



# Installation and Troubleshooting Guide



This installation is to be completed by an Authorized Dealer or Professional Service Technician. For questions regarding installation or warranty, call CDI Tech Support at 866-423-4832. Do not return to the Dealer or Distributor where the part was purchased. Contact CDI Electronics Directly for Return Material Authorization.

## CDI P/N: 114-4953

This Switchbox replaces these P/N's: 18495A10, A12, A18, A19, A26, and 18-5790.

**Warning! This product is designed for installation by a professional marine mechanic. CDI cannot be held liable for injury or damage resulting from improper installation, abuse, neglect, or misuse of this product.**

### How to test the Engine Stop Circuit (Kill) for DC Voltage:

1. DC voltage present on the kill circuit of the Switchbox due to a faulty key switch, boat harness, or engine harness will severely damage the Switchbox's internal kill circuit. Connect a Digital Multi Meter to the Ignition Stop wire(s) AT THE SWITCHBOX(S) while disconnected from the Switchbox in reference to a known good engine ground. Turn the Ignition switch on and off several times. If, at any time, you see over 2 VDC on the kill wire(s), there is a problem with one or both harnesses and/or the Ignition switch. The Ignition Stop wire should not be connected back to the new Switchbox at any point until the problem is corrected **OR DAMAGE TO THE SWITCHBOX WILL OCCUR!**

## INSTALLATION

1. Disconnect the Negative battery cable.
2. Check and clean all battery terminals and engine grounds.
3. Label the position of the Green, Green/White, and Green/Red Primary wires for each cylinder before removing the wires for the Ignition coils! These engines used a variety of different firing orders and the firing order for your engine will not be notated anywhere on your engine nor the service manual.
4. Remove the wires from the Switchbox.
5. Unbolt and remove the old Switchbox, saving the original bolts and nuts.
6. Install the new Switchbox using the original bolts and nuts.
7. Connect the black ground wire to engine ground and the remaining wires to the new Switchbox as they were on the old Switchbox (If the old Switchbox did not have any wires connected to the red terminal, do not connect any wire to the Red terminal on the new Switchbox). The second black/yellow wire is for use with the rev limiter (if equipped).
8. Reconnect the Negative battery cable.

## TROUBLESHOOTING

### NO SPARK ON ANY CYLINDER:

1. Disconnect the Black/Yellow (or Orange) stop wire AT THE SWITCHBOX and retest. If the engine's Ignition now has spark, the stop circuit has a fault. Check the key switch, harness, and shift switch (if present).
2. Disconnect the Yellow wires from the Stator to the Regulator/Rectifier and retest. If the engine has spark, replace the Regulator/Rectifier.
3. Check the cranking RPM. A low cranking speed may not allow the system to spark properly. This can be caused by a weak battery, dragging starter, bad battery cables, or a mechanical problem inside the engine.
4. Inspect and clean all engine and Ignition ground connections.



# Installation and Troubleshooting Guide



This installation is to be completed by an Authorized Dealer or Professional Service Technician. For questions regarding installation or warranty, call CDI Tech Support at 866-423-4832. Do not return to the Dealer or Distributor where the part was purchased. Contact CDI Electronics Directly for Return Material Authorization.

5. Check the Stator resistance and DVA as given below:

### Black Stator using Flywheel with Bolted-in Magnets

Read from	Read to	OEM Ohms	CDI Ohms	DVA (Connected)	DVA (Disconnected)
Blue (Low Speed Coil)	Engine Gnd	5.8-7.0K $\Omega$	2.0-2.4K $\Omega$	180-400 V	180-400 V
Red (High Speed Coil)	Engine Gnd	135-165 $\Omega$	45-55 $\Omega$	25-100 V	25-100 V

### Black Stator using Flywheel with Glued-in Magnets

Read from	Read to	OEM Ohms	CDI Ohms	DVA (Connected)	DVA (Disconnected)
Blue (Low Speed Coil)	Engine Gnd	3.25-3.65K $\Omega$	488-662 $\Omega$	180-400 V	180-400 V
Red (High Speed Coil)	Engine Gnd	75-90 $\Omega$	28-32 $\Omega$	25-100 V	25-100 V

