

MSD **IGNITION** **INSTALLATION INSTRUCTIONS**

MSD Single Cylinder Programmable Ignition PN 4217

Parts Included:

1 - PN 4217

1 - PN 4217 Wire Harness

1 - CD Rom 9609

1 - Parts Bag

1 - Serial Cable

WARNING: During installation, disconnect the battery cables. When disconnecting, always remove the Negative cable first and install it last.

The Single Cylinder Programmable Ignition is designed for use on a variety of single cylinder motorcycle type 2 and 4-stroke engines. It delivers increased spark energy and voltage through the entire rpm range and provides the user with a variety of programmable functions including mapping two timing curves, setting a launch rpm limit, using TPS for timing control and more.

To program the PN 4217, MSD includes the Pro-Data+ software on a CD along with a 6-to-9 pin PC harness for easy programming on a PC. The ignition can also be programmed with MSD's optional Hand Held Monitor, PN 7550.

TIMING FUNCTIONS

The Programmable Ignition gives you control over the timing functions of your engine, making it imperative to understand ignition timing. Following are a couple basic explanations of ignition timing.

One timing setting is not ideal as engine rpm and loads change. By adjusting the ignition timing you can improve performance by matching the ideal timing with the engine's needs. To achieve the optimum performance, you'll need time for testing and tuning.

Total: Total timing references the Start timing along with the available advance. As an example, if you have 10° of Start timing and add another 22°, the total timing will be 32°.

Start Timing: The amount of timing advance that is in place when the engine is idling or during start up.

Available Advance: This determines what is the most timing advance available. This is determined by the Pickup Width, or the duration of the pickup signal. See "Pickup Width" in Programming Features.

PROGRAMMING FEATURES

TIMING CURVES

There are two timing curves that can be switched between through wire activation. Both Timing Maps allow up to 20 points to be plotted in 100 rpm and 1° increments from 0 – 16,000 rpm and 0-50°. The Brown/White wire is used to switch between Curve A and B. When it is connected to ground, Curve B is selected.

These curves can also be set up relative to TPS voltage input from closed throttle to Wide Open Throttle. See TPS Timing Curve on next page.

Timing Curve A: This is the default timing curve.

Timing Curve B: This is the optional curve and is active when the Brown/White wire is switched to ground.

TPS/TIMING CURVE

If a TPS sensor is being used on your application, the timing curves can be programmed relative to TPS input. This provides a three dimensional timing map (Figure 1). This feature allows the user to map timing curves for Closed Throttle and Wide Open Throttle. With the two timing maps, the PN 4217 will control the timing based on throttle position, within the timing map parameters. This flexible feature allows for timing to advance or retard as the throttle opens/closes.

