Twin Tec

M8FI-G8 TCFI-G8 Racing EFI Startup Guide and Installation

⚠ **OFF ROAD USE ONLY** → **NOT LEGAL FOR SALE OR USE IN CALIFORNIA OR ON POLLUTION CONTROLLED VEHICLES.**

⚠ **DESIGNED FOR RACING** → **CAREFULLY READ INSTRUCTIONS BEFORE PROCEEDING.**

🛠 **M8FI-G8 & TCFI-G8 Racing EFI system** has been designed for **offroad racing use** in the "King of the Baggers" racing series. Each Racing ECU has been designed to plug directly into the factory HD harness.

Part Num	Application	Engine Type	MAP Sensor Type
17800	2014-2016 Touring	Twin Cam – NA Engine	Use OE 1 Bar
17801	2016-2016 Touring	Twin Cam – Turbo (15psi)	Inc – 2 Bar Sensor
17802	2014-2016 Touring	Twin Cam – Turbo (21psi)	Inc – 2.5 Bar Sensor
17803	2014-2017 Softail	Twin Cam – NA Engine	Use OE 1 Bar
17804	2014-2017 Softail	Twin Cam – Turbo (15psi)	Inc – 2 Bar Sensor
17805	2014-2017 Softail	Twin Cam – Turbo (21psi)	Inc – 2.5 Bar Sensor
17808	2017-2020 Touring	M8 – NA Engine	Use OE 1 Bar
17809	2017-2020 Touring	M8 – Turbo (15psi)	Inc – 2 Bar Sensor
17810	2017-2020 Touring	M8 – Turbo (21psi)	Inc – 2.5 Bar Sensor
17811	2018-2020 Softail	M8 – NA Engine	Use OE 1 Bar
17812	2018-2020 Softail	M8 – Turbo (15psi)	Inc – 2 Bar Sensor
17813	2018-2020 Softail	M8 – Turbo (21psi)	Inc – 2.5 Bar Sensor
17818	2021-2023 Touring (2021-2024 Ultra)	M8 – NA Engine	Use OE 1 Bar
17819	2021-2023 Touring (2021-2024 Ultra)	M8 – Turbo (15psi)	Incl - 2 Bar Sensor
17820	2021-2023 Touring (2021-2024 Ultra)	M8 – Turbo (21psi)	Incl 2.5 Bar Sensor
17821	2021-2024 Softail Models	M8 – NA Engine	Use OE 1 Bar
17822	2021-2024 Softail Models	M8 – Turbo (15psi)	Incl 2 Bar Sensor
17823	2021-2024 Softail Models	M8 – Turbo (21psi)	Incl 2.5 Bar Sensor

🛠 **OVERVIEW**: M8FI / TCFI Racing EFI system has been designed for **offroad racing use** in the "King of the Baggers" racing series. Each Racing ECU has been designed to plug directly into the factory HD harness

⚠ **The first few pages of this manual will match the G7-G8-G9 Tuning Guide. This manual is a designed as a Install/Setup Guide – it does not have tuning details. Be sure to review the Tuning Guide.**

⚠ **Software:** **PC_LINK.exe = ECU Tuning** and **TCFI_LOG.exe = ECU logging/graphing.** Our software works on **Windows 7/8/10/11** and is **FREE** on our website: **daytona-twintec.com.**

⚠ **AUTO-TUNE AI**: AI is included in firmware versions greater than (G9 3.03.09+), (G8 3.63.09+) & (G7 2.98.09+). The AI looks for exhaust reversion while in closed loop → To enable **AUTO-TUNE AI**, first verify you have a version of the product that has the AI, next both of the wideband O2 sensors must be installed in the exhaust. closed loop must be enabled and the Auto-Tune AI must be enabled in the tune. After the engine is warm and close loop becomes active, AUTO-TUNE learns fuel trim corrections and the AI looks for reversion. To apply the learned fuel corrections to the tune, Read the tune from the ECU and apply the learning. Use Edit…Tables → Apply – Front/Rear BLM Fuel to apply the learning to Front and Rear Fuel Tables.

⚠ **BUILD INTERNET RACE TUNE:** Use this feature to automatically build a starting tune. After you have built a tune, prior to using the Auto-Tune. You must be willing to do some basic tuning, this means that you must verify that the tune on your motorcycle functions at a basic level before relying on the AUTO-TUNE feature**. Your engine must start and run without popping and blowing black smoke.**

⚠ **ABS:** The correct VIN must be programmed otherwise the ABS light will flash.

⚠ **RDRS:** Some 2019-2024 bikes utilize the **Harley-Davidson's Reflex™ Defensive Rider Systems**(RDRS). Our ECU works with RDRS. If your bike is equipped with RDRS: The correct VIN must be programmed into our ECU otherwise the red trouble light will illuminate on the speedometer and the ABS and Traction Control Lights will remain illuminated when the bike is moving. After the VIN is programmed, each time your bike is started the ABS and Traction Control Lights will blink, and they will turn off after the bike starts moving. Even though the dashboard does not show any lights, the OE RDRS system is **deactivated**.

⚠ **ECU UPDATES:** Occasionally new ECU features are added. We do not expect our customers to be computer experts. Contact us for an RMA for the update. All updates will be turned around promptly.

⚠ **Data Logging is Auto Enabled:** Anytime the engine is running. The ECU continuously records 60 minutes of engine data in a loop, overwriting the oldest data with new data. Use**TCFI_LOG.exe** to access.

⚠ **Tuning, Live Tuning, Monitoring and Data Playback:** Connect the USB-C on the ECU directly to a USB port on your PC. ECU tune file adjustments are made via **PC_LINK.exe. TCFI_LOG.exe** to view Live Data Monitoring, Live Adjust Fuel, read ECU codes or reviewing automatically recorded data logs.

⚠ **ECU Diagnostics & Code Reading:** Use the Live Data View feature within **TCFI_LOG.exe**. All ECU error codes display and automatically clear once the issue is resolved. Historical ECU codes can also be cleared manually via this program. Read the continuous log file to see what conditions set and clear a code.

⚠ **Diagnose Other Modules (BCM, Speedo, ABS, etc.):** For other modules, an OE HD Code Reader is required to read and clear codes. Twin Scan IV for models up to 2018. Twin Scan V – Coming Soon.

⚠ **Individual Front and Rear Fuel Tables:** Adjustable in the tune file – choose multiplier or individual.

