



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: 114-4952A30

This unit replaces the 18495A 9, A14, A16, A17, A20, A21, and A30 Switchboxes.

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

This engine has a locked Trigger arm. The timing is controlled by the Switchbox and varies according to the engine RPM. RPM limiting is done by retarding the timing at high RPM. Timing adjustment must be done when installing either a Switchbox or a Trigger.

PLEASE USE THE OEM RECOMMENDED SPARKPLUG NGK BPZ8H-N-10.

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

- 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

- Disconnect the Negative battery cable (if equipped).
- Disconnect all wires connected to the old Switchbox along with the Green Primary wires connected to the Ignition coils.
- Unbolt and remove the old Switchbox.
- Bolt the new Switchbox on, using the original bolts.
- Connect the Brown/Yellow and Brown/White wires to the Trigger by matching the wire colors.
- Connect the 3 pin connector to the Stator connector.
- Connect the Green/Yellow Primary wire to the #1 Ignition coil.
- Connect the Green/White Primary wire to the #2 Ignition coil.
- Connect the Black ground wire to a clean engine ground and verify continuity using a multi meter.
- Connect the Black/Yellow kill wire to the Black/Yellow kill wire from the engine or stop button harness.
- Reconnect the Negative battery cable (if equipped).
- Verify engine timing using the service manual for your engine before putting the engine back into normal operation.

TROUBLESHOOTING

NO SPARK ON EITHER CYLINDER:

- Disconnect the Black/Yellow stop wire AT THE SWITCHBOX and retest. If the engine now has spark, the stop circuit has a fault. Check the key switch and harness (if equipped).
- Check the cranking RPM. A cranking speed of less than 250 RPM 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.
- Inspect and clean all engine and ignition ground connections. Make sure the Switchbox and Ignition coils are grounded.
- Verify the Flywheel only has 2 outer magnets not 4 magnets. The newer ignition system has a 4 magnet Flywheel and uses a 114-5713 Switchbox and Stator with the White/Green & Green/White wires.
- Check the Stator and Trigger as follows:

Read from	Read to	OEM Ohms	CDI Ohms	DVA Connected	Disconnected
Blue (Low speed Stator)	Black (Stator ground)	2900-3500 Ω	1900-2400 Ω	180 V Minimum	180 V Minimum
Red (High speed Stator)	Black (Stator ground)	100-180 Ω	200-250 Ω	25 V Minimum	25 V Minimum
Brown/Yellow (#1 Trigger)	Brown/White (#2 Trigger)	650-850 Ω	-	4 V Minimum	4 V Minimum
Brown/Yellow (#1 Trigger)	Engine Ground	Open	Open	1 V Minimum	-
Brown/White (#2 Trigger)	Engine Ground	Open	Open	1 V Minimum	-

- Check the DVA on the Black/Yellow kill wire 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 wire coming out of the Switchbox is low, the Switchbox is likely faulty.

CDI Electronics, LLC • 353 James Record Road SW • Huntsville, AL 35824 USA

Web Support: www.cdielectronics.com • Tech Support: 1-866-423-4832 • Order Parts: 1-800-467-3371

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7. 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 minimum 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.
8. Check the flywheel magnets for cracked, broken, or loose magnets.

NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. Disconnect the Black/Yellow stop wire AT THE SWITCHBOX and retest. If the engine now has spark, the stop circuit has a fault. Check the key switch and harness (if equipped).
2. Check the Stator and Trigger DVA and Resistance (See **NO SPARK ON EITHER CYLINDER**).
3. Check the DVA on the Green Primary 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 V minimum at both places. If the reading is low on one cylinder, disconnect the Green Primary wire from the Ignition coil for that cylinder and connect it to a Pack Load resistor. Retest. If the reading is now good, the Ignition coil is likely bad. A continued low reading indicates a bad Switchbox or low Trigger DVA for that cylinder. Test Trigger DVA and Resistance (See **NO SPARK ON EITHER CYLINDER**).
4. Check the Ignition coil's primary resistance from the Positive (+) terminal to the Negative (-) terminal. You should read 0.02-0.04 Ω . If out of specification, replace the Ignition coil.
5. Check the Ignition coil's secondary resistance from the sparkplug wire to engine ground. You should read 0.8-1.1 K Ω . If out of this range, replace the Ignition coil.
6. Connect an inductive tachometer to each cylinder and compare the RPM readings at the RPM where the problem is occurring. If only one cylinder is dropping out, swap the Ignition coil locations and retest. If the problem follows a coil, replace the coil. If it stays on the same spark plug, either the Switchbox or Trigger is faulty. Test Trigger DVA and Resistance (see **NO SPARK ON EITHER CYLINDER**).

