Twin Tec

Installation Instructions for VT-i System

CAUTION: CAREFULLY READ INSTRUCTIONS BEFORE PROCEEDING.
NOT LEGAL FOR USE OR SALE ON POLLUTION CONTROLLED VEHICLES.

OVERVIEW

The Daytona Twin Tec VT-i system is an ultra reliable dual fire electronic ignition system for all Harley-Davidson® V-twin engines except early magneto and distributor type and 1999 and later Twin-Cam®. The VT-I system includes a special trigger rotor for use with a traditional mechanical advance mechanism (supplied by customer). A Hall effect sensor detects the teeth on this special trigger rotor and provides very stable spark timing.

A rotary switch is used for a precise digitally set RPM limiter (200 RPM steps from 5,200 to 7,000 RPM) and a red status LED allows easy static timing.

The VT-i is compatible with most original equipment and aftermarket dual fire ignition coils (3-5 ohms primary resistance) and has a simple two wire hookup to the coil. Electronic dwell control provides maximum ignition energy at high RPM and reduced current draw at low RPM. The unit operates down to below 6 volts for reliable starting under all conditions, including kick start.

The VT-I utilizes fully encapsulated construction with surface mount electronics. The unit is waterproof and highly resistant to vibration and shock. The electronic components include over-temperature protection and are rated to operate up to 125º C (260º F).

AVOIDING HEAT RELATED FAILURES

Heat kills electronics. The VT-i can tolerate heat, but exposure to temperatures above 125º C (260º F) will greatly reduce life expectancy. We sometimes see problematic applications where several ignition systems have failed. The failure mode is a classic thermal intermittent where the ignition stops firing when it gets hot. We have found that these problematic applications share one or more of the following characteristics:

- Improper carburetor jetting resulting in lean air/fuel ratio (AFR). A lean AFR will cause the engine to run very hot. All performance engine modifications necessitate carburetor rejetting. Carburetors are never correctly jetted out-of-the-box. The only practical means of correctly jetting a carburetor is to test the motorcycle on a chassis dyno equipped with an exhaust gas sniffer or to use our WEGO system.
- Lack of an oil cooler on a 95 CID or larger engine.
- Exhaust pipe without heat shield in close proximity to the nose cone.

If any of the above applies to your application, the VT-I may be exposed to excessive temperatures resulting in reduced life expectancy.

INCLUDED AND ADDITIONAL REQUIRED PARTS

The unit includes a parts bag with crimp terminals for coil hookup and hardware for cover plate re-installation.

You will require a mechanical advance mechanism. For high compression engines, install suitable advance springs.

PREPARATION

Start by inspecting your ignition system. We recommend that you replace the spark plugs and spark plug wires.

CAUTION: Do not use solid copper spark plug cables or non-resistor type spark plugs. The unit may misfire.

INSTALLATION

1. Turn off the ignition switch and disconnect the battery ground cable before proceeding.
2. Remove gear case cover plate and mounting hardware. On late models, you may have to drill out two rivets that hold the cover (reassemble with supplied screws). Remove the existing ignition plate and wiring.
3. You can completely remove the OE ignition harness and external module (1980 and later

models) if desired. However, you must disconnect all OE wires from the coil except the white/black wire from the engine stop/run switch.

4. Install the trigger rotor supplied with the VT-i system. It will only slide down on the advance mechanism when properly oriented. Lubricate the trigger rotor and advance mechanism with a light oil such as 3-In-One or WD-40. Make sure you use the original lock washer and apply some threadlocker such as blue Permatex to the screw that secures the rotor. Then verify that the rotor and advance weights move smoothly without binding.
5. Install the VT-i using the original mounting standoffs. Do not fully tighten the standoffs or install the outer cover plate until after the timing procedure. Route the wire harness from the VT-i through the cable exit hole in the gear case cover. You may have to enlarge the hole with a drill on some early models.
6. Route the wire harness along the frame tubing to the ignition coil. Make sure that the harness is clear of hot exhaust areas and cannot chafe against sharp edges. Secure the harness with nylon cable ties.
7. Connect the two wires from the VT-i to the coil as shown in Figure 1 using the supplied ring terminals.
8. Use a small flat screwdriver to set the VT-i RPM limit switch to a safe value for your engine:

Switch Setting	RPM Limit
0	5,200
1	5,400
2	5,600
3	5,800
4	6,000
5	6,200
6	6,400
7	6,600
8	6,800
9	7,000

NOTE: The VT-i is grounded by means of the gear case housing. The mounting surface must not be anodized or painted.