⚠ **Dyno Tune and Track Tune Modes:** Speed up tuning. Use PC_Link.exe to enable and disable.

⚠ **For additional information** read the detailed tuning guide:
G7-G8-G9_Tuning_Guide_M8FI-TCFI.pdf
https://daytona-twintec.com/instructions/ or https://daytona-twintec.com/content/DTT/Instr/G7-G8-G9_Tuning_Guide_M8FI-TCFI.pdf

TUNING CLASSES AVAILABLE → CALL 386-304-0700 FOR DETAILS.

💻 HOW TO Download and Install Software and Device Drivers

1 – Visit the software download page: https://daytona-twintec.com/software/

2 - Navigate to the section: "M8FI - TCFI - VRFI -- EFI Stand Alone - PC Software"

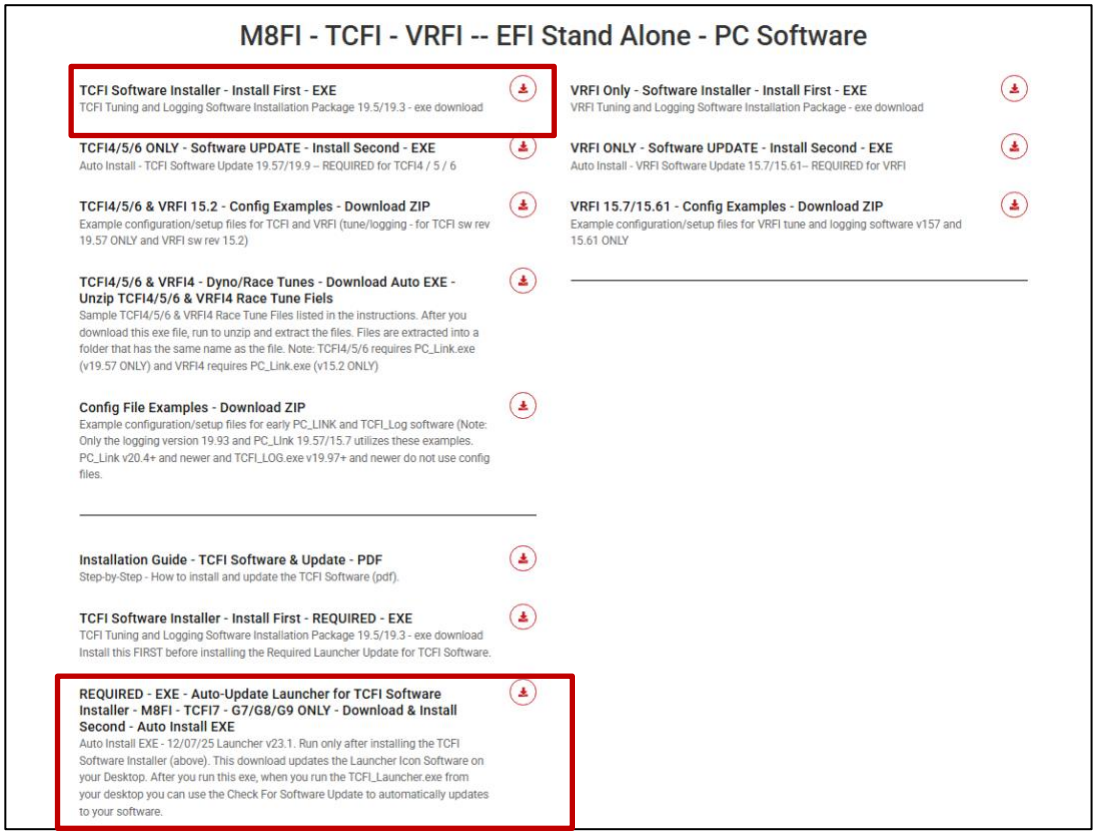
3 – Download the original TCFI Software Installer: Look for: **TCFI Software Installer - Install First - EXE**

4 - Run the original TCFI Software Installer: Execute "**TCFI_Software_Installer.exe**".

5 – Download the Auto Update Launcher Software: Scroll down further on the page and find "**REQUIRED – EXE – AUTO UPDATE LAUNCHER FOR TCFI SOFTWARE INSTALLER.**" Download and install, the update. Click YES to allow the App to make changes and confirm file replacement.

6 -  Run TCFI_Launcher.exe icon from your desktop. Click **check for software update** to update the software to the latest version. See additional information in the PC_LINK_TCFI.exe Application section below

⚠ **Important:** Install the **TCFI Software Installer package FIRST,** before running the update**.**



⚠ **While tuning and configuring, we recommend that you connect your bike to either a 3amp or 5amp 12v battery charger.**

⚠ **YouTube software install video** and overview is available at: https://youtu.be/QQCByMf6wpk

ENGINE STARTING PROCEDURE

The proper engine starting procedure must be followed. When the run/stop switch is turned on, the ETC system runs an auto-calibration routine that establishes the zero (closed throttle) position. During this time, the check engine light is on

and the fuel pump is energized for several seconds, making an audible buzz. Do not press the starter button until the check engine light goes out and the fuel pump stops buzzing (~5 seconds)We recommend that you let the engine idle for about 20-30 seconds before riding the motorcycle. This allows the closed loop idle air control system to stabilize idle RPM.

