltage sample.

• Automated checks use explicit transport fixtures. Windows installation, native menu rendering and physical vehicle/bench validation of this workflow remain pending.

Current online tutorial: grindertunes.com/help#first-start

38 Capture a crank attempt

Mark and review the before-crank, cranking and starter-release phases inside First Start / No Start.

1. Open Crank Capture

Open First Start / No Start. Choose First Crank or No Crank and click Connect vehicle. Start recording with ignition on before trying START.

What you should see
The crank logging controls open.

2. Record key-on data

With ignition on and engine stopped, record at least two complete key-on polling cycles.

What you should see
Actual baseline samples arrive.

3. Mark the attempt

Click Mark START Attempt before trying the key, then Key Released when you release it. Capture two more complete cycles.

What you should see
The attempt and release times are in the recording.

4. Stop and review

Click Stop & Review and confirm what physically happened. The detailed Review a crank attempt section can also add a separately measured fuel pressure.

What you should see
The report distinguishes PCM data from physical observations.

5. Save the report

Save the report/recording with the job.

What you should see
Raw replies and findings remain available for diagnosis.

What this feature supports

• RPM, injector command or timing data does not prove spark at a plug, fuel delivery or correct mechanical timing.

Current online tutorial: grindertunes.com/help#crank

39 Use Swap Tune Builder

Turn build choices into a review of supported changes.

1. Load the target tune

Open a supported actual backup and confirm the installed build sheet.

What you should see
The wizard knows the exact mapped layout.

2. Enter the intended choices

Use the available swap controls for the physical parts and requested configuration.

What you should see
Unknown or unsupported fields remain unavailable.

3. Review the proposed changes

Read original/proposed values and controller coverage before saving.

What you should see
The request is a concrete file change list.

4. Save, then program separately

Save the verified copy and follow the supported write workflow on the actual target.

What you should see
A wizard selection alone does not install a tune.

Current online tutorial: grindertunes.com/help#swap-builder

40 Use Turbo Setup

Record the hardware and inspect supported settings before a measured tuning process.

1. Record the hardware

Confirm the actual turbo/boost system, MAP sensor, injectors, pressure, regulator and fuel.

What you should see
The build sheet identifies the actual system.

2. Check mapped coverage

Load the actual tune and review which Turbo Setup controls are implemented for this OS.

What you should see
Displayed choices are distinguished from unavailable editing.

3. Review any proposed changes

Enter reviewed values and inspect the exact file changes before saving.

What you should see
No complete boost calibration is inferred from a dropdown.

4. Validate with measurements

Use a supported programming path and appropriate controlled measurements for further tuning.

What you should see
A saved setup or log is not proof of a validated boost tune.

Current online tutorial: grindertunes.com/help#turbo

41 Test, write and verify a tune

A no-erase test and a saved file are separate from physical programming.

1. Confirm the exact target and source

Connect the actual PCM, confirm controller/OS/VIN, keep a fresh verified backup and select the intended saved revision.

What you should see
The file and physical target meet the implemented compatibility checks.

2. Complete the prerequisites

Follow the app’s license, supported adapter, voltage, ignition/engine-state and recovery checks. Current guarded voltage checks require measured PCM samples in the allowed range shown by the app.

What you should see
The prerequisites pass using actual evidence.

3. Run the supported no-erase test

Choose Test Write / Test Transfer where required and review its result.

What you should see
A tested result has not erased or programmed flash.

4. Choose the separate programming action

Use Write PCM / Transfer Tune to PCM only after reviewing the exact file fingerprint, changed regions and confirmation.

What you should see
The physical programming operation starts only from its guarded control.

5. Keep the session intact

Keep power and the interface connected during erase, programming and verification. Follow any recovery instructions; cancellation can be deferred after erasure begins.

What you should see
The current stage continues without a competing scanner or forced shutdown.

6. Wait for verified read-back

Confirm the independent read-back, expected regions, checksums and identity result. Save the result and validate actual engine behavior afterward.

What you should see
The report distinguishes a verified write from a test or failed transfer.

7. Review the status and original report

Use the plain-language write status. Expand Technical Details — original programming report to inspect exact addresses, messages and checks. An edited saved tune is separate from a verified controller read-back.

What you should see
The original programming report remains available, and the VATS result keeps its saved-tune or controller-read-back scope.

If something goes wrong

Write is unavailable

Read the exact coverage and reason. An activated license, selected profile or matching filename cannot bypass a missing implementation or required evidence.

Programming or recovery failed

Keep power and the adapter connected if erase/programming or recovery is pending. Save the full error stage and follow the specific recovery instructions. Do not repeatedly retry or power-cycle a pending recovery state.

Current online tutorial: grindertunes.com/help#write-verify

42 Transfer a reviewed tune to a target

Review the donor file and actual target before transferring supported calibration regions.