9. Reconnect the battery ground cable. Complete the timing procedure given on page 4.
10. Reinstall the cover plate. On late models, use two supplied 10-24 x 1/4" socket head screws and lock washers in place of the original rivets. You will have to tap the rivet holes on the inner plate (do this with the plate removed from the bike to avoid damaging the ignition). You can use the supplied 10-24 x 3/8" self threading screw as a tap.

Figure 1 – VT-i Hookup

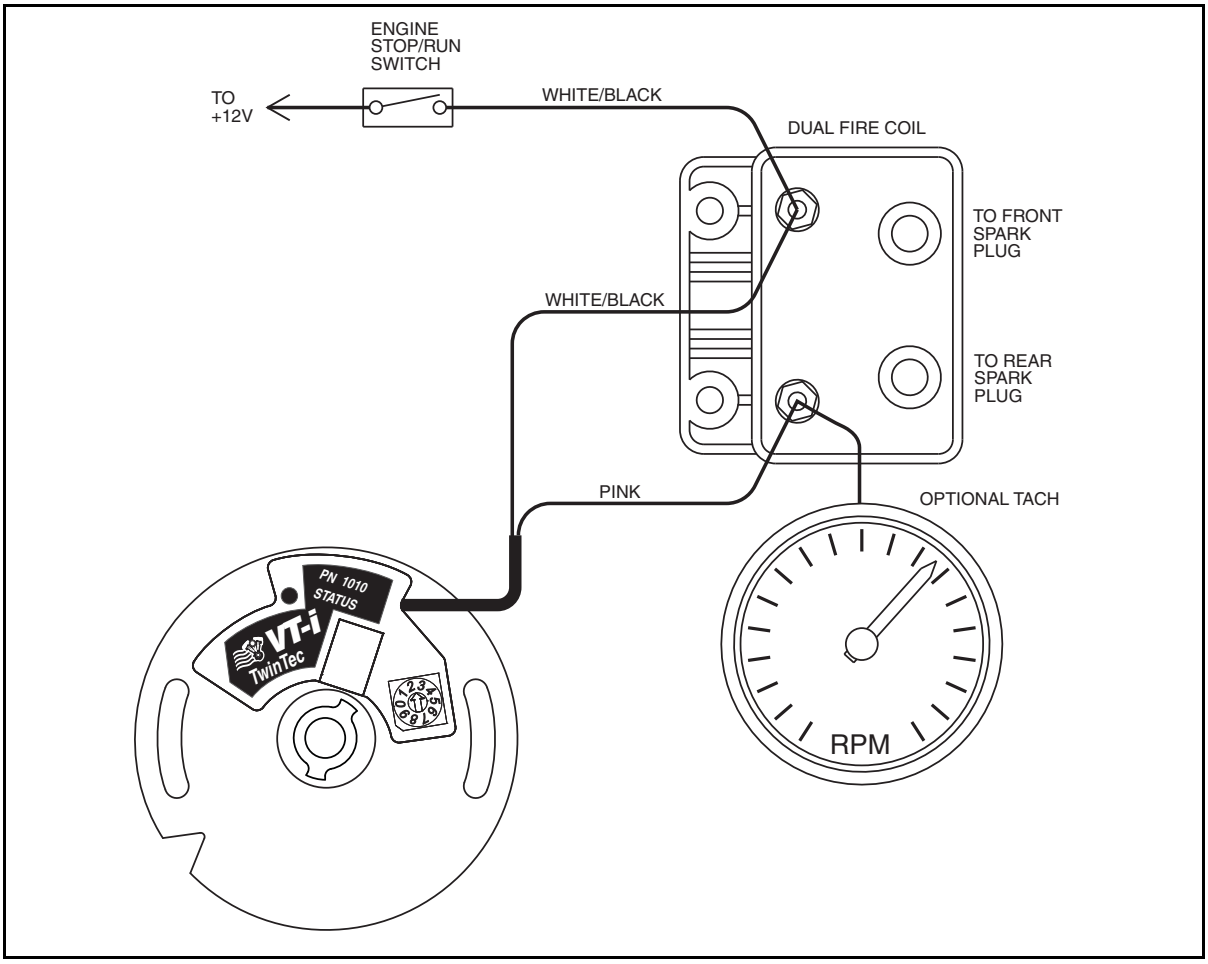
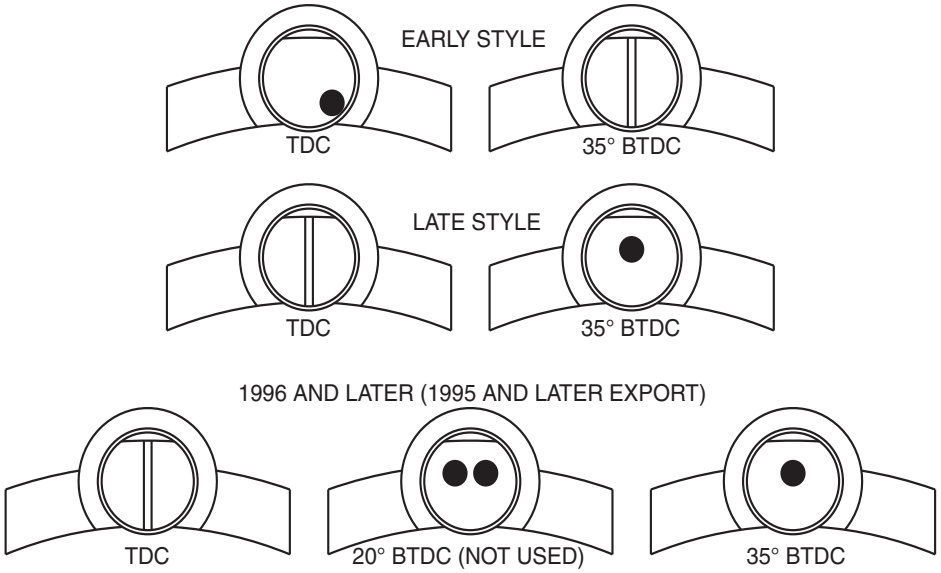