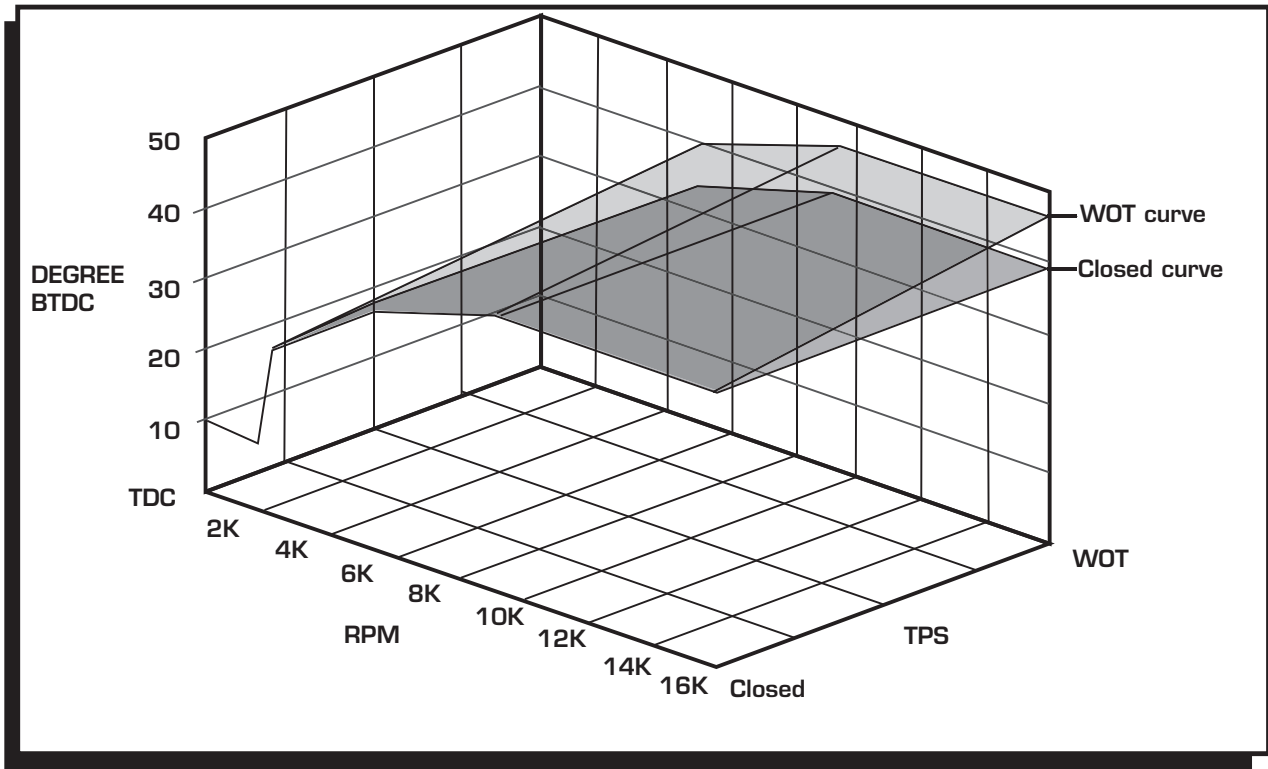


Figure 1 TPS/Timing Curve Example.

PICKUP WIDTH

This is the duration of the trigger signal. This is a self learning feature that is measured with the engine running between 800 and 1400 rpm. This duration determines the amount of advance you can program the ignition for. This value should be used as the reference pickup tab width for the program value PickupRef degrees. Figure 2 shows an example.

CAM OR CRANK TRIGGER

This option lets you select the trigger location of the engine, whether crankshaft (default) or camshaft.

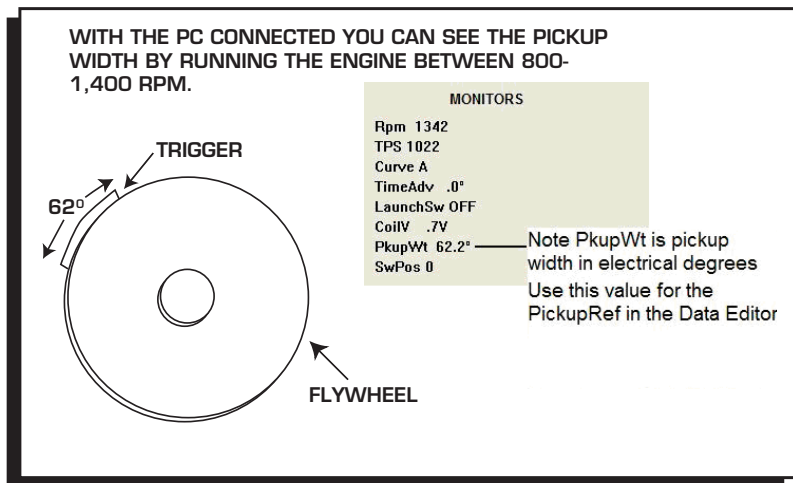


Figure 2 Pickup Width.

TACH IN

This allows for the different type input signals such as Hall-effect or magnetic pickup such as an MSD type trigger.

Tach Input: RawHall or MSDHall: The white wire connects to an MSD Hall-effect pickup.

TachIn Mag: The Green and Violet 2-pin harness is used.

Two Tabs: For use on engines such as the CRF450R with a dual tab flywheel and trigger design.