1. Keep a fresh target backup

Read the actual target successfully and retain its original file and identity.

What you should see
The target is represented by a verified backup.

2. Choose the donor revision

Use the supported donor-file control and select the intended validated saved copy.

What you should see
The app inspects the donor’s actual controller/OS/layout.

3. Review compatibility and regions

Read the transfer plan and any exact compatibility restrictions. OS replacement is a separate operation with its own checks.

What you should see
Only the supported regions and intended changes are proposed.

4. Test, then program separately

Use the supported Test Transfer and separate confirmed transfer action, keeping power and adapter connected.

What you should see
A verified programmed result requires actual read-back; a test is not a write.

Current online tutorial: grindertunes.com/help#transfer

43 Search the controller catalog

Use catalog information as a reference, then confirm the actual PCM.

1. Search the controller or OS

Use the catalog filters for the controller, service number or exact OS you need.

What you should see
Matching reference records appear.

2. Compare with actual identity

Use the connected or opened-file identity lookup and confirm the actual installed hardware.

What you should see
Reference information and measured identity are distinguished.

3. Review the implemented capability

Open Read and write coverage for the actual operation. Export the catalog if you need a job reference.

What you should see
A catalog match alone does not enable reading, editing or writing.

Current online tutorial: grindertunes.com/help#catalog

44 Activate a serial and manage vehicles

Your plan controls vehicle allowance; controller support is checked separately.

1. Save the paid license details

Use the private confirmation page after verified payment. Keep the serial and license file private.

What you should see
You have the license issued for your purchase.

2. Activate the installed app

In License & Settings → Serial Code & Vehicles enter the serial and choose Activate Serial, or import the signed license file.

What you should see
The signed license is checked and stored using Windows account encryption.

3. Check your allowance

Read the plan, purchased limit, used slots and remaining allowance shown by the app.

What you should see
Custom purchased limits are preserved; Shop/owner allowance is unlimited.

4. Unlock the actual target when needed

Read the target to obtain its VIN, then use Unlock Vehicle for a supported write. Choose Refresh License after an upgrade.

What you should see
The actual target’s license status is shown; feature coverage remains a separate check.

If something goes wrong

AI asks for activation

Live AI uses the installed app’s signed customer authorization. Activate or refresh your serial in License & Settings; never paste it into the help chat.

Owner activation

Sign in at grindertunes.com/admin, download the owner license, then use Import License File in the same Windows installer.

Current online tutorial: grindertunes.com/help#license

45 Install an approved update

The signed feed and downloaded installer must pass verification.

1. Open Software Updates

Use an installed Windows copy and choose Check for Updates.

What you should see
The app reads the approved release metadata.

2. Download and verify

Choose the available update and wait for the signature and installer fingerprint checks.

What you should see
Install is offered only for the verified approved artifact.

3. Finish and save the job

Complete any PCM operation, save files, and release the diagnostic session. Do not install during programming or pending recovery.

What you should see
The app can close the interface cleanly.

4. Install and restart

Use Install and Restart, confirm the prompt and finish Setup from your Windows account.

What you should see
The new version appears after restart with your files and activation retained.

5. Read the updated tutorial

Open Help / Tutorial for the changed feature or the current website guide.

What you should see
The app, website and PDF identify the same tutorial release.

If something goes wrong

Failed to download

Check connectivity and use the official direct Windows download if necessary. Retain the exact error. Do not disable signatures or integrity checks.

NSIS integrity error

Download a fresh complete official Setup. Do not use /NCRC or another integrity bypass.

Current online tutorial: grindertunes.com/help#updates

46 Disconnect and exit safely

Let the active operation and interface cleanup finish before closing.

1. Check the current stage

Read the operation rail and any recovery message.

What you should see
You know whether diagnostics, reading, programming or recovery is active.

2. Save your work

Save tune revisions, projects and logs when the current workflow permits it.

What you should see
The files you need are retained.

3. Use Disconnect & Exit

Select the app’s exit control and let it drain the current diagnostic exchange and close the interface.

What you should see
The app closes after its supported cleanup checks.

4. Follow any blocked-exit message

Keep power and the interface connected during programming or pending recovery and follow the actual recovery instructions.

What you should see
A blocked exit is not bypassed by forcing the process closed.

Current online tutorial: grindertunes.com/help#safe-exit

47 Use Help / Tutorial and Ask AI

Numbered help works offline. Live AI is available after the owner enables it.

1. Open the current section’s help

Select Help / Tutorial beside a section title or press F1. Search the topic list if you need another workflow.

What you should see
The walkthrough opens beside your work without taking the hardware interface.

2. Follow the numbered steps

Use Previous and Next step as you complete the task. Read What you should see and the troubleshooting entries. Use Show this section only to navigate.