Figure 2 - Front Cylinder Timing Marks



STATIC TIMING PROCEDURE

1. Timing marks are located on the flywheel and may be viewed by unscrewing the inspection hole plug. Most engines will have both TDC and advance timing marks for the front cylinder as shown in Figure 2. If you are not sure, refer to your shop manual. You can also identify the TDC mark by removing the spark plugs and rotating the crankshaft (turn rear wheel in high gear) until the front piston comes up on TDC.
2. For static timing, you must rotate the crankshaft so that the front piston is at the 35º BTDC advance mark on the compression stroke. Remove spark plugs and rotate crankshaft. If you place your thumb over the spark plug hole, you will feel pressure as the piston comes up on the compression stroke. Continue rotating the crankshaft until the 35º BTDC advance mark is precisely centered in the inspection hole.
3. Ground the spark plug cables to avoid a shock hazard. You can use small jumper wires with alligator clips for this purpose. You can also disconnect the COIL- connection (yellow wire) while setting static timing.
4. Turn on the ignition switch. The red LED is used as a timing indicator. ***Note that the LED may not immediately illuminate when power is first turned on.*** While holding the trigger rotor in the advance position (counterclockwise), rotate the VT-i back and forth until the red LED illuminates. Then slowly rotate the VT-i clockwise until the LED goes out. If you have rotated the unit back and forth several times, the LED may start to just flash briefly. Cycle the ignition switch off and then on again to continue static timing.
5. Tighten the standoffs to secure the unit. Turn off the ignition switch and reinstall the spark plugs.

PRECISE TIMING PROCEDURE

1. Use a standard timing light. Note that most dial-back type timing lights will not work correctly with dual fire applications. If you have a dial-back timing light, set the dial-back to zero.
2. Connect the timing light pickup to the front cylinder spark plug cable. Loosen standoffs securing the VT-i. Run the engine at a steady speed just over 2,000 RPM. Rotate the VT-I to center the 35° BTDC timing mark in the inspection hole. Tighten standoffs and verify that the timing has not changed.

TROUBLESHOOTING FLOWCHART

Follow the troubleshooting flowchart shown on the next page. Experience has shown that most units returned for warranty are OK and another problem, such as a defective coil, is later identified.

TROUBLESHOOTING TIP: If you are installing an internal (nose cone) type ignition for the first time and the engine will not start, the most likely problem is improper static timing. Make sure that the front piston is at TDC on the compression stroke and not on the exhaust stroke.

Troubleshooting Flowchart