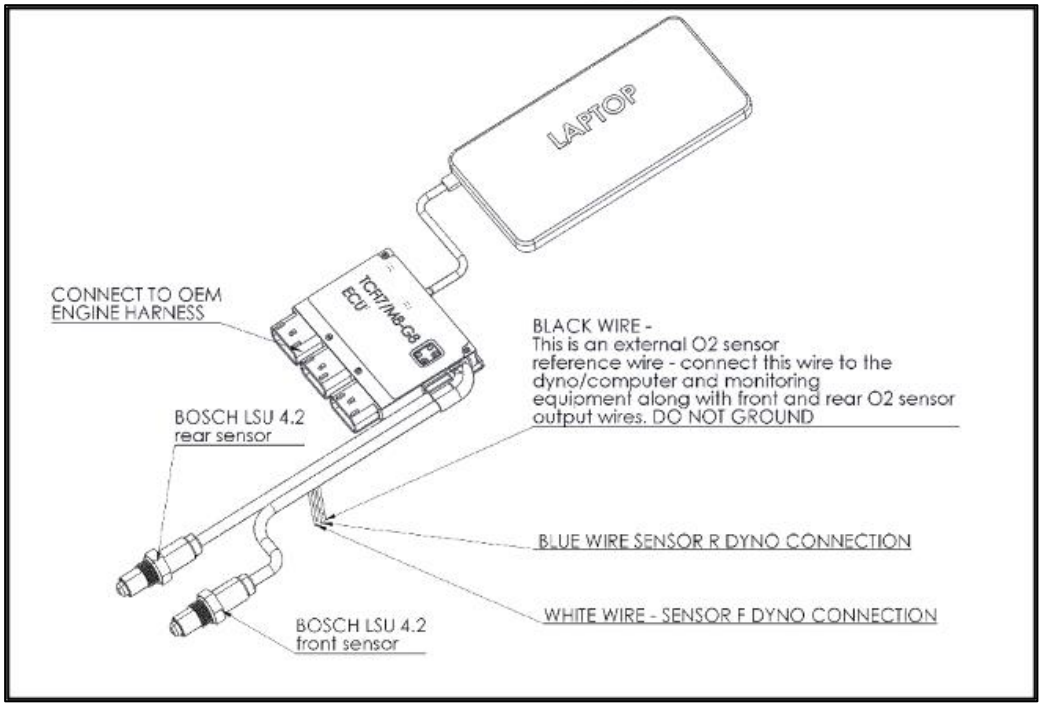
If during the first 30 seconds of running, the check engine light (CEL) comes on and remains on the issue is because the engine has not synced up during startup correctly. The only fix is to completely turn off the engine for 30 seconds and to restart. A pop or a misfire during cranking can cause this type of sync error to occur. After 30 seconds of run time, if the check engine light (CEL) turns on, this is because of an actual issue.

G7 (Gen 7) Non-Integrated ECU vs G8 (Gen 8)/G9 (Gen 9) Integrated ECU. The integrated versions of the ECU have the Wideband O2 and USB interfaces built into the ECU, making the system more compact. Functionally, there is no difference between the non-integrated and integrated ECU systems.

G8 kit M8FI/TCFI includes:

- One G8 ECU for M8 or Twin Cam
- 2 - Bosch LSU 4.2 oxygen sensors
- USB interface cable
- 2 - 18x1.5 mm O2 weld nuts
- Extension cable for O2 front sensor
- 3 connectors with pins and weather seals for connecting O2 outputs to a dyno

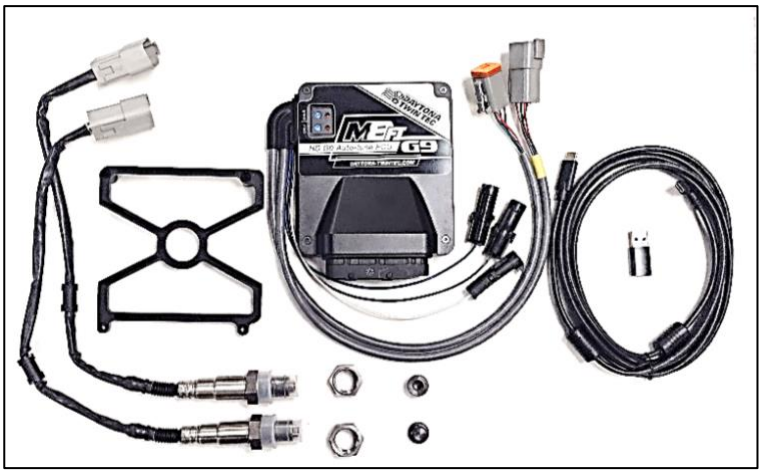
G8 Integrated System Diagram



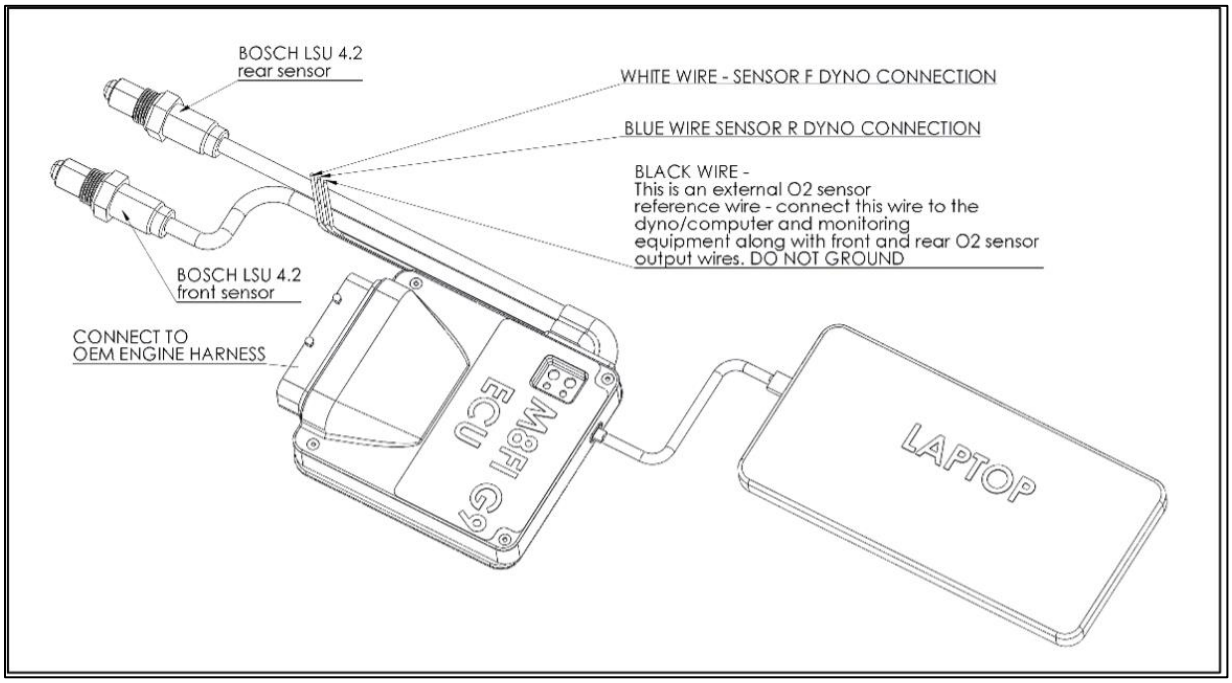
G9 Integrated M8FI G9 Diagram (M8) – O2 + USB INTEGRATED IN ECU

The M8FI GEN 9 kit includes:

- One G9 ECU for M8
- 2 Bosch LSU 4.2 oxygen sensors
- USB interface cable
- 2 18x1.5 mm weld nuts
- Extension cable for O2 front sensor
- 3 connectors with pins and weather seals for dyno testing
- Adapter frame – ECU some models



M8FI GEN 9 SYSTEM DIAGRAM



⚠ **CAUTION**: ***G8/G9 DO NOT GROUND THE BLACK WIRE – IT WILL DAMAGE THE ECU.***
The single black wire that exits the G8/G9 ECU is an O2 sensor "reference wire". This wire is used to by a dyno to monitor and display the wideband info from you ECU directly to your dyno screen/dyno graph. Do not use these wires, unless you are connecting to a dyno/computer or other monitoring equipment.