What you should see
You keep control of each actual operation.

3. Ask a question when online

Open Ask AI, review the context shown and enter your question. Press Ask AI to recheck the current connection and activation before sending. The app sends your question, recent chat and limited section/controller/OS/operation context only after that check passes.

What you should see
If enabled and licensed, a live response arrives from the owner-configured OpenAI service. If unavailable, the reason appears beside the buttons and your question stays in the box.

4. Use the answer as guidance

Check the linked official tutorial and actual on-screen result. Ask AI can explain steps but cannot operate the adapter, edit a tune or start programming.

What you should see
Every hardware action still uses the existing explicit controls and checks.

5. Continue offline if needed

If internet, activation, owner setup or the usage allowance is unavailable, continue with the built-in walkthroughs. Use Check connection after setup or reconnecting. Clear chat removes the current in-app conversation.

What you should see
The offline tutorials remain usable.

If something goes wrong

Ask AI does not answer

In Windows 0.1.66, press Ask AI or Check connection to refresh availability. Read the reason beside the buttons. Activate or refresh your serial if requested. If the shop has not enabled live AI, the built-in numbered guides still work.

Owner setup previously reported the AI service could not be reached

The website request compatibility repair was published on November 21, 2026. Reload the private owner AI Help settings and re-enter the key if the earlier save failed. Save settings, enable live help and use Send test question. Failed connection checks did not save the newly entered key.

What this feature supports

• Do not enter API keys, license codes, passwords, security keys or private customer details. Tune files, VINs and raw logs are not attached automatically.

• AI replies can be wrong. Verify against the actual supported workflow and measurements.

• Live AI requires an owner-configured OpenAI API account with separate usage billing. It is not enabled merely by installing the app.

• The chat is text-based. Built-in Read this step aloud uses available Windows voices; it is not a microphone conversation.

Current online tutorial: grindertunes.com/help#help-ai

48 DOD / AFM: choose ON or OFF and program a supported E38

Review the DOD state, save a verified copy, and follow local programming progress and independent read-back.

Before you start

• For direct programming, read the actual E38 OS 12614088 using OBDX Pro GT; the verified 2 MiB backup must match the same ECM and AMD 29BDD160G flash chip.

• Confirm the physical AFM hardware is appropriate for the selected state. Use regulated 12.5–14.0 V bench power and keep the adapter connected.

1. Read and inspect the controller

Read PCM, then open DOD / AFM. The complete verified E38 backup supplies the saved DOD state. An offline customer HPT or BIN can also be opened for editing.

What you should see
The controller, exact OS and current DOD ON/OFF calibration state are shown.

2. Choose ON or OFF

Choose the desired DOD state and confirm the installed hardware. Select Review DOD Calibration and inspect the current and proposed values.

What you should see
Only the DOD byte and its checksum/CVN fields are proposed for change; VATS is preserved.

3. Save and verify the copy

Save a separate BIN or supported HPT copy, then select Verify Saved BIN. Direct writing requires a changed copy from the same current hardware backup.

What you should see
The saved image reopens and all six checksums and CVNs verify.

4. Write DOD to the supported PCM

Select Write DOD to PCM and review the confirmation. The progress panel directly above the buttons shows a fresh preflight read, a 35-second wait before the writer, the no-erase transfer check and actual DOD programming.

What you should see
Getting ready to turn DOD OFF/ON shows the countdown; Turning off/on your DOD appears during the real write.

5. Wait for the full independent read-back

After the writer returns to normal mode, the app waits another 35 seconds, then reads the full main flash. Keep power and the adapter connected. Watch progress beside the write button or expand Technical details here.

What you should see
Only a complete matching read-back reports DOD is OFF/ON — verified. A failed write with a verified original restoration is labeled separately.

If something goes wrong

The countdown has reached zero but success is not shown

The countdown covers only the settling period. The write, complete read-back and integrity checks must still finish. Keep power connected and follow the named stage.

The write remains unverified

Preserve the original/requested snapshots and recovery files. Keep bench power connected and read the same E38 again to verify the pending operation.

What this feature supports

• Direct DOD writing is limited to the reviewed E38 OS 12614088 / AMD 29BDD160G combination. E67, E92/E92A and other E38 OSs are not enabled.

• DOD ON to OFF passed one physical bench erase/write and independent read-back on November 26, 2026. Reverse-direction programming and recovery under real failure conditions are not yet physically qualified.

• The action does not change VATS, DTC tables, fuel/spark maps, OS code or boot sectors. Engine operation, installed hardware and actual cylinder mode require separate checks.

Current online tutorial: grindertunes.com/help#dod-delete

49 Race Tune: record, revise and compare

Keep track passes, mapped calibration revisions and verified programming results in one session.

Before you start

• Connect the PCM and adapter. Set up the recorder while parked.