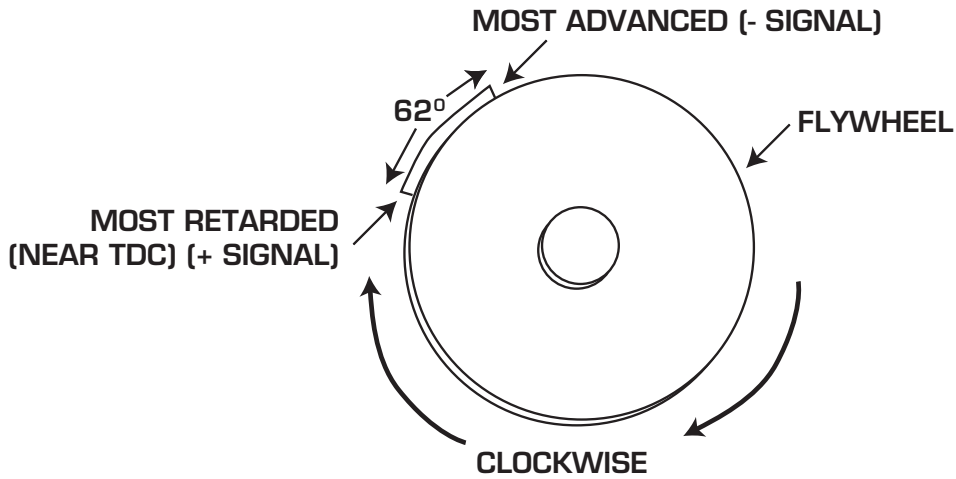
REV LIMITS

There are two rev limits to program with the PN 4217. One for overrev protection and another limit to use for the launch. Both are adjustable from 1,000 – 16,000 rpm.

Launch RPM: This provides you with second rpm limit that is activated when the Blue wire is connected to ground. Once removed from ground, the Max limit is active.

Max RPM: This is the overrev rpm limit. It will keep the engine from overrevving due to a missed gear or driveline failure.

| WIRING | |
|--|---|
| Group A connectors: | |
| ORANGE | Connects to Coil positive (+) |
| BROWN/ORANGE | Connects to Coil negative (-) |
| VIOLET | On/Off, connect to switched +12 volts |
| BLACK | Ground, connect to battery negative or crankcase ground |
| RED | Connect to battery positive, 12 volts |
| Group B connectors: | |
| BLUE | Launch RPM Limit, the launch rpm is active when connected to ground |
| TRIGGER PICKUPS | |
| GREEN | Magnetic pickup negative |
| VIOLET | Magnetic pickup positive |
| See Figure 3 on page 4 for information about pickup polarity. | |
| Note: The mag pickup wires are never connected when the White wire is used. And vice-versa. | |
| WHITE | Hall Effect trigger input or kill switch to ground |
| BROWN/WHITE | Timing Curve B Select. When connected to ground, Timing Curve B is active |
| THROTTLE POSITION WIRING | |
| YELLOW | TPS input signal |
| BLACK | TPS ground |
| RED | TPS +5 volt signal output |
| LED | An LED indicator will be On when there is valid trigger input and can be used as a static ignition timing indicator with the Hall Effect pickup input |



MAGNETIC PICKUP POLARITY IS IMPORTANT. THE ENGINE MAY NOT RUN PROPERLY IF CONNECTED REVERSE. THE ENGINE NEEDS TO SEE A NEGATIVE SIGNAL ON THE VIOLET WIRE AT THE ADVANCED EDGE OF THE TIMING TAB AND POSITIVE AT THE TRAILING EDGE (THE MOST RETARDED AMOUNT).

NOTE: IF THE PC SHOWS PICKUP WIDTH AT A LARGE VALUE >90°, THE POLARITY AT THE PICKUP IS REVERSED.

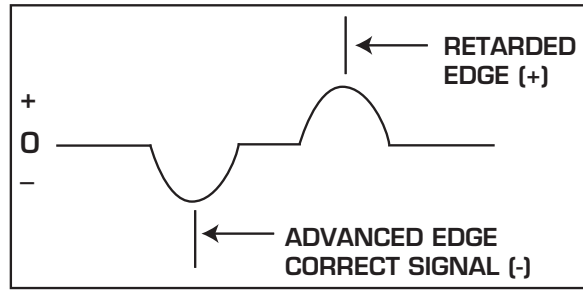


Figure 3 Pickup Polarity.

