Killshot Series: Fusion Quick Install Guide V2

Audience: Everyday installers and tuners. No pro-level experience required.

Scope: Quick install and first-start checklist for the ACES EFI Killshot Fusion (integrated ECU throttle-body injection). For full details, use the complete Installation Guide.

1) Safety and Prep

- Work in a well-ventilated area. Keep flames and sparks away.
- Park on a level surface. Set the parking brake. Use jack stands or a lift correctly.
- Key off and disconnect the battery before wiring. Reconnect only when instructed.
- PPE: wear safety glasses. Use insulated gloves when probing electrical circuits.

Tools

- Wrenches/sockets, screwdrivers, wire stripper/crimper, heat-shrink, zip ties
- Voltmeter
- Drill with 7/8 in step bit (for O_2 bung)/Welder
- Thread sealant/anti-seize

2) Throttle Body and Sensors

1. **Remove carb/TBI**

- Disconnect fuel, linkage, and vacuum lines.
- Clean the manifold flange. Cap any unused vacuum ports.

2. **Mount the Fusion throttle body**

- Install base gasket. Set unit on studs/bolts and tighten evenly.
- Reconnect required vacuum lines. Cap unused ports.
- Install the air cleaner.
- The Fusion ECU is built in, so there is no separate ECU box to mount.

3. **Roots blower only: boost reference port (Requires advanced tuning)**

- Remove the lower-right plug on the linkage side. Install a 1/16 in pipe-to-hose fitting.
- Plumb to the manifold under the blower, or tee with the boost gauge line.
- Apply threadlocker to the bottom plug as instructed.

4. **Wideband O_2 sensor**

- Weld or clamp the bung 6 to 10 in after the collector at a slight angle to avoid condensation. Refer to the “O2 Sensor Guide” for more details
- Ensure at least 18 in of exhaust remains downstream of the sensor.
- Locate the sensor before any catalytic converter. Use anti-seize on threads only.
- Verify there are no exhaust leaks.

5. **Coolant temperature sensor (CTS)**

- Install a 3/8 in NPT port in the intake or cylinder head. Using the thermostat housing may result in extended rich conditions during warm up.

- Use thread sealer. Do not overtighten.

3) Power, Grounds, and Main Harness

1. **Main power and ground (required)**

- **Main_Power+** → Battery positive (fused)

- **GROUND** → Battery negative or clean engine ground

- **IGNSW** → Switched +12 V (hot in RUN and CRANK)

Keep EFI power and grounds direct to the battery. Avoid starter and alternator posts which are noisy electrical sources as they can damage ECU and or Handheld.

2. **Fuel pump power**

- **FUEL_PUMP+** supply and trigger the pump through a relay with proper gauge wiring.

- Do not drive high-amp pumps directly from small harness leads. Ensure the pump has a solid ground.

3. **Handheld and CAN cable**

- Use the **C2 (CAN)** connector near the unit and route into the cabin for access.

4) Sensor and I/O Hookups

Core sensors

- **CTS**: connect the harness lead to the installed coolant sensor.
- **WBO (wideband O_2)**: plug the supplied sensor into the WBO connector.
- **MAP/TPS/IAT**: integrated in the unit and pre-wired through the main connector.

Optional inputs and outputs (pigtail B3 / C6 group)

- **Tach_in** (Gray, C6-A): RPM input from coil negative or a CDI Tach Out when Fusion is not controlling timing.
- **Tach_out** (Brown, C6-H): 12 V square-wave output for an external tach.
- **OPS** (Purple, C6-B): oil pressure signal.
- **Fuel_level** (Red, C6-C): 0 to 250 Ω or 250 to 0 Ω input.
- **TPS_OUT** (Blue, C6-D): TPS signal to external modules if needed.
- **FAN1** (Green, C6-F) and **FAN2** (Yellow, C6-E): low-side (ground) triggers to relays. Do not power fans directly from these wires.
- **Ground trigger** (Orange, C6-G): configurable low-side output.

5) Ignition Setup (choose one)

A) No ECU timing control

- Connect **Tach_in** (Gray) to coil negative or CDI Tach Out so the ECU reads RPM.
- Set base timing with your distributor as normal. The ECU does not alter timing.

B) ECU-controlled timing

- Magnetic pickup distributor locked out: connect **VR+** (Purple) and **VR–** (Green) to **C3 (vr)**. Lock out mechanical and vacuum advance in the distributor.
- Fusion drives the coil: **COIL+** (Red) and **COIL–** (Black). Use coil connector **C5** or the provided **B1/B2** pigtails per diagram (A = Red +, B = Black –).