ECU PRE-INSTALLATION CHECKS

Make sure that the original equipment (OE) engine control module (ECM) is functioning correctly (other than tuning issues) before attempting installation. If the OE ECM is setting diagnostic codes, find and correct any underlying problems first.

GENERAL RECOMMENDATIONS

Our ECU system has been designed to be used with either our Daytona Twin Tec or the H-D® OE ignition coils. Fuel injected engines require a special coil with low primary resistance. We offer HO replacement ignition coils for all M8 and TC engines. Due to the short lengths involved on motorcycle applications, energy losses in spark plug wires are insignificant. OE carbon core suppression cables will deteriorate after several years. For a more durable replacement, we suggest spiral core type spark plug cables.

⚠ **CAUTION: DO NOT USE *solid copper spark plug cables or non-resistor type spark plugs.* The ECU may malfunction due to the excessive EMI.**

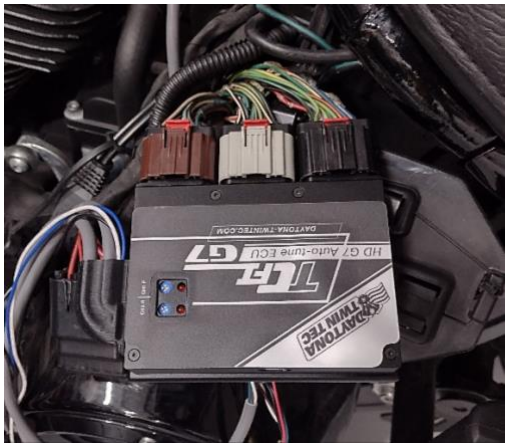
📌 G8 & G9 ECU INSTALLATION

1. If motorcycle is equipped with security system, make sure system is disarmed. Turn off the ignition switch and disconnect the battery ground cable before proceeding.
2. Find and remove the OE ECM. The OE module is usually located under the seat or under a side cover.
3. Install the ECU module. The pictures below show a typical G8 installation on Touring and Softail models (2014-2020 Models)
4. **Do not attempt to start the engine until you have completed the initial setup.**

TYPICAL INSTALL 2014-2020 Bikes:

Touring (Left) → ECU is under the seat

Softail (Right)→ ECU under left panel



TYPICAL INSTALL 2021-2024 Touring Bike with RDRS → ECU is under the seat

REPLACEMENT - AUTOTUNE WIDEBAND O2 SENSORS

The AUTOTUNE AI AFR monitoring system utilizes Bosch Wideband LSU 4.2 sensors. We offer replacement wideband sensors with the Deutsch DT-04-6P connector installed. https://daytona-twintec.com/product/115001-replacement-wide-band-exhaust-gas-oxygen-sensor-high-performance-o2-sensor

WIDEBAND O2 SENSOR & WELD-IN BOSS INSTALLATION

1. If motorcycle is equipped with security system, make sure system is disarmed. Turn off the ignition switch and disconnect the battery ground cable before proceeding.
2. In general, the Wideband O2 sensors should be mounted 3-9 inches from the exhaust header flange. Available clearance will usually dictate the optimum location. When choosing a mounting location, allow several inches clearance for the sensor wire harness. The wire harness must exit straight out from the sensor. Do not loop the O2 sensor wire harness back onto the sensor body.
3. Many aftermarket pipes have 18mm bosses and 12mm inserts. If you have an OEM pipe, you cannot use the original equipment (OE) 12mm x 1.25 mm oxygen sensor mounting bosses. Our larger diameter 18mm bosses are included and they will be installed in the same position as the factory 12mm bosses. Cut the original 12mm mounting bosses from the original OE exhaust pipe and install the included 18mm bosses.
4. Weld the 18mm x 1.5 mm bosses near or replace the smaller OE oxygen sensor mounting bosses. After welding, be sure to run an 18mm x 1.5 mm tap through the threads. Failure to clean the threads may result in O2 sensor damage. Most aftermarket exhaust systems come standard with 18mm O2 Sensor threads and utilize reducers from 18mm to 12mm for the OE O2 Sensors.
5. Do not install the new Bosch sensors until after the free air calibration procedure described in the following section. Always use a touch of anti-seize lubricant such as Permatex 133A on the sensor threads.
6. Connect the Bosch Wideband sensors to the 6 pin mating connectors on the ECU wire harness. The cable with yellow band is for sensor 1 (front). For additional protection of the Wideband Sensors Wire and improved cosmetics, use Techflex 1-1/4" Black Flexo Clean Cut FR expandable sleeving over the connectors (available from www.wirecare.com).
7. **Reconnect the battery ground cable. Do not attempt to start the engine until you have completed the free air calibration of the O2 sensors and initial setup of the ECU.**

Typical Wideband O2 Placement - ULTRA/TOURING

Typical Front Sensor Installation

Typical Rear Sensor Installation

Typical Wideband O2 Placement – SOFTAIL – OE Sensor left in place

Typical Front Sensor

Typical Rear Sensor

O2 SENSORS – FREE AIR - CALIBRATION AND OPERATION

The O2 controller (integrated into the G8 and G9 ECU) has red status LEDs for each O2 channel. When power is turned on, the LEDs blink at a slow rate until the corresponding sensor has reached normal operating temperature.

