

ROTOMASTER TECHNICAL DIAGNOSTIC GUIDE

TDG NUMBER: VGT Actual vs. VGT Desired

DATE: March 2026

SUBJECT: Turbocharger Diagnosis & Calibration (if applicable)

MODEL(S): RAM 2500/3500 SERIES

ENGINE: CUMMINS 6.7L

TURBO PART NUMBERS: ROTOMASTER H1350138N; H8350112R; H1300124N; H8300124R;
H1300125N; H8300128R; H1300131N.

SCOPE NOTE: VGT command/position behavior and PID naming/scaling vary by model year, calibration, and turbo family. Confirm you are viewing VGT POSITION (Desired/Actual) and that your scan tool % convention matches the truck (0% open vs 100% open can be reversed depending on PID/tool).

IMPORTANT: CAUTION & LIABILITY STATEMENT

READ BEFORE PROCEEDING:

This guide is intended for Licensed Professional Technicians. Use by unauthorized or unqualified individuals is at their own risk and may void all expressed or implied warranties.

- **LIMITATION OF LIABILITY:** Rotomaster shall not be held liable for any damages—including engine failure, personal injury, or incidental costs—resulting from improper installation or calibration.
- **INSTALLER RESPONSIBILITY:** The technician must verify that all adjustments comply with the specific vehicle manufacturers (OEM) current service specifications at the time of repair.
- **WARRANTY VOIDANCE:** Damage caused by incorrect electrical probing or unauthorized physical modification of the unit will void the manufacturer's warranty.
- **SAFETY:** Ensure the engine and exhaust system are cool to the touch before attempting adjustments to prevent severe burns.
- **LEAK VERIFICATION:** The installer must perform a hot-check for leaks after installation. **Check for oil feed/return leaks and exhaust leaks. Check for coolant leaks only if the specific turbo/engine configuration is equipped with coolant lines. Undetected oil leaks can lead to engine fire; undetected leaks can lead to engine damage or failure.**

On a Ram 6.7L Cummins, comparing VGT Actual vs. VGT Desired (Commanded) is one of the fastest, highest-signal checks to separate control/electrical issues from mechanical vane/unison-ring issues. Confirm with operating conditions, DTCs, and a commanded actuator test/relearn.

IMPORTANT PID NOTE: Scan tools label these differently (e.g., VGT Position %, VGT Commanded %, Turbo Vane Position, or Duty Cycle). Confirm you are viewing POSITION (Desired/Actual), and confirm whether your tool uses 0% = open / 100% = closed (or the reverse). If Desired/Actual do not change during a commanded sweep test, you may be on the wrong PID or the PID is defaulting.

Target VGT Percentage Values (General Reference Only)

VGT command/position is calibration-dependent. Use this as a pattern guide, not an exact % spec:

- Idle (Cold Start): Desired may command higher closure to build heat; Actual should move and then stabilize as temps rise.
- Idle (Warm): Desired often commands moderate-to-high closure on stock trucks (emissions/EGR/thermal management).
- Cruising (Steady): Desired continuously modulates with load; Actual should follow with brief lag during transients.
- Exhaust Brake ON: Desired commands high closure to create backpressure; Actual should respond quickly and track closely.
- Wide Open Throttle: Desired may close initially to spool then open as flow increases; Actual should not “flat-line” or stick.

Rule of thumb: After short transients, Actual should generally track Desired closely. Persistent large offsets, no movement, or a flat-lined Actual requires DTC + commanded sweep/relearn confirmation.

How to Read the "Gap"

Always confirm your conclusion with DTCs and a commanded actuator sweep/relearn (where available). Do not condemn a turbo based on a single snapshot PID reading.

The “Fixed-Value” Error (often 0%, 50%, or 100%): If VGT Actual stays pegged at a fixed value and does not respond during a commanded actuator sweep/relearn, the PID may be defaulting (tool/PID mismatch) OR there may be an electrical/communication/actuator fault. Confirm with (1) relevant DTCs, (2) commanded actuator test/relearn results, and (3) power/ground/connector/wiring checks before condemning the turbo.

The Tracking/Lag Error: If Desired moves significantly (exhaust brake request or commanded sweep) but Actual consistently lags, stalls, or stops short, suspect mechanical restriction (vane/unison ring coking, linkage binding), actuator torque limitation, wiring/voltage drop, or control constraints. Confirm with DTCs and a commanded sweep/relearn; if the actuator commands movement but Actual will not travel through range, mechanical binding becomes likely.

Calibration/Index Offset: If Actual shows a repeatable offset from Desired across multiple operating points, suspect (1) actuator indexing/alignment to the sector gear and/or (2) an actuator relearn/calibration that did not complete successfully. Verify correct installation alignment and perform the OEM-approved relearn/calibration routine before re-clocking or replacing parts.

The “Mechanical Freedom” Check (Use OEM Procedure)

1. Key OFF and allow components to cool. Follow OEM safety steps before disconnecting components.
2. Remove the actuator following OEM procedure. Do NOT leave the actuator powered/plugged in while removed.
3. Using light, controlled hand pressure, check vane lever/sector movement through its travel. It should move smoothly without grinding or binding. Some resistance can be normal; do not force it.
4. If movement is rough/gritty/binds, suspect vane/unison-ring restriction or mechanical damage (clean/repair/replace as required).
5. If movement is smooth, focus on actuator power/ground/wiring, DTCs, and relearn/calibration completion.

TECHNICAL ASSISTANCE & COMPLIANCE:

This guide provides supplemental information and does not replace the vehicle manufacturer's (OEM) service manual. If any part of this diagnostic procedure is unclear, or if technical data conflicts with OEM specifications, the installer must seek clarification prior to proceeding. For further technical assistance, please visit the Rotomaster Support & FAQ Portal or contact the Rotomaster Technical Support Line at 1-888-596-9899.