• No external wideband is configured. Use available PCM channels and their actual sample rates.

1. Start a session and attach the PCM calibration

Open Race Tune, create a session and choose Read Current PCM. After the verified read, attach that calibration. A saved offline file can be attached for review; programming needs the matching hardware backup.

What you should see
Session files retain the baseline and its controller / OS / SHA-256.

2. Record and review the baseline pass

Choose Record Pass, then Stop & Save Pass. RPM, MAP, throttle and spark are prioritized, with slower channels rotating. Review missing readings and observed rates, then choose Play Back Pass.

What you should see
The complete pass saves automatically with its markers and current calibration reference.

3. Save a deliberate calibration revision

For reviewed P01 OS 12202088 or P59 OS 12587603 layouts, choose a mapped table, row and column. Stage a value, review changes and Save Revision. Full Table Editor uses the same staged copy.

What you should see
A separate checksum-verified BIN is saved. Saving does not apply it to the PCM.

4. Park and stop the engine before programming

With ignition on and regulated power connected, confirm parked / engine stopped, run Test Transfer, then separately select Write Revision. Identity, live RPM, reported speed and voltage are checked before either operation. Existing target, checksum and read-back checks remain required.

What you should see
Only a successful verified write changes the calibration linked to the next pass. Other controllers remain record / review only in Race Tune.

5. Record the next pass and compare

Record another pass under comparable conditions. Choose before / after passes and a comparison channel. Review matching RPM / MAP ranges and sample counts.

What you should see
Cells need at least 3 samples in each pass. Commanded lambda and narrowband O2 are not measured AFR; changed readings do not prove more power.

If something goes wrong

A channel is unavailable

The PCM may not expose it, or its response may be missing or unsupported. Inspect raw playback; do not substitute an estimated value.

Test Transfer or Write Revision is disabled

Stop recording, read and attach the same PCM, save pending mapped edits and confirm parked / engine off. Write also requires a current successful Test Transfer for the exact prepared revision.

What this feature supports

• PCM channels only; no external wideband measurement. Actual channel rates vary with adapter, protocol and selected channels.

• Race Tune performance editing is mapped only for P01 OS 12202088 and P59 OS 12587603 with reviewed code fingerprints. Other controllers can record / review without Race Tune programming.

• Automated simulation and software checks do not establish physical vehicle or racetrack performance.

Current online tutorial: grindertunes.com/help#race-tune

50 T42 Bench Lab (read-only beta)

Probe a transmission CAN address and save the evidence. No T42 programming is enabled.

Before you start

• Verify the exact T42 pinout, power, ground and CAN termination. Disconnect other adapters and keep engine off.

• Use trusted installed Python 3 and the OBDX Pro GT J2534 driver with matching architecture.

1. Open T42 Bench Lab

Use the shop shortcut and choose Read TCM identification. Read the bench warning.

What you should see
You are in the independent T42 diagnostic workspace.

2. Select the trusted binaries

Choose the installed python.exe and OBDX J2534 DLL when prompted.

What you should see
The read-only Mode 9 probe runs. No flash access occurs.

3. Review the report

Review the addressed response and VIN if supplied, then export a diagnostic / conversion plan.

What you should see
The JSON preserves the raw replies. A reply is not proof of exact T42 hardware or OS.

If something goes wrong

No reply

Check the bench pinout, fused power, wake-up and CAN termination, and driver compatibility. Do not try programming.

What this feature supports

• Full BIN reading, exact OS identification, calibration editing, Test Write and flash programming are disabled. The transmission selector is planning only.

• This portable beta is not installed by Setup and does not update through the stable feed.

Current online tutorial: grindertunes.com/help#t42-bench

51 Engine Tune: review and program supported settings

Change supported idle, fan and mapped A/C settings through the review and write workflow.

1. Read PCM or open a backup

Use Connect & Read PCM or Open Backup BIN. Check the controller and exact OS displayed in Engine Tune.

What you should see
A validated supported backup is loaded.

2. Enter the settings to change

Enter the desired mapped idle and fan values. Choose the idle coolant row range. Blank fields preserve existing values. A/C compressor protection appears only for a mapped OS.

What you should see
Only the requested supported settings are selected.

3. Generate and review the tune

Choose Generate & Review Tune and read the before/after values. Confirm fan settings match actual relay wiring.

What you should see
A supported calibration revision is reviewed; the PCM has not been programmed.

4. Save, test and write calibration

Save the revision, follow Test Write, then the separate Write Calibration action with the required fresh backup, identity, voltage and read-back checks.

What you should see
A successful write is reported only after matching complete read-back.

What this feature supports

• Cam, injector and engine-size build notes do not automatically generate fuel or spark targets. Physical engine behavior must be verified separately.

