

# Tempest 3 (T3) Installation Instructions Sea-Doo 1-coil Ignition

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## For use with:

'97 GSX      '98 GSX-L  
'98 GTX-L  
'97 XP        '98 XP-L

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The Tempest 3 Model 1948 Ignition is designed for use on all Sea-Doo® 1996 through 1998 single coil 785 and 951 Rave engines. Your Tempest 3 Ignition is the first of a new breed of fully integrated engine controllers. This single device provides all of the following capabilities:

## Tools Required

- 8" Slip joint pliers
- Diagonal cutters
- Black electrical tape

## First Things First, For Safety...

 **Disconnect the battery positive cable (red) before proceeding**

## Installation Overview

This Ignition is designed to give you trouble-free service if installed according to these instructions. Read the entire installation procedure before beginning the installation. If you do not understand any portion of these instructions, refer installation to a qualified technician.

1. With the help of the "Wiring Guide" in Figure 1, locate the model of your boat from the chart.
2. Having located your model on the guide, you now know how the connectors (P1, P2, & P3) are arranged on the MPEM.
3. The picture of your MPEM points to a chart of numbers in the center of Figure 1. The chart indicates where each wire from the Tempest Ignition attaches to your MPEM. Example: For a 98XP-L, the Violet wire attaches to Connector P2, pin # 2.
4. The wire colors used on the Tempest 3 Ignition match the wire colors they connect to on the Sea-Doo® connectors.

## Mount the Tempest 3 Ignition

Locate a suitable position near the MPEM and mount the ignition. The Tempest 3 Ignition is waterproof, but try to find a place where it is somewhat protected from excess water.