6) Fuel System (plumbing essentials)

- Mount the pump low and near the tank. Use a coarse pre-filter before the pump and a 10 micron filter after the pump.
- Ensure the tank is properly vented. Use a return-style regulator. The return line backpressure should be 3 to 5 psi and must not go to a vapor canister line.
- Flush lines before final hookup.

7) First Power-Up (Key On)

1. **Prime and leak check**

- Reconnect the battery. Key on: the pump should run for about 5 seconds. Fix any leaks before proceeding.

2. **Handheld connection**

- Power on and confirm the display works via the **C2** connection.

3. **Sensor sanity check (Key On Engine Off)**

- **RPM** = 0
- **MAP** near 13.8 to 14.8 psi (95 to 102 kPa) at sea level. Lower values at higher altitude.
- **TPS** = 0% closed; about 85 to 90% at wide-open throttle
- **CTS** near ambient temperature
- **Battery** at least 12.0 V

8) Startup Wizard (Handheld)

- **Run Wizards → Start Wizard**
    - Units (Imperial or Metric; AFR or Lambda)
    - Throttle Body: Killshot Fusion
    - Cam type: Stock, Mild, or Race
    - Ignition type: Magnetic, Coil negative, CD box, or Points
    - Injectors: 4; Flow: 65 lb/hr or 100 lb/hr (depending on model)
    - Engine displacement (CID or liters)
    - Target hot idle RPM (for example, 750 to 850)
- Save, then cycle the key **off** for 5 seconds and **on** again.

9) First Start and Warm-Up

1. **First start**

- Crank while watching RPM on the handheld. The engine should fire and stabilize. Cold idle can be higher initially.

2. **Warm to operating temperature**

- Learning requires coolant temperature at least **160 °F** (**71 °C**) and closed-loop operation.

3. **Set Idle Air Control (IAC) range**

- At hot idle in neutral, adjust the throttle stop so **IAC Position** reads **6 to 20 steps**.
- If **TPS** rises above 0 during adjustment, perform **TPS Zero Learn**, then continue.

10) Timing Verify (ECU-controlled timing only)

- On the handheld: **Tuning → Spark → Advanced → Lock Ignition Timing** at **15° BTDC**. Refer to “Killshot Series: Spark Guide” for more details
- Use a timing light and rotate the distributor to 15°. Tighten the clamp.
- Unlock timing. Note: at idle, timing may appear slightly off due to idle control. Verify just above idle speed.

11) Drive and Self-Learning

- Confirm **Closed Loop** is active and **Fuel Learn Status** shows learning.
- In neutral, hold steady RPM steps up to about **2 500** RPM, then road test with gentle throttle sweeps through the gears.
- Avoid rapid throttle stabs or prolonged coasting when checking learning.

  Note: Please refer to “Killshot Series: Fuel tuning guide” for more details.

12) Finalize

- **Fans and aux outputs**: verify **FAN1/FAN2** drive relays only and engage per temperature or A/C settings.
- **Secure harnessing**: loom and tie. Keep sensor wiring away from ignition noise sources such as plug wires and CDI boxes.
- **Final checks**: recheck for leaks, chafing, and correct clearances.

13) Wiring quick key

- **C7**: Main_Power / Main_Power+ (Red, 12 AWG)
- **C8**: FUEL_PUMP+ and PUMP_Main (Orange, 14 AWG)
- **C2**: Handheld power/ground + CANH (White) / CANL (Green)
- **C1**: Sensor GND (Black), CTS (Blue)
- **C3**: VR− (Green), VR+ (Purple)
- **C5**: COIL− (Black), COIL+ (Red)
- **B3/C6 group**: Tach_in (Gray), OPS (Purple), Fuel_level (Red), TPS_OUT (Blue), FAN1 (Green), FAN2 (Yellow), Ground trigger (Orange), Tach_out (Brown)
- **IGNSW**: Red (20 AWG) switched 12 V

14) Notes and Warnings

- Use relays for fans and pumps. Avoid direct connection from ECU outputs.
- Use unleaded fuel to protect the wideband O_2 sensor.
- Incorrect tuning can damage an engine. If you are unsure, Check out the Killshot Series guides for more tuning information.
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Acronyms used

- **ACES**: “For the People”
- **AFR**: Air Fuel Ratio
- **BTDC**: Before Top Dead Center
- **CDI**: Capacitive Discharge Ignition
- **CID**: Cubic Inch Displacement
- **CTS**: Coolant Temperature Sensor
- **ECU**: Electronic Control Unit
- **EFI**: Electronic Fuel Injection
- **IAC**: Idle Air Control
- **IAT**: Intake Air Temperature
- **kPa**: kilopascal
- **MAP**: Manifold Absolute Pressure
- **RPM**: Revolutions Per Minute
- **TPS**: Throttle Position Sensor
- **WBO**: Wideband Oxygen sensor
- **WOT**: Wide Open Throttle