After initial installation, the ECU system requires ONE free air calibration, it is very simple to do. This should be done with the sensors dangling in free air. The environment must be free of hydrocarbon vapors (meaning that you should not run this process if the air in the room smells like exhaust). We suggest that you perform the free air calibration outdoors. Turn BOTH of the free air calibration trim pots to full counterclockwise position with a small screwdriver. Turn on power and wait for 60 seconds so the system can fully stabilize. Then slowly turn each free air calibration trimpot clockwise until the corresponding LED starts flashing at a rapid rate. Try to set each trimpot at the point where its LED just starts to flash. The free air calibration procedure should be performed at reasonable intervals (every 250-500 hours) or whenever a sensor is replaced. If you cannot get an LED to rapidly flash when its trimpot is turned full clockwise, you either have a damaged sensor or very high hydrocarbon levels in your environment. If both LEDs keep blinking at the slow rate, you may have a low battery voltage condition. Try connecting a battery charger. The ECU includes internal diagnostics for abnormal battery voltage (less than 11 volts or greater than 16.5 volts), sensor open circuit, and sensor short circuit conditions. A fault condition causes the status LEDs to blink at the slow rate.

⚠ **CAUTION:** Racing gasoline containing lead will quickly degrade the wideband O2 sensors. Under these conditions, expected sensor life is less than 10 hours. There is no warranty on the wideband O2 sensors.

⚠ **NOTICE:** When tuning on the dyno, it is recommended to connect the bike to a battery charger. Use a battery charger that utilizes a transformer to step the voltage down. Be sure to also choose a battery charger that is powerful enough to keep the battery charged when the bike is turned on (at least 3 AMPS of continuous output). Avoid trickle chargers and battery chargers that do not have a transformer.

⚠ After installing the ECU & Wideband O2 Sensors, prior to starting the engine: Several items MUST be configured using the PC_LINK_TCFI.exe software (see: First Start Checklist).

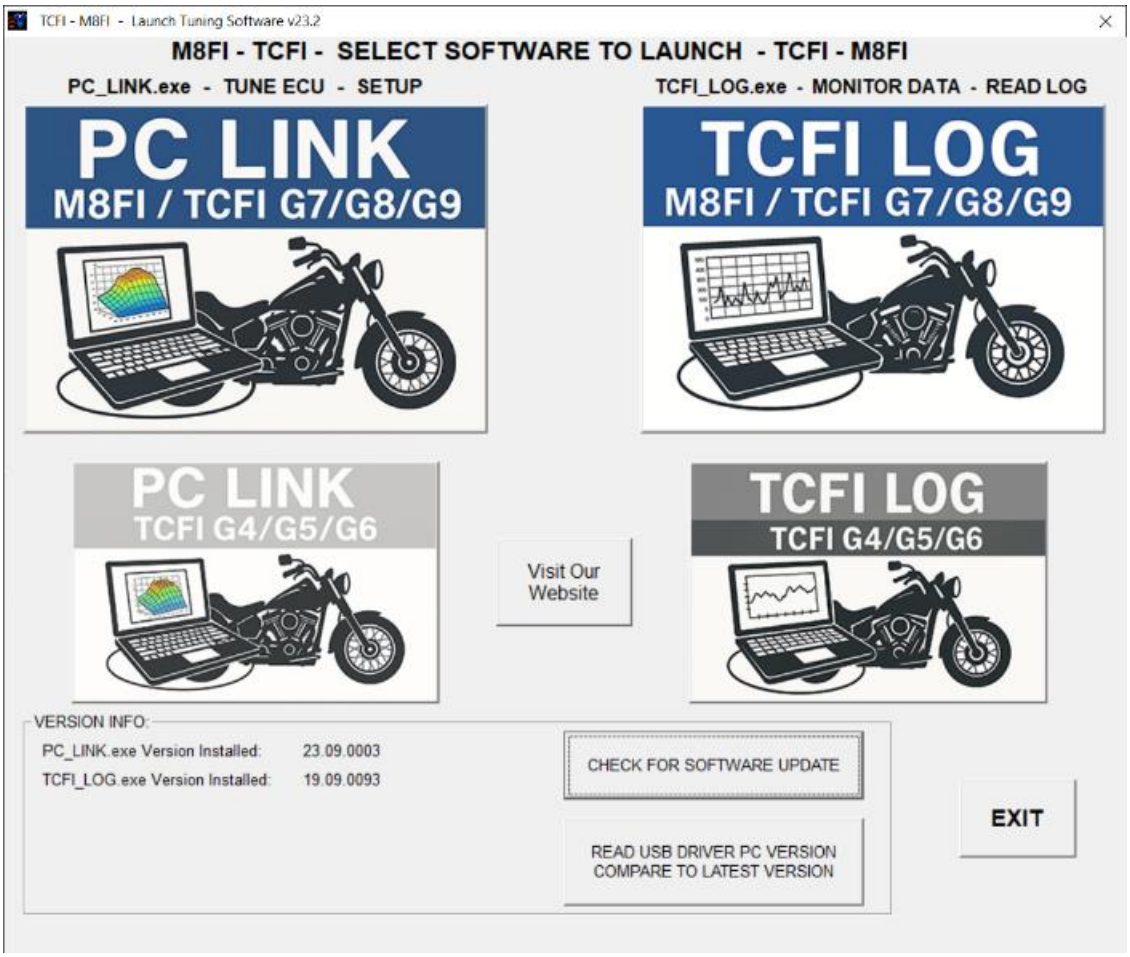
🛢 PART 1 - FIRST START – CHECKLIST → Three Steps to Part 1 (1-3)

1. **Plug the USB cable** into the USB-C port on the ECU and a USB port on the PC
2. **Open/Run the PC_LINK_TCFI.exe** -- Tuning Software by clicking on the TCFI_Launcher.exe icon on your desktop – be sure to check for software updates.
3. **Follow the next steps 4-10 located on the next page**.

The TCFI_Launcher.exe icon should be located on the desktop.

Double click on the shortcut and a window will open listing the two programs available to run (Tune and Log).

If the shortcut is not located on the desktop, you can locate it in TCFI Software folder and place the shortcut on desktop. C:\Program Files (x86)\Daytona TwinTec\TCFI_Software



• ECU setup/tuning changes click the icons image to the LEFT – **PC_LINK_TCFI.exe**.
• Live Data View, Data Log Viewing, Code Reading and other special features, click the icons image on the RIGHT – **TCFI_LOG.exe**.

⚠ **For the initial** ECU setup, choose: **PC_LINK_TCFI.exe** program.
⚠ **G8 & G9** ECU's require the use of version 23.95+ of the **PC_LINK.exe** for tuning and v20.00+ of **TCFI_LOG.exe** logging software. The latest versions support the Autotune AI feature.