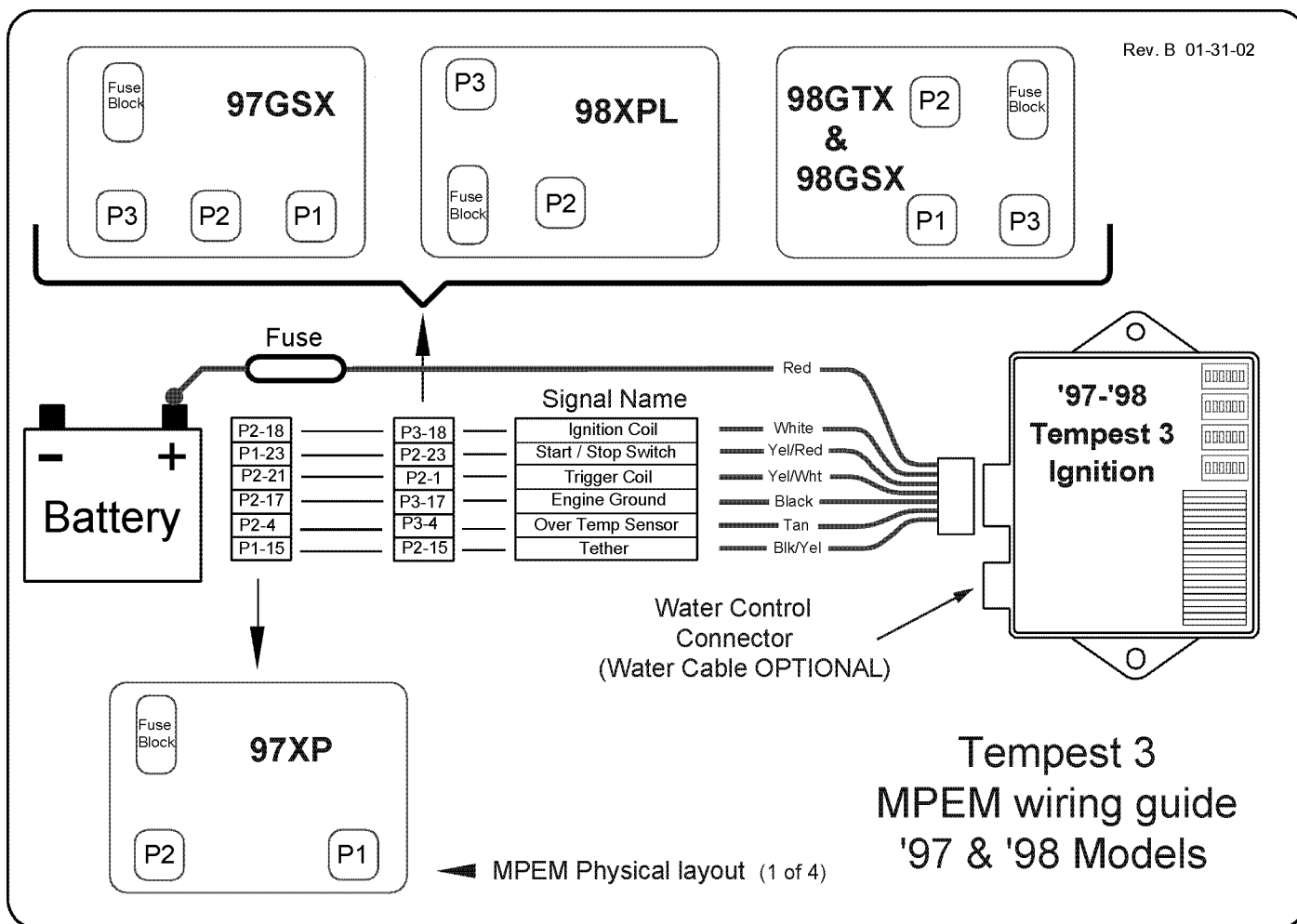


Figure 1

**Connector P1 Wiring (98 XP-L does not have connector P1)**

1. Locate connector P1 on the MPEM. Unlatch and remove it.
2. Fold back the rubber boot (if present) exposing the wires attached to the connector.
3. Referring to the Wiring Chart in Figure 1, determine which wires on the Tempest 3 Ignition attach to this connector.

**Example: '97XP has 3 wires that connect to P1**

Connector Location	Signal:	Color:
P1-23	Start/Stop Sw.	Yel/Red
P1-14	+12V Power	Violet
P1-15	Tether	

4. Thread these wires through the cable entry opening of the rubber boot (if present).
5. Locate one of the matching colored wires in the wiring harness. Confirm the wire is installed in the correct pin location of the connector (see connector detail in Figure 2). Unsnap the flap on a blue T-splice exposing the side wire slot. Slide the Sea-Doo wire into the slot. Be sure that the end of the splice with two holes is facing away from the connector (see Figure 3). Position the blue T-splice 2" or 3" from the Sea-Doo connector, then snap the flap over the wire slot to hold the wire in place.

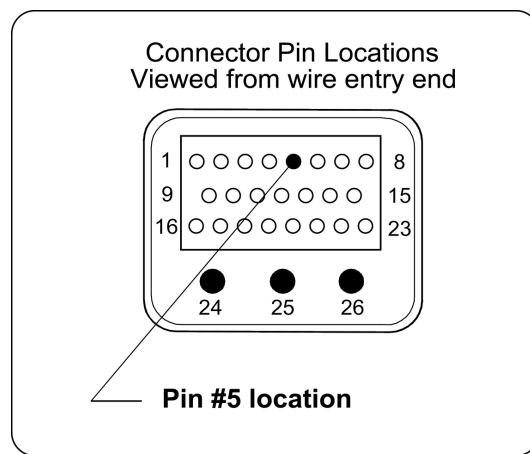


Figure 2

Continued...

5. Insert the free end of the matching color wire from the Tempest 3 Ignition completely into the wire opening on the blue T-splice.
6. Using a pair of pliers, grasp the blue T-splice and squeeze to press the metal contacts completely into the body of the splice.
7. Close and latch the plastic flap over the metal contact.
8. Repeat step #4 through #8 for each of the remaining wires that attach to the P1 Sea-Doo connector.
9. After all wires have been attached to this connector, replace the rubber hood (if present) over the connector and re-install the connector into the MPEM.

## Connector P2 and P3 Wiring

For connectors P2 and P3, follow the procedure for P1.