Current online tutorial: grindertunes.com/help#easy-engine-tune

52 Transmission Tune: gear and tire calibration

Read the PCM, review supported gear/tire changes, save a separate BIN and use Test Write before writing. E38 OS12614088 now has an exact gear/tire definition.

1. Read PCM and use the accepted backup

Choose Read PCM. After a successful verified read, the same backup, controller, OS and supported transmission settings load into Transmission Tune automatically. An existing backup can also be opened explicitly.

What you should see
The controller, OS and backup filename appear above the fields. A loaded controller with no reviewed definition is identified with a coverage explanation.

2. Enter the installed combination

Select the installed transmission as a build note and enter actual axle ratio and tire size. E38 OS12614088 loads current speedometer values from its BIN and does not require a transmission-module read or output-shaft checkbox. For supported Gen 3 definitions, confirm the sensor location.

What you should see
The displayed combination matches the physical installation.

3. Generate and review

Choose Generate & Review Tune and inspect the supported gear/tire changes. Stall and driving profile remain build notes.

What you should see
No automatic pressure, shift schedule or TCC changes are implied.

4. Save, test and program only a supported revision

Follow the separate save, Test Write and Write PCM steps offered by the app, including independent read-back.

What you should see
Programming success is distinguished from a donor review, build plan or no-erase test.

5. Save from the transmission screen

Save Tune Copy is always visible beside Generate & Review Tune. Open a supported backup, enter a real gear/tire change and generate the review. Inspect the inline current/proposed values, then choose Save Tune Copy. Review / Test Write / Write PCM opens the existing programming review.

What you should see
The native save dialog writes and reopens a separate BIN. Save is disabled until a valid review exists, and the saved path appears after success. Changing any specification invalidates the review.

6. Continue after restarting the app

The last verified read can reopen automatically for editing after restart. Prior J2534 backup folders are recovered only from complete metadata and a matching file hash. Read the connected PCM again before hardware programming; an old Test Write approval is never restored.

What you should see
The validated backup is available without a file picker. A changed, missing or incomplete backup is not accepted, and write recovery remains protected.

7. E38 gear/tire bench qualification

For E38 OS12614088, save the reviewed gear/tire BIN, select the capture adapter and Gen 4 / E38, then run no-erase Test Write. A passed independent read-back enables Write Calibration for that exact copy for 30 minutes. Both operations wait 35 seconds before the writer and 35 seconds before independent full read-back. The local progress bar shows the current phase and remaining settling time.

What you should see
Six checksums and six CVNs verify. Only the 0x1C0000 calibration sector is writable for gear/tire changes. VATS and DOD remain as read.

What this feature supports

• Selecting a different transmission does not implement or authorize a conversion. A validated compatible conversion is required; donor review alone is insufficient.

• Private E38 gear/tire qualification build: software and simulated-transfer checks are complete; physical E38 gear/tire test/write and vehicle speed calibration are pending. E38 stall, transmission selection and driving profile remain build notes. Shift pressure, TCC, converter stall, fan and idle editing are not added by this feature.

Current online tutorial: grindertunes.com/help#transmission-tune

53 P59 engine, transmission and fan workbench

Edit a reviewed P59 OS 12587603 BIN inside Grinder Tunes, review every change and save a verified copy.

Before you start

• Keep the original BIN and the working stable installer. This preview requires the exact reviewed P59 executable-code layout.

• Finish scanning or logging and disconnect diagnostics. Save or undo edits in Tune Editor and Build Settings before editing in this separate workspace.

1. Open the P59 workbench

Choose P59 Workbench under Build & Tune, then Open P59 BIN. Select a backup with OS 12587603.

What you should see
The filename, OS, transmission configuration and eight verified file checksums appear. Unsupported layouts remain unavailable.

2. Choose the calibration item

Use Engine, Transmission or System, or search for an item such as idle, D0701 or fan. This catalog contains 28 engine, 32 transmission and 5 fan items.

What you should see
The table shows its dimensions, units and row and column labels. Transmission fields are editable only for BINs configured as 4L60E or 4L80E.

3. Edit and inspect

Change a cell or select a rectangle using rows and columns starting at 1. Use set, add, percent, numeric paste, interpolation or smoothing. Select Table, 2D curve or 3D surface. Undo and Redo operate on one edit at a time.

What you should see
Changed cells are marked and every edited cell appears in Change Review. Invalid or out-of-range operations leave the table unchanged.

4. Check fans and comparison values

Fan turn-off temperature must be below turn-on for each active fan. Selecting No electric fans does not enable outputs. Compare BIN opens a same-layout reference; the Values menu shows original, edited or comparison differences. Table JSON imports must match the native definition, axes and units.

What you should see
Invalid fan pairs block saving until corrected. Original stored values remain intact until an explicit edit is made.