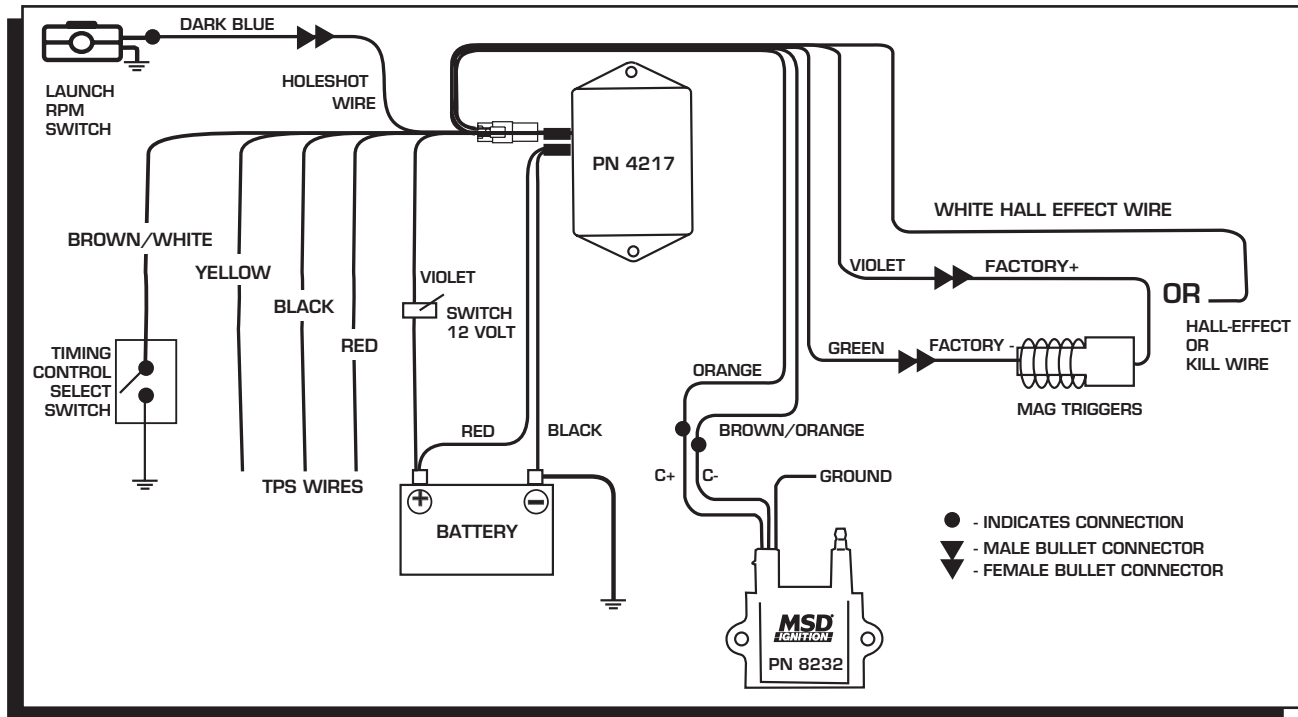


Figure 4 Wiring the PN 4217 Single Cylinder Ignition.

PROGRAMMING

Installing the MSD Pro-Data+ Software

1. Insert the CD.
2. In Windows, click Start then select Run.
3. In the box type: A:\Setup then press enter.
4. Follow the on screen instructions.
5. Two MSD icons should appear on the desktop.
6. Select the GraphView icon.
7. In the upper left corner of the screen select File, then PN 4217.
8. Select the file that says 4217vXX.ign (XX means the latest version such as 02).
9. Click on Open.

SAVES AND TRANSFERS

Whenever a change is made to a program it either must be saved to your PC or transferred to the ignition file you are programming. The software gives you the choice of automatically transferring the change to the MSD or the PC.