⚠ **To enable communication between the PC, and ECU**, the power to the ECU must be turned on (some bikes have both an on/off switch near the twist grip and a main switch). After the power is turned on, the two RED O2 Status LEDs will turn on…. indicating that the ECU has been powered on.

⚠ **To speed up ECU read/flash time:** Set the COM port latency (delay) to 2ms using PC Device Manager.

PART 2 - FIRST START – CHECKLIST → Six Steps to Part 2 (4-10)

4. Program VIN (Setup New ECU -> Edit TCFI or M8FI VIN) - Enter the Vin

⚠ **Caution:** ***The body control module (BCM) may not allow starter engagement if the ECM is programmed with an incorrect VIN. The speedometer will also display a VIN error message.***

⚠ **If you have a RDRS bike:** you will need to adjust the tune and check the box in the **Edit..Scalars→Basic Parameters – Scalars Basic Parameters –** "ENABLE RDRS-Disable VSS". The speedometer is also controlled by RDRS. A bike that has RDRS must have this feature turned on the tune otherwise the speedometer will not work. On a stock bike the RDRS can control the throttle. In our RACE ECU the throttle is NOT controlled by RDRS feedback so it behaves like a bike that does not have RDRS (RDRS is disabled without any error lights).

⚠ **Custom Bike Note**: If you do not have a working VSS on a custom bike — checking this box can also be used to eliminate the check engine light that occurs when the VSS hardware does not have a valid signal.

5. Program Odometer (Setup New ECU ->Edit TCFI or M8FI Odometer Setting) – enter the Odometer reading. The ECM, BCM and Speedometer store accumulated odometer mileage.

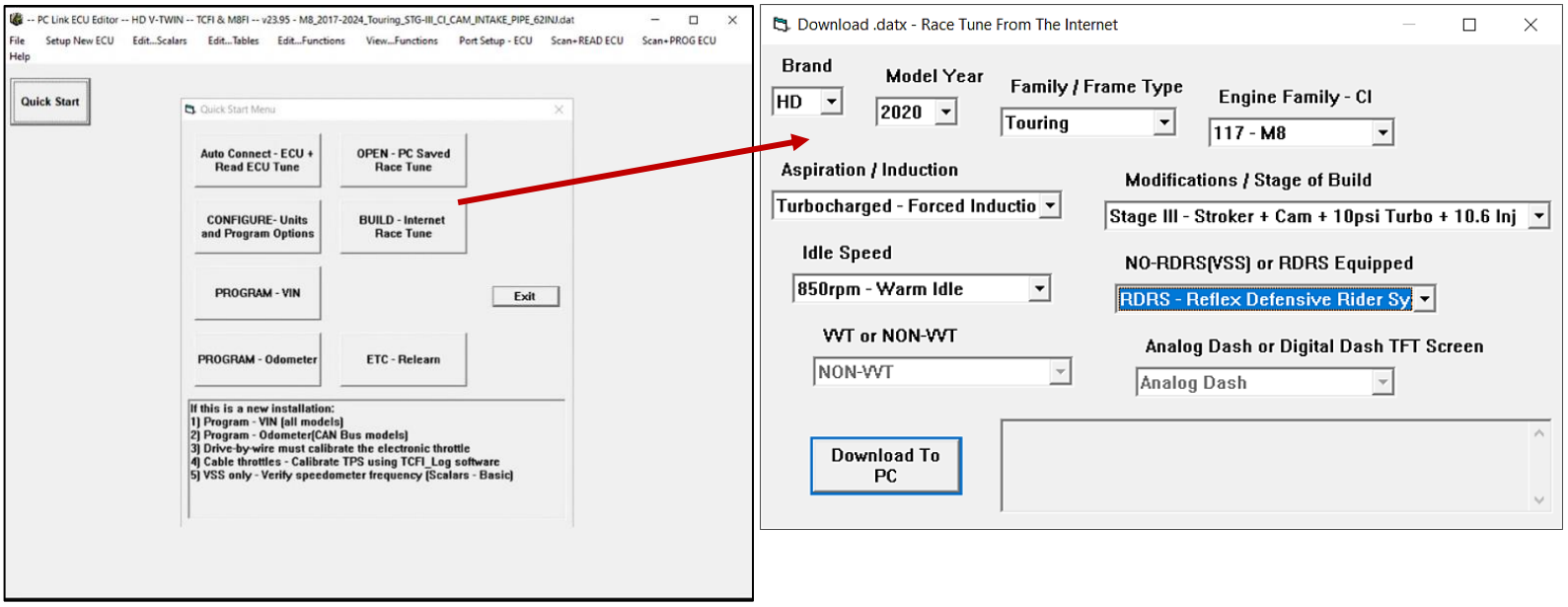
⚠ **Caution: if you program a higher odometer value, the odometer display will the higher value.**

⚠ **Caution: If you mistakenly program the wrong odometer value, and it is higher, the only solution is for the Harley-Davidson dealer to replace the speedometer and BCM and any other modules that might store the speedometer value. If this unfortunate mistake occurs, all modules will have to be replaced at the same time, otherwise any one of the modules with the incorrect odometer information will update the speedometer to the incorrect value.**

6. Run the ETC auto-calibration routine (Setup New ECU ->Calibrate ETC System) – For most throttle bodies we recommend running the **SHORT ETC TEST.**

⚠ **NOTE:** If the bike is idling high, check the Live Data View Screen to see if the TGS at idle is greater than zero. At idle, the TGS should be between 0-1%. If it is higher, this is most likely caused by a **Calibrate ETC System** learn issue. Perform the Calibrate ETC System function again, and then complete exit from the software (be sure to click exit and upload from the Calibrate ETC Screen). Next power off the bike and wait 30 seconds for the ECU to turn completely off before re-cranking and checking the Live Data Screen. If you still have an issue, contact tech support and we will walk you through the process.

7. Determine if the current file in the ECU will work for your bike, if not load a previously saved Race Tune or Build Race Tune from the Internet. The file sent with the ECU might work, if you need help contact tech support support.jmschip.com.