5. Save the edited copy

Use the common Save Tune As button to combine workbench changes with other reviewed settings. Only non-conflicting mapped changes are included, segment checksums are recalculated, and the BIN is reopened and verified.

What you should see
A verified saved copy appears. The original BIN, boot code and unrelated bytes are unchanged.

6. Continue through existing transfer review

After Read PCM and Save Tune As, use Review Saved Tune > Test Write, then Write Saved Tune. The existing same-OS calibration transfer is prepared from your saved document without choosing a donor.

What you should see
The transfer review opens. This button does not program or erase the PCM. New workbench maps still require physical qualification before customer release.

If something goes wrong

Cannot start another job

Save the workbench copy or use Discard Changes. A confirmation protects pending edits.

Workbench unavailable

Check that the BIN is P59 OS 12587603 with the reviewed executable-code layout and all eight valid OEM checksums. Reopen the intended original after finishing other editor changes.

What this feature supports

• These file-editing definitions cover one exact P59 OS and code layout. It adds no E38, E67, E92, T42 or Gen 4 fan definitions. Save Tune As composes reviewed changes across the supported editors.

• Checksums and software roundtrips verify file handling; they do not prove an engine tune, pressure, shift schedule, hardware compatibility or physical programming outcome. New transmission maps have not been bench qualified.

• Generic XDF import and arbitrary definition scripts are not included. Workbench table import and export use matching JSON. Existing Tune Editor HPT export and Build Settings tire height / rear axle ratio can be included in the shared Save Tune As document.

Current online tutorial: grindertunes.com/help#p59-workbench

54 E92 VATS and calibration programming

Read the E92, select VATS, save a reviewed copy, then test and program it on the bench.

Before you start

• OS 12710466 VATS On/Off editing matches the owner’s HP Tuners reference pair, including independently recalculated OS sum and CVN. VATS Off was installed on the reference E92 and confirmed by a complete independent PCM read-back.

• The earlier physical same-image calibration write and independent read-back passed on the owner’s E92. OS 12677878 retains its separate private calibration writer. Use a regulated bench supply and the selected J2534 adapter.

1. Read and verify

Select Gen 5 E92 and the J2534 adapter. Run Read & Verify E92. Keep power connected through both complete reads and the 35-second settling intervals.

What you should see
Two matching captures, valid OEM sums/CVNs and unchanged controller identity establish the backup for this session.

2. Select the VATS setting

Open E92 VATS Controls, or System > General > Security. Select VATS Off or On.

What you should see
The exact-reference OS 12710466 switch shows the original and pending setting. Another OS or changed firmware does not inherit this definition.

3. Save and review the VATS copy

Choose Save Tune As in the common toolbar or File menu. The exact VATS-off/on target is saved and its programming review is prepared automatically when linked to the current verified E92 hardware read.

What you should see
The saved BIN matches the exact reference transition. Review Saved Tune shows Test Write for that revision.

4. Run the no-erase test

Choose Test Write (No Erase). The native helper uploads W1 into SRAM, checks its heartbeat, compares the complete live image and reconnects to stock diagnostics.

What you should see
No erase or programming command is sent. The passed test is bound to this exact review and target for 30 minutes. It does not qualify physical OS programming.

5. Write and independently verify

Choose Write VATS to E92 and review the explicit OS bench-write confirmation. The writer programs the code sector at 0x280000 and OS checkword sector at 0x0C0000. Keep power connected through completion.

What you should see
The helper journals before erase, checks every sector and the complete W1 image, reconnects, waits 35 seconds and performs an independent complete R2e read-back. Success requires every readable target byte and the controller identity to match.

If something goes wrong

A write stops or does not verify

Keep bench power connected. Open Programming Report and retain the original, target and logs. A persistent recovery hold blocks new writes, updates and normal exit. Two matching complete reads of the same E92 must match either the original or intended target before the hold can clear.

Review Existing Calibration stays blocked

Complete both E92 reads with the current adapter. A failed read, changed identity, missing traceability/part response, wrong OS or unsupported calibration layout cannot authorize programming.

Write stays disabled after installing the new bench build

Install 0.1.90. Run Read & Verify E92 in the new session, select the supported VATS setting and Save Tune As to create its automatic review. Pass Test Write for that exact copy within 30 minutes. Old session attestations do not carry forward. A different firmware image or missing identity response remains blocked.

A program.erase.pending.json file remains after a successful operation

The per-operation file records the pre-erase intent and is retained for audit. The final operation-report.json must show verified true, a matching independent read-back and recoveryRequired false. It is distinct from the app’s active global recovery hold.

What this feature supports

• Only the two exact owner-supplied full-image fingerprints for OS 12710466 are accepted for VATS transitions. Other E92 OSs, changed calibrations and arbitrary OS edits remain blocked. Service number 12703872 is owner-reported label context.