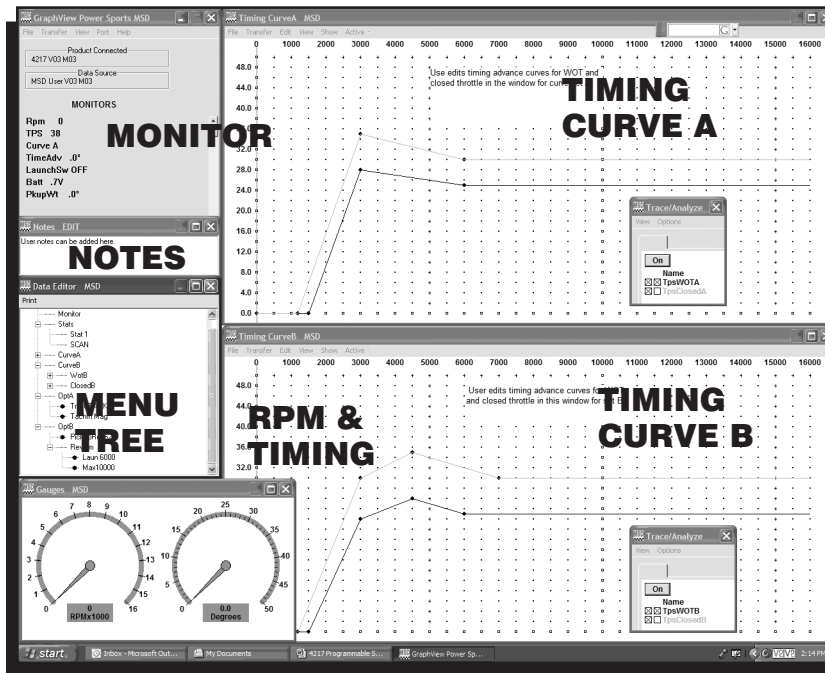
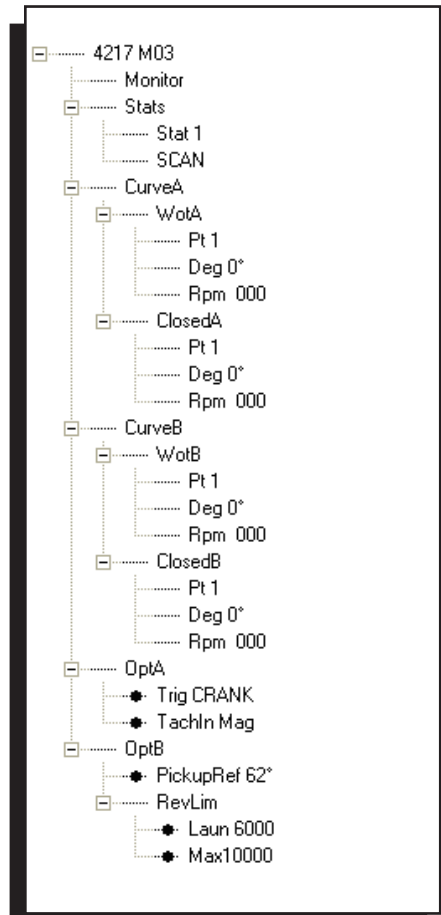


Figure 5 Pro Data+ Software for PN 4217.



Figur 6 Menu Tree Options.

TIMING

When using the PN 4217 it is important to understand a few terms related to timing.

Pickup Trigger - This is the trigger used to tell the ignition when to fire. The PN 4217 can be used with either a magnetic pickup or a Hall-Effect pickup.

Timing Tab - This is the tab on the flywheel. A timing tab is primarily used on steel flywheel in combination with a magnetic pickup (Figure 7).

Tab Width - This is the amount in crankshaft degrees, that the tab is long. This will control the amount of total advance curve you can achieve. For example, if you have a timing tab that is 30 degrees in length you can program up to a 30 degree curve into the PN 4217 (Figure 7).

Magnets - Magnets are typically used in an aluminum flywheel and trigger a Hall-Effect pickup. You might use several magnets in a row to be able to achieve a certain amount of timing curve capability (Figure 8).

Leading and Trailing edge - Leading edge refers to the first edge of the timing tab or magnet to pass the pickup. Trailing edge refers to the last edge of the timing tab or magnet that passes the pickup.

Total timing - This is the maximum amount of timing you can achieve with a particular combination. This will also be where the leading edge of the timing tab is located.