ENGINE WILL NOT STOP (KILL):

1. Check the kill circuit in the Switchbox by using a jumper wire connected to the Black/Yellow wire coming out of the Switchbox and shorting it to ground while the engine is running. If this kills the engine, the kill circuit in the harness or on the boat is defective. If not, the Switchbox is defective

HIGH SPEED MISS:

1. Check the DVA of the Stator from the Red wire to the Black wire while running the engine. It should show a smooth rise in voltage as the RPM rises. If there is a sudden or fast drop in voltage right before the miss becomes apparent, the Stator is usually at fault.
2. Verify the correct spark plugs are installed. OEM calls for a BP8H-N-10 or BPZ8H-N-10. If the BP8H-N-10 spark plugs are installed, try the BPZ8H-N-10 spark plugs.
3. If there is no indication of the problem, it could be a small water leak in one or both cylinders. Perform a high speed shutdown and read the sparkplugs.

BOTH CYLINDERS HAVE SPARK BUT THE ENGINE WILL NOT RUN:

1. Check the flywheel shear key.
2. Index the flywheel and check timing on both cylinders. If the timing is off, check the Trigger and flywheel.
If one of the Trigger wires is shorted, the timing may not advance on ONE cylinder, but the other cylinder will advance.
3. Check the idle screw adjustment set point. If set too low, the engine will not run.
4. Check the idle air/fuel mixture set point. If out of adjustment, the engine will not run.
5. Check the Fuel pump diaphragm for a pin hole. It could be leaking fuel into the intake and have too rich of an air/fuel mix.

ENGINE LOW ON POWER OR TIMING WILL NOT ADVANCE WITH ENGINE RPM:

1. Verify the ignition timing is advancing from 3-5° BTDC at idle to approximately 28° BTDC at 3000 RPM.
The timing will retard slightly from 28° BTDC at 3000 RPM to 25° BTDC at 5500 RPM, dropping down to 15° Degrees BTDC between 5800-6200 RPM.
2. Index the flywheel and check timing on both cylinders. If the timing is off, check the trigger and flywheel.
If one of the Trigger wires is shorted, the timing may not advance on ONE cylinder, but the other cylinder will advance.

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. Check the Trigger resistance and DVA (see **NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER**).
3. Replace the Ignition coil on the cylinder dropping spark.

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WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect a DVA meter between the Stator's Blue and Black wires. Run the engine up to the RPM where the problem is occurring. DVA voltage should increase with RPM. A sharp drop in DVA right before the problem occurs usually indicates a bad Stator.
2. Connect a DVA meter between the Stator's Red and Black wires. The DVA should show a smooth climb in voltage and remain high through the RPM range. A reading lower than the Blue wire reading usually indicates a bad Stator.
3. 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 or Switchbox.
4. Perform a high speed shutdown and read the spark plugs. Check for water. A crack in the block or a leaky exhaust plate gasket can cause a miss at high speed when the water pressure gets high, but a normal shutdown will mask the problem.
5. Check the Trigger and Stator charge coil flywheel magnets for cracked, broken, or loose magnets.

MISS AT ANY RPM:

1. Disconnect the Yellow wires from the Stator to the Rectifier (if equipped) and retest. If the miss clears, replace the Rectifier.
2. In the water or on a Dynamometer, check the DVA on the Green Primary 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 300-400V 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, Ignition coil, or Trigger. Check the Trigger DVA (see **NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER**).
4. Perform a high speed shutdown and read the spark plugs. Check for water. A crack in the block or a leaky exhaust plate gasket can cause a miss at high speed when the water pressure gets high, but a normal shutdown will mask the problem.
5. Check the Trigger and Stator charge coil flywheel magnets for cracked, broken, or loose magnets.