**NOTE: The White wire will be located in either P2 or P3 depending on your Sea-Doo model. White wire attachment must be performed as follows or damage to the Sea-Doo MPEM or Tempest 3 Ignition may result.**

1. Connect the White wire from the Tempest 3 Ignition to the White wire of the Sea-Doo® in the same manner as the other wires.
2. Using a pair of wire cutters, cut the White wire that runs between the blue T-splice and the Sea-Doo® connector (see Figure 3). Cut the wire close to the blue T-splice. This will leave a pig tail on the Sea-Doo connector to reconnect the stock ignition if it becomes necessary.
3. Wrap black electrical tape over the cut end of the wire to protect it from shorting to any conductive surface.

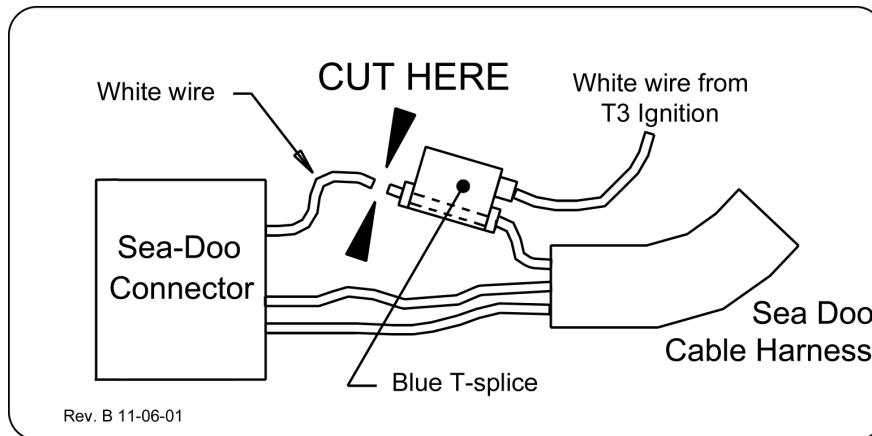


Figure 3

## Last Things Last

1. Remove the bolt from the the positive (+) battery terminal, then locate the Red wire previously routed to the battery. Slip the ring lug over the bolt's shaft and reinstall the bolt with ring lug in the battery terminal.
2. Reconnect the battery cable removed at the beginning of this installation procedure.
3. Perform the Crank Position Sensor procedure that follows in the next section.

**Attention! Severe engine damage may occur.**

**Do not attempt to start the engine until you have properly set the Timing Correction Switches and selected the correct Advance Curve.**

If you have any questions or comments, please contact us by phone, FAX or E-Mail.  
Be sure to reference the year and model of your Sea-Doo®.

# Crank Position Sensor Calibration Procedure

**Caution:** Severe engine damage is possible if this procedure is not properly completed.

**Engine Timing Overview:** The Sea-Doo RAVE engine is built with excessive tolerance in the positioning of its ignition pulser coil. The pulser coil must be correctly positioned relative to the piston to achieve accurate ignition timing. Otherwise, poor engine performance or engine damage may result.

The ignition trigger sensor in the RAVE engine can be as much as 4° retarded to 3° advanced from the correct setting.

## Setting the Timing Correction Switches

### Using a Timing Light to Determine Timing Correction Value

Calibrating the engine timing must be performed when the T3 ignition is installed on any model Sea Doo. If this procedure is not performed correctly, severe damage can result.

**Note:** If you do not have the required tools or are not confident in performing the procedure as outlined, please consult your local dealer or other qualified person for assistance.

### Tools Required:

#### Tools you supply

- 12mm wrench
- 13mm wrench
- Spark plug wrench
- Tachometer (if boat is not equipped with one)
- TDC dial gauge
- Timing Light

#### Tools supplied with Ignition

- Pointer tool
- Alcohol wipes
- Timing calibration tape

### Set Ignition timing correction

1. Set the timing correction switches to the most retarded timing calibration, as shown in Figure 1x.
2. Set the Curve Selector to curve 1 (stock, pump gas), Sw 1 & 2 OFF.