### Red Stator Kit

Read from	Read to	OEM Ohms	CDI Ohms	DVA (Connected)	DVA (Disconnected)
White/Green (Stator)	Green/White	500-700 $\Omega$	400-550 $\Omega$	180-400 V	180-400 V
Blue (Adapter Module)	Engine Gnd	Open	Open	180-400 V	180-400 V

6. Check the DVA on the Black/Yellow kill wires coming out of the Switchbox. You should have a reading of at least 150 DVA or more. The Stator and Trigger should be connected to the Switchbox for this test. If you do not, check the DVA on the Stator and the Trigger. If the DVA on the Stator and Trigger but the DVA on the Black/Yellow Kill wires coming out of the Switchbox is low, the Switchbox is likely faulty.
7. Check the Triggering and Charge coil flywheel magnets for cracked, broken, or loose magnets.

## NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

1. Check the Trigger resistance and DVA as given below:

Read from	Read to	Ohms	DVA (Connected)	DVA (Disconnected)
Brown (Trigger)	White/Black (or Black) (Trigger)	0.8-1.4K $\Omega$	4 V Minimum	4 V Minimum (*)
White (Trigger)	White/Black (or Black) (Trigger)	0.8-1.4K $\Omega$	4 V Minimum	4 V Minimum (*)
Purple (Trigger)	White/Black (or Black) (Trigger)	0.8-1.4K $\Omega$	4 V Minimum	4 V Minimum (*)
Brown (Trigger)	Engine Gnd	Open	1 V Minimum	-
White (Trigger)	Engine Gnd	Open	1 V Minimum	-
Purple (Trigger)	Engine Gnd	Open	1 V Minimum	-

(\*) This reading can be used to determine if a Switchbox has a problem in the Trigger circuit. For instance, if you have no spark on one cylinder and the Trigger's DVA reading for that cylinder is low, disconnect the Trigger wires and check the DVA again. If the reading stays low, the Trigger is more than likely bad. If the reading is now within specification, the Switchbox is more than likely bad.

2. Check the DVA on the Green wires from the Switchbox while connected to the Ignition coils. Check the reading on the Switchbox terminal AND on the Ignition coil terminal. You should have a reading of at least 150 DVA or more at both terminals. If the reading is low on one cylinder, disconnect the Green wire from the Ignition coil for that cylinder and reconnect it to a Pack Load Resistor. Retest. If the reading is now good, the Ignition coil is likely bad. A continued low reading symptom indicates a bad Switchbox.
3. If the cylinders are only misfiring above an idle, connect an inductive tachometer to all cylinders and try to isolate the problem cylinders.
4. Swap the wires on the Switchbox as shown below. If the miss or no fire problem moves to another cylinder, replace the Switchbox. If it stays on the same cylinder(s), retest the Trigger and check the Ignition coils ferrite core for cracks or broken cores (dismount the coils and carefully slide the coils out of the holder to expose the rubber boot covering the side opposite end of the coil from the sparkplug wire. If the dark grey ferrite core is damaged, replace the coil.
1. Swap the Green Coil Wire with the Green/Red Coil Wire
  2. Swap the Green/White Coil Wire with the Green/Black Coil Wire
  3. Swap the Purple Trigger Wire with the Brown Trigger Wire
  4. Swap the White Trigger Wire with the White/Black (or solid Black) Trigger Wire
5. Check the Trigger and Stator coil flywheel magnets for cracked, broken, or loose magnets.

## SWITCHBOX OR TRIGGER REPEATEDLY BLOWS ON SAME CYLINDER:

1. Check the Trigger wires for shorts to engine ground as a shorted Trigger wire can destroy a SCR inside the Switchbox.
2. In contrast, a shorted SCR inside the Switchbox can destroy a Trigger coil. Check the Trigger resistance and DVA (see **NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS**).
3. Replace the Ignition coil on the cylinder dropping spark.



# Installation and Troubleshooting Guide



This installation is to be completed by an Authorized Dealer or Professional Service Technician. For questions regarding installation or warranty, call CDI Tech Support at 866-423-4832. Do not return to the Dealer or Distributor where the part was purchased. Contact CDI Electronics Directly for Return Material Authorization.