8. **<u>Program the new tune or the changes into the ECU</u>**

Important items:

- **After you do the ETC relearn and upload the changes, you must wait for the BCM to shut off the ECM — otherwise the ETC relearn changes will not work. Alternatively, could pull power — fuse or ECM connectors. Sometimes it takes around 30 seconds for the bike to power off.**
- **The power is BCM controlled — we have cannot control how long BCM stays powered.**
- **If you have a custom power switch setup — that could cause an issue.**
- **If during cranking/starting the bike backfires, ECU sync is not reliable. If this happens the check engine light will be ON during for the first 30 seconds after startup. If this occurs, turn the bike off and wait at least 30 seconds before restarting — if you crank right away and don't wait for the bike to turn completely off, the ECU will not power down and it will not relearn the sync (startup/cranking location of the engine pistons.)**
- **If you ever accidentally bump/disconnect the programming cable during ECU programming, you will need to pull power from the ECU, restart the PC_Link.exe Software and reprogram the ECU. We recommend pulling the main fuse to make this easier. Power must be removed from the ECU because it is stuck in a programming bootloader loop**
- **Latest file format for tune files is: .datx**
- **The new software can open old files .dat or the new .datx files.**
- **New software will only save .datx files.**

9. **<u>Start the TCFI_LOG.exe software</u> → Click on Scan+VIEW LIVE DATA to monitor engine data and scan for Diagnostic Codes.**

10. **<u>Verify that the bike is in neutral and start the engine.</u>**

⚠ **<u>NOTE:</u>** If the bike has larger injectors, we recommend that you adjust the tune, save and upload to the ECU prior to starting the bike (Scan+PROG ECU in PC_LINK). See Tuning Basics below for more information.

⚠ **For additional information** read the detailed tuning guide:
G7-G8-G9_Tuning_Guide_M8FI-TCFI.pdf
https://daytona-twintec.com/instructions/ or https://daytona-twintec.com/content/DTT/Instr/G7-G8-G9_Tuning_Guide_M8FI-TCFI.pdf

TUNING CLASSES AVAILABLE → CALL 386-304-0700 FOR DETAILS.

⚠ **NOTE:** After starting the motorcycle – if you have a check engine light – use the **TCFI_Log.exe** software to view the code. Choose **SCAN+VIEW LIVE DATA** and in the upper right-hand corner the error will be displayed.

⚠ **IMPORTANT** – If a check engine light is set during the first 30 seconds after startup, this can only be a sync error. The ECU will not set a hard fault (for example a BAD O2 Sensor until after the first 30 seconds of engine run time). This allows a customer to determine if a restart is required due to a sync error.
Sync Error usually occur due to a misfire (a pop during cranking). This is most likely to occur while you are initially tuning a file. Do not worry, once you have configured the engine to crank reliably this error will not occur. If a sync error occurs – shut off the engine and the bike completely and wait 30 seconds before restarting or until the lights on the **ECU** module go off and then restart the engine

Fuel System Overview:

Our system is an **Alpha-N,** Fuel Pulse width based system.
All fuel tables are multiplied against a Base Fuel Pulse Width Value ms to generate the actual pulse width for the fuel injector. This type of system is easy to tune and configure.
For example, if you choose a BASE Fuel Pulse Width of 20ms and the values in your main table were 15 → the commanded pulse width would be ~3ms. Note: Your actual value will typically be higher due to other adders that are setup to start and run/trim the engine; if all of these adders were set to zero, your actual PW will be 3ms. With the default tune that is shipped with the M8 NA ECU for a stock cam → when the engine is at 220F, then the rear pulsewidth will be around 3.7ms and the AFR at idle will be around 13:1.
In this system, the Base Injector Pulse Width should be coordinated with the maximum rpm of the engine.
We do not advise adjusting the Base Injector Pulse Width Value and the MAX RPM limit unless you understand the consequences (a complete retune might be required).
However, if you are adjusting the RPM Limit, our recommendation is to click the check box: BASE INJ PW under (**Edit…Scalars→Edit Basic Parameters**).
Choosing this checkbox automatically calculates and sets the Base Fuel Pulse Width value to the maximum pulse width value that can be utilized at the **MAX RPM Limit** value (**Edit…Scalars→Edit Basic Parameters**) entered in the tune. We recommend setting this value to a high value (slightly higher than the ACTUAL maximum pulse width value at the max RPM) –> this is because on heavy tip in events → often times, it is possible to for the engine to require a larger value than the maximum pulse width.

How to Adjust the fuel tables for a fuel injector change.
Assuming that you already have a tune that works well. Before you make this change, you must determine what injector size was originally used in the tune that you have open in your software. The stock M8 Fuel Injectors are 4.38 gm/sec. Our system is Alpha-N, which means that Throttle Position and RPM is used to lookup the

injector pulse width. Alpha = throttle position and N = RPM. This type of system is very easy to calibrate and configure (especially with our very powerful wideband AutoTune).

To adjust for larger injectors: Generate your scale factor: old injector size / new injector size = scale factor. For example, if your original tune was designed for 4.38gm/sec injectors and your new injectors are 5.38gm/sec all that is required is for you to do a minor amount of math and you can quickly adjust the main fuel table(s) into the correct range. Divide the Old/New values or 4.38/5.38=0.814 (81.4%) be sure to write the result down. This is the amount of reduction for the main fuel tables.

Next you have to determine if you are using two individual fuel tables (one for each cylinder) or a single fuel table and a multiplier (rear fuel table and front multiplier). You can do this by opening File→ Configure – Units and Program Options. If Front Alpha Fuel is selected then you have two individual fuel tables, otherwise if Front Mult Fuel is selected you have one fuel table and one multiplier table. If the option is not shown at all, then you have one fuel table and one fuel multiplier table.
If you have two fuel tables, then you will have to multiply all of the cells in each table (Front Cyl – Main Fuel or Rear Cyl – Main Fuel) by the same amount (in this case 81.4% to reduce the fuel pulse width by 18.6%). If you have a single fuel table, you will only modify the one table (Rear Cyl - Main Fuel).

To modify, open the table Edit…Tables→Front Cyl – Main Fuel and/or Rear Cyl – Main Fuel.
Next click on the top left corner cell TPS/RPM to select the entire fuel table and then right click and choose either the Modify or Multiplier option. Be sure to read the information in the pop up so you enter the correct value. If you want to use the value straight from the calculator, choose Multiplier and then enter your factor value 0.814 (for 81.4%) and click enter. The entire table should change color to GREEN to indicate that the values that you just set in the table are lower than the original values – Save the Table values and if you have to modify a second Fuel table, open it and make the same change.
Finally, Save the new tune file with a new name (File -> Save As) and then upload the modified file to the ECU (**Scan+PROGRAM ECU)**.

⚠ **Important**: Scaling the Fuel Tables will only get you close. If after this change, the bike starts and responds normally, you can move to using AutoTune to finish up.