Initial timing - This is the idle timing of the engine. This will also be where the trailing edge of the timing tab is located.

Total timing advance - This is the amount of timing advance you can achieve with a particular combination. The total advance is the number of degrees between the leading and trailing edge on the flywheel.

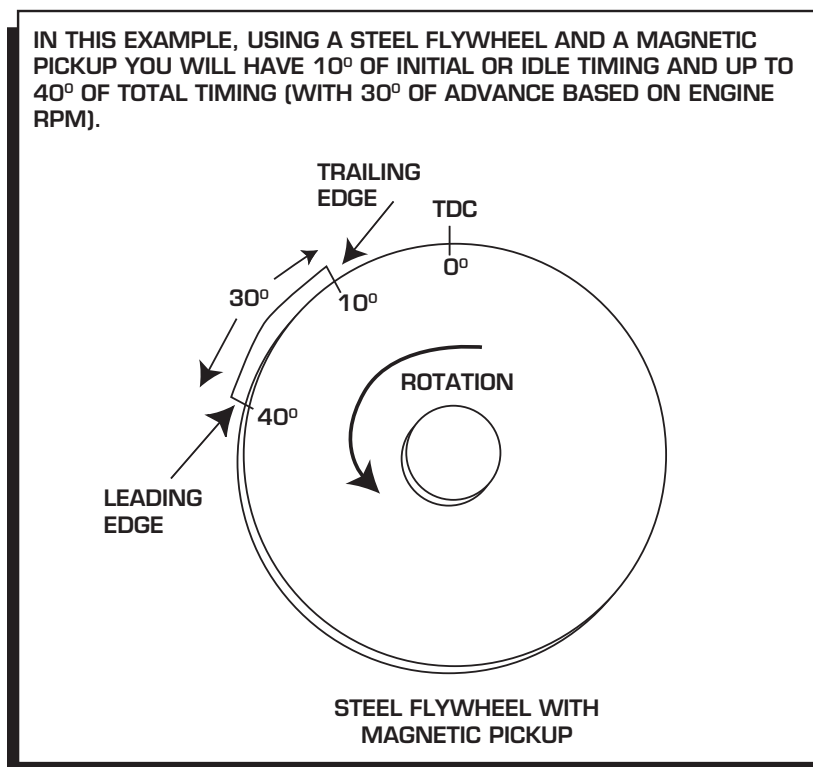
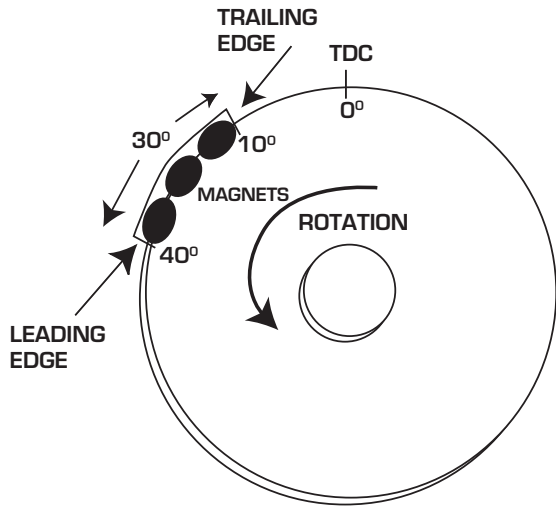


Figure 7 Magnetic Pickup.

IN THIS EXAMPLE USING AN ALUMINUM FLYWHEEL WITH MAGNETS INSERTED YOU WILL HAVE 10° INITIAL OR IDLE TIMING AND UP TO 40° OF TOTAL TIMING (WITH 30° OF ADVANCE BASED ON ENGINE RPM).

NOTE: WHEN USING MAGNETS TO TRIGGER A HALL-EFFECT PICKUP THE AMOUNT ADVANCE CURVE YOU CAN ACHIEVE WILL BE BASED ON THE FLYWHEEL DIAMETER AND NUMBER OF MAGNETS INSTALLED.



ALUMINUM FLYWHEEL WITH MAGNETS AND HALL-EFFECT PICKUP

Figure 8 Hall-Effect Pickup.

TECH NOTES