## ENGINE WILL NOT STOP (KILL):

1. Disconnect the Black/Yellow (or Orange) wire(s) at the Switchbox. Connect a jumper wire to the stop wire from the Switchbox and short it to engine ground. If this stops the Switchbox from sparking, the stop circuit has a fault. Check the key switch, harness, and shift switch (if present). If this does not stop the Switchbox from sparking, replace the Switchbox. Repeat the test as necessary for any additional Switchboxes.

## WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Disconnect the Yellow wires from the Stator to the Regulator/Rectifier and retest. If the engine now has good spark, replace the Regulator/Rectifier.
2. Connect a DVA meter between the Stator's Blue wire and engine ground. Run the engine up to the RPM where the problem is occurring. The DVA should increase with RPM. A sharp drop in DVA right before the problem occurs usually indicates a bad Stator. (Read from Blue wire out of the Adapter Module to engine ground if the engine has a Red Stator kit installed).
3. Connect a DVA meter between the Stator's Red wire and engine ground. The DVA should show a smooth climb in voltage and remain high through the RPM range. A reading lower than on the Blue wire reading indicates a bad Stator.
4. Connect an inductive tachometer to each cylinder in turn and try to isolate the problem. A single cylinder dropping spark will likely be a bad Switchbox or Ignition coil. All cylinders not sparking properly usually indicates a bad Stator.
5. Perform a high-speed shutdown and read the spark plugs. Check for water. A crack in the block can cause a miss at high speed when the water pressure gets high, but a normal shutdown will mask the problem because the water will evaporate off the spark plug before you can identify it.
6. Check the Trigger and Stator coil flywheel magnets for cracked, broken, or loose magnets.

## MISS AT ANY RPM:

1. Disconnect the Yellow wires from the Stator to the Regulator/Rectifier and retest. If the miss clears up, replace the Regulator/Rectifier.
2. In the water or on a Dynamometer, check the DVA on the Green wires from the Switchbox while connected to the Ignition coils. You should have a reading of at least 150 DVA or more, increasing with engine RPM until it reaches 300-400 DVA maximum. A sharp drop in DVA right before the miss becomes apparent on all cylinders will normally be caused by a bad Stator. A sharp drop in DVA on less than all cylinders will normally be the Switchbox or Trigger.
3. Connect an inductive tachometer to each cylinder in turn and try to isolate the problem. A high variance in RPM on one cylinder usually indicates a problem in the Switchbox or Ignition coil. Occasionally, a Trigger will cause this same problem. Check the Trigger DVA (see **NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS**).
4. Perform a high-speed shutdown and read the spark plugs. Check for water. A crack in the block can cause a miss at high speed when the water pressure gets high, but a normal shutdown will mask the problem because the water will evaporate off the spark plug before you can identify it.
5. Check the Trigger and Stator coil flywheel magnets for cracked, broken, or loose magnets.
6. Rotate the Stator one bolt hole in either direction and re-test. If the miss is gone, leave the Stator as is. If the miss is worse, rotate the Stator back where it was.

## WILL NOT IDLE BELOW 1500 RPM:

1. Check the Bias resistance from the Black/White **terminal** (wire disconnected) on the Switchbox to engine ground. Reading should be 13-15K  $\Omega$ .
2. Check the Stator and Trigger Resistance and DVA (see **NO SPARK ON ANY CYLINDER**).
3. Check for air leaks.

## ALL CYLINDERS HAVE SPARK BUT ENGINE WILL NOT RUN:

1. Disconnect the White/Black wire and check the Bias circuit (White/Black terminal) resistance in reference to engine ground. Readings should be approximately 13-15K  $\Omega$ . A shorted Bias circuit can advance the ignition timing as high as 40° above the set point.
2. If the Bias readings are correct on the Switchbox, index the flywheel and check timing on all individual cylinders. If the timing varies, either the Switchbox or the Trigger could be faulty. Also, check the center hub Triggering magnet on the flywheel for damage or movement.
3. Check the firing order. Remember there are at least 4 different firing orders for these engines. Connect the Green wires to the Ignition coils to match the firing order.