⚠ **Adjust your tune based on engine data** delivered by the View Live Data Stream or by analyzing saved data logs and engine data (for example: wide-band sensor data).

Use Scan+VIEW LIVE DATA to look at the engine in real time – you do not need to save this data because if the engine is running the data is automatically saved to the logging system.

Scan + DOWNLOAD LOGGED DATA+View Chart allows you to download and graphically view and save data. This is how you access the data that is automatically saved during the last 60 minutes of run time.

⚠ **Utilize the built-in wideband sensors** and the real time data logging **– adjust the tune prior to turning on the AUTO-TUNE Feature.**

Typical SAFE Target AFR values -- IDLE: 13.0-13.3 AFR (0.88 λ - 0.9λ)

Typical SAFE Target AFR values -- CRUISE: 12.5-13.3 AFR (0.85λ - 0.9λ)

Typical SAFE Target AFR values -- WOT NA: 12.0 (0.82λ) WOT Boosted: 11.0 (0.75λ)

⚠ **Read and Clear ECU codes by** using the TCFI_Log.exe software

Use the Scan+VIEW LIVE DATA to view existing codes, they display in the upper right window.

View ECU DIAG CODES→ Download and View Statistics/Diagnostic Codes to view Historic Codes

To Clear, Special Features→Clear Historical Diagnostic Codes to clear past codes and trip counter

⚠ **FUEL Reference**: Typically, if an engine pops on acceleration, it is LEAN…when cold---if it won't start, it is usually LEAN…. otherwise, if it is too rich it blows black smoke.

⚠ Important Wideband O2 Note - Related to turbocharged applications:

If O2 sensors are installed in-between the Head and the Turbo will read slightly different, depending on the pressure. The pressure in the exhaust will skew the air fuel that is reported by the sensor up to a full air fuel point. Example: AFR reported by the sensor in the pipe before the turbo shows 11.4:1 and the actual AFR after the turbo is 12.2. This is not a huge issue – on a turbo bike, it is important to run a commanded AFR that is slightly richer than you desire to achieve the expected results.

🔍 *ENGINE DIAGNOSTICS AND START ISSUES*

The **G8/G9** ECU has extensive diagnostics. When the ignition switch is first turned on, the Check Engine LED (CEL) illuminates. The LED goes out when the system initialization is complete.

If a diagnostic fault is detected while the engine is running, the LED will illuminate. Diagnostic codes can be read and cleared by means of the speedometer (same as with the OE ECM) or TCFI Log software. Most of the diagnostic codes are the same as those used by H-D and the H-D Electrical Diagnostic Manual for your model should be employed as a primary troubleshooting reference. Certain diagnostic codes that are unique to the ECU or require special consideration are listed below:

⚠ **How to tell if it is a sync issue or other problems:** With our system, after the bike starts, a physical fault will take 30 seconds to set the Check Engine Light. Example: if one or both of the O2 sensors are not connected, it will not set a code for 30 seconds. That is how you can tell the difference between a startup sync lost issue or a hard fault issue. If the check engine light stays on during the first 30 seconds it is a sync issue and the bike should be completely shut off for 30 seconds and then restarted to clear.
Note: any time the bike starts, if the CEL stays on => it does not have cam sync (the ECU calculates cam sync based on the engine cranking speed). Therefore, a pop at start or a weak battery will cause a sync issue. This issue usually sets a check engine light around 5 seconds after the engine has been running.
Remedy: let the bike run a bit to warm up and charge the battery, then key off the ignition. Turn completely off, wait 30 seconds for all modules to turn off. Restart. Few seconds after starting the CEL will flash on/off; that is normal.

P0373 CKP Signal Lost. This code will appear if the engine stalls. Customers are often confused about the meaning of the term "trips" associated with codes, especially P0373. This is an industry standard terminology. If code P0373 shows 40 trips, it means that the code was set 40 engine start cycles ago, not that the code has been set 40 times and that the crankshaft position sensor is defective.

P1607 refers to a diagnostic trouble code indicating a problem with the "Throttle Position Sensor (TPS) Signal Out of Range. Pops up within 5 sec after start.

P0371 indicates a problem with the "Timing Reference High Resolution Signal A" which is typically related to a faulty crankshaft position sensor, meaning the engine control module is detecting an abnormal

signal from the sensor regarding the engine's position, potentially causing issues with ignition timing and fuel delivery; essentially, the bike's computer is not getting a clear signal about where the crankshaft is in its rotation cycle.

P0132 Rear Oxygen Sensor High, P0134 Rear Oxygen Sensor Low/Open, P0152 Front Oxygen Sensor High, or P0154 Front Oxygen Sensor Low/Open. These codes normally indicate a problem with the connection to the wideband sensor. Verify that the sensors is connected. These codes may also be set if a Bosch sensor fails or becomes contaminated by leaded gasoline.

If the engine "pings" on hot start => reduce PW in function table "Priming Fuel PW vs Engine temp". The Priming – Fuel PW function is only activated when the engine is initially turned on (prior to cranking). If excessive fuel is injected when the bike is HOT, it can cause a audible ping on cranking.

Priming - Fuel PW vs Engine Temp - Fuel Injected Prior to Cranking

ET F	3	32	61	90	118	147	176	205	234	262	291	320	349	378	406	435	464
PW msec	33.02	26.88	18.43	8.45	4.86	3.07	2.05	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02

⚠ **Historical diagnostic codes** logged by the ECU are listed along with the number of trips (engine start cycles) since the individual code was last logged. Codes are automatically cleared after 50 trips. "Trips" is an industry standard terminology. If a code shows 40 trips, it means that the code was set 40 engine start cycles ago, not that the code has been set 40 times.

🔍 *REINSTALLING THE ORIGINAL EQUIPMENT ECM*

Removal of the Wideband Sensors is not required for simple operational tests with the OE ECU: such as verifying that the engine will start and run.

⚠ **For additional information** read the detailed tuning guide:
G7-G8-G9_Tuning_Guide_M8FI-TCFI.pdf
https://daytona-twintec.com/instructions/ or https://daytona-twintec.com/content/DTT/Instr/G7-G8-G9_Tuning_Guide_M8FI-TCFI.pdf

TUNING CLASSES AVAILABLE → CALL 386-304-0700 FOR DETAILS.

APPENDIX A – TROUBLESHOOTING FLOW CHARTS

⚠ FAIL to START TROUBLESHOOTING FLOWCHART