### Setup the Engine for Timing Measurement

1. Remove the two breather hoses just forward of the gas tank along with the accompanying grommets used to hold them in place in the hull.
2. Remove the black or gray plastic drive shaft safety cover from the rear of the engine. There is a drive shaft 'hanger' bolted to the bottom of the safety cover. This hanger bracket must be removed first. Locate the two 12mm bolts, one on each side. Remove these bolts and lift out the hanger.
3. Remove the two 13mm bolts and flat washers, one on each side of the safety cover. Remove the cover and set it aside.

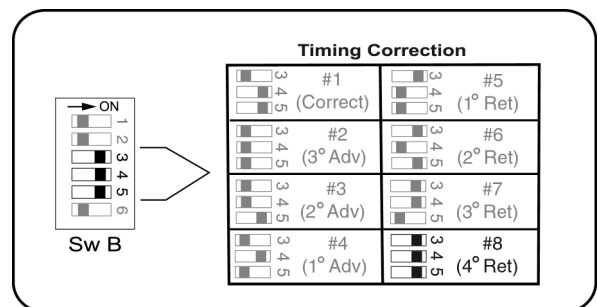


Figure 1x

4. Remove both spark plugs. Ground the spark plugs case so they will spark when the engine turns over. Failure to do this will cause damage to the ignition coils.
5. Using a dial gauge, insert it into either spark plug hole and locate Top Dead Center (TDC). **DO NOT** use the starter motor to turn the engine. Manually turn the power take off (PTO) that is exposed in step 1. Leave the dial gauge in place.
6. Using the alcohol wipe provided, clean the top area of the PTO's outer edge between the 10 and 2 o'clock positions.
7. Using a highlighter pen highlight the 25° mark on the timing tape so it can be easily distinguished during the tests.
8. Remove the backing paper from the Timing Calibration Tape and fasten it to the area just cleaned. The arrow on the chart must point in the counter clockwise direction when viewed from the rear of the engine toward the front. Be sure the 0.0° mark (TDC) on the tape is positioned near the top center, 12 o'clock position of the PTO. Note: the timing tape can be lifted and repositioned if required.
9. Insert the nylon 'jam washer' into the 1/4" hole in the rear engine mount. This hole is located directly above the 12 O'clock position of the PTO.
10. Insert the short end of the pointer tool bracket into the jam washer. Apply firm pressure to the bracket until it is inserted completely into the nylon jam washer. The bracket is properly inserted when it comes to rest on the head of a cap bolt directly beneath the jam washer.
11. Slide the pointer along the bracket until it is precisely aligned with the 0.0° (TDC) mark on the timing tape. Next, rotate the pointer downward so it is close but not touching the timing tape. This reduces the parallax error.
12. Repeat step 5 and confirm that the pointer is at TDC on the tape. Readjust the pointer as required.
13. Remove the dial gauge and reinstall the spark plugs and plug wires.
14. Attach a timing light per its operating instructions.  
**Note:** Make sure the timing light is attached to the spark plug of the cylinder you're using to find TDC.

### Measure and Calibrate Engine Timing

The timing tape displays crankshaft angles from TDC 20° in through 35° in 1.0° increments.

1. Set the ignition to Curve #1 by turning switches 1 and 2 OFF on Switch block B.
2. Refer to the Timing table sheets that were supplied with your ignition. Determine the timing at 3000rpm from curve #1.
3. Using a highlighter pen highlight the value from step 2 on the timing tape so it can be easily distinguished during the tests.
4. Start the engine (**Do not rev it past 5000rpm since it could cause damage to your engine**).
5. Adjust the idle screw to set the engine RPM close to 3000 RPM.
6. Using a timing light, determine how many degrees advanced or retarded your engine as compared to the highlighted value on the timing tape. Stop the engine. Example: 24° highlighted, 26° measured. The result is 2° advanced.

**NOTE:** On all models except the GTX-L sight through one of the holes used by the vent tubes to get a clear view of the timing tape and pointer.

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