• The OS write requires erasing and reprogramming two complete physical sectors: 512 KiB plus 256 KiB, with 192 acknowledged 4 KiB chunks. Five changed bytes do not mean five flash bytes can be written alone.

• VATS Off installation is confirmed for the reference controller by independent full read-back. Reverse physical ON writing and broader firmware coverage remain undocumented. An engine-start test can add whole-vehicle functional evidence; it is not required to confirm that this VATS-off patch

was stored.

• This change adds no E92 DOD/AFM, fan, cam or transmission definitions. Boot, VIN/parameter, companion and shadow writes remain excluded. Captures disclose two eight-byte ECC placeholders.

Current online tutorial: grindertunes.com/help#e92-programming

55 Open, save and close tune files

Open or read a tune, edit mapped settings, save one tune document, then optionally test and program that saved revision.

1. Open a tune or read the controller

Use File > Open (Ctrl+O), Open Recent, or Read PCM. BIN, GTF and supported HPT files open locally. Reading supplies the immutable baseline for the matching controller and OS.

What you should see
The filename, controller and OS appear at the top. Offline editing does not require a hardware connection.

2. Edit and review supported settings

Stage VATS, calibration-table, workbench, Cam Tuning, DOD or build/gear/tire changes where an exact definition exists. Review wizard plans before saving. The Settings and programming panel lists which definitions are mapped for the opened file.

What you should see
Multiple editor changes stay in the current document. Different proposed values for an overlapping stored setting stop Save As with the editor names.

3. Save one tune file

Choose Save Tune As, File > Save Tune As (Ctrl+Shift+S), or Save Tune Copy (Ctrl+S). Reviewed changes are combined, OEM checkwords are recalculated and the resulting BIN is reopened and compared byte for byte. An unchanged file can also be saved as a copy.

What you should see
One BIN contains the reviewed changes. The opened source and Original Backups stay intact. Saving does not send data to the PCM.

4. Test or write when ready

Open Review Saved Tune. A matching hardware read and adapter are required for programming. Run Test Write, then Write Saved Tune for that exact saved revision. Gen 3 prepares its existing same-OS transfer internally; no donor selection is needed for ordinary edits. E38 combines only validated VATS, DOD and gear/tire components. E92 retains its exact reference-pair writer.

What you should see
Write becomes available after the matching no-erase test. A write is confirmed only by independent PCM read-back. New edits require another save and matching test.

5. Keep or close the project

Use File > Save Grinder Project to preserve supported project metadata with the saved document. File > Close File (Ctrl+W) offers Save, Discard or Cancel for unsaved changes.

What you should see
Saved copies remain in Open Recent. Closing does not delete your files.

If something goes wrong

The file is marked with an asterisk

A reviewed or staged edit is pending. Save its tune copy, or choose Discard Changes when closing. Cancel leaves it open.

A recent file cannot open

The file may have moved or changed. Use Open to locate the intended file. Validation failures preserve the previous open file and its unsaved edits.

What this feature supports

• A common workspace does not supply unknown calibration addresses. Fan, fuel, spark, DOD and transmission definitions remain specific to the exact controller, OS and reviewed code layout. Gen 4/5 do not inherit Gen 3 table addresses.

• The E38 combined document route has native/software validation and retains existing programming and recovery logic. A physical combined write has not yet been documented. Its individual feature bench results do not establish every combination.

• A BIN saved offline needs a fresh matching hardware read before programming. Existing controller identity, voltage, firmware, license, settling and recovery checks apply.

Current online tutorial: grindertunes.com/help#file-workspace

56 No Crank and bench checks

Record an attempted start and separate what you observed from what the ECM actually reported.

Before you start

• Use the correct fused harness or vehicle diagnostic port. Set Park/Neutral and the parking brake for an installed vehicle.

1. Choose No Crank

Open First Start / No Start and select No Crank. Select the vehicle or bench setup. Connect vehicle opens the diagnostic adapter directly; no BIN is required.

What you should see
Record No Crank or Record Bench Check becomes available after the diagnostic connection is ready.

2. Capture the key attempt

Record key-on data for at least two complete cycles. Mark START Attempt, try the key normally and mark Key Released. Leave recording on for two more complete cycles, then Stop & Review. An ECM-only bench check can stop after two complete cycles without an attempt.

What you should see
RPM and separate voltage sources are available by phase when enough usable replies were captured.

3. Confirm what happened

Choose Your observed result after the recording. The software cannot determine whether the starter physically turned from zero RPM alone. Review voltage changes, interrupted communication, suspicious reported temperatures and raw-decoded fault codes.

What you should see
The next checks follow the evidence and your observation. Missing or unsupported sensor replies do not become a claim that a connector is unplugged.

4. Save the evidence

Save Diagnostic Report stores the raw recording, your observed result and the review. Save Recording stores a replayable logger JSON.

What you should see
You can reopen the evidence and compare it with a repeat capture after checking a circuit.

If something goes wrong

No usable ECM data

Check ECM power, grounds, ignition feed, adapter selection and the controller-specific data link before interpreting any sensor channel.

No RPM samples during a short attempt

Use the focused No Crank channel preset. Wait for key-on samples and mark the attempt and release accurately. Sequential polling can miss a short event.

What this feature supports

• A bench ECM can communicate and report substitute sensor readings with external sensors absent. The report identifies unverified connections and clues; it cannot declare every sensor disconnected.

• The present channel set does not measure starter command, relay state, Park/Neutral, clutch switch or security start-enable.

• The tool records data and never energizes the starter or writes a calibration.

Current online tutorial: grindertunes.com/help#no-crank

57 Match the PCM VIN to the vehicle

Read the live PCM identity, review the vehicle VIN, write through the dedicated diagnostic route, then reconnect after ignition cycling to verify it.

Before you start

• Use the vehicle VIN from its identification plate and the selected J2534 adapter. Keep the engine stopped and use a stable fused power supply.

• Gen 3 P01/P59, Gen 4 E38 and Gen 5 E92 routes are implemented in this private qualification build. Other controllers, including E67, do not inherit a fallback writer.

1. Open VIN Match and read the actual target

Choose Tools > VIN Match or the VIN Match shortcut on Home. Select the adapter under Adapter Settings, then Read Current PCM VIN. The app stops/drains diagnostics before the dedicated helper opens the adapter.

What you should see
Controller, OS, current VIN, stable hardware identity and two RPM/voltage readings appear. No BIN or full flash read is needed for VIN identification.

2. Enter and review the vehicle VIN

Copy the 17-character VIN from this vehicle’s identification plate. Confirm the plate check, then Review VIN Match. North American VIN check digits are validated.

What you should see
The reviewed controller, current VIN and intended vehicle VIN are shown together. Editing the input invalidates the visible write review.

3. Write the VIN

Click Write Vehicle VIN to PCM after reviewing both VINs. The native helper independently identifies the same hardware/OS/VIN again and checks two zero-RPM replies plus stable 12.5–14.5 V adapter readings before sending the VIN update. Existing activation/vehicle write requirements remain enforced.

What you should see
An accepted command is labelled pending. It is not a verified persistent change. A refusal is reported and does not trigger a raw flash-sector erase or manufacturing/security-counter change.

4. Complete the ignition save/reconnect steps

After acknowledgement leave ignition ON 15 seconds. Turn ignition OFF 30 seconds with battery power still connected, ON 30 seconds, then repeat OFF 30 and ON 30 seconds. Follow any additional controller-specific service requirements.

What you should see
The app retains a durable pending record. Verify becomes available after at least 135 seconds and explicit confirmation that the physical ignition steps were completed.

5. Reconnect and verify

Confirm the displayed ignition steps and select Reconnect & Verify Saved VIN. A fresh helper process reads the VIN and stable module identity.

What you should see
A matching vehicle VIN clears the pending record and saves a receipt. An unchanged original VIN is reported as unchanged, not successful. Other results stay pending on the same PCM. Read the PCM again before later calibration programming.

6. Handle a refused or interrupted change

Keep the same PCM selected. Finish the save/reconnect interval and verify first. If a partial VIN remains, Read Current PCM VIN and review the same intended vehicle VIN to make an explicit retry. A pending change cannot be moved to another PCM or another target VIN.

What you should see
No automatic reflash, factory-counter change or hidden rollback occurs. The app retains enough identity and request information for a controlled read-back or retry.

If something goes wrong

Controller is unsupported

The detected family and OS must be recognized. P01, P59, E38 and E92 routes are included; unknown families and E67 do not use an assumed E38 algorithm.

VIN write refused

Read the operation details and complete the fresh read-back. A refusal may depend on the controller’s state. The app does not alter manufacturing counters or use a flash-sector fallback.

Unchanged after verification

The fresh read still returned the original VIN. The change is recorded as unchanged. Recheck the vehicle/controller and service requirements before another reviewed attempt.

What this feature supports

• Diagnostic VIN writing can be refused by the controller’s current software/security state. E92 support is a standard VIN-command route, not a claim that every E92 OS accepts it. Physical qualification remains pending.

• VIN matching does not choose a compatible calibration or complete key, immobilizer, BCM or other module setup. Use the matching service procedure for any additional setup.

• Existing calibration engines and E92 boot/parameter-sector restrictions are unchanged. VIN matching uses a separate helper; it does not enable full-chip or parameter cloning.

• A timed interval and user confirmation do not measure the physical ignition switch. Persistence is checked by the subsequent fresh diagnostic read.

Current online tutorial: grindertunes.com/help#vin-match