INSTRUCTIONS FOR C. H. IGNITIONS

Your C. H. Capacitive Discharge Ignition system can be installed on most single or twin cylinder, two or four stroke engine.

THESE INSTRUCTIONS ARE IN THREE PARTS
- The battery
- Installing the ignition and engine in your plane
- Troubleshooting
- Timing with printable timing degree wheel link

These instructions are only for the ignition systems. If you ordered an ignition with a T.C.S.A. or a Synchro spark, follow the instructions that came with them for correct installation.

SAFETY NOTE: The ignition can fire one time when the switch is turned off or on. Stay clear of the prop when turning the ignition off or on. If the engine would happen to be on compression, it could kick over.

BATTERY: Now that you have purchased the ign. module, you will need a good 4.8 volt battery pack 800 MA or larger. MAKE SURE YOU HAVE THE POLARITY CORRECT. Red wire is always positive and we always put the positive wire in the center of the Dean’s plug. If in doubt, check with a voltmeter; I have found new packs wired wrong. THE CENTER PIN on your radio plug is not always positive. Airtronics has the positive pin on the outside of the plug. THERE IS NO REVERSE PROTECTION on any of our systems now. While reversed polarity shouldn’t hurt the module, it could damage the sensor. Do not try and run the ignition off the same pack as the radio.

We send most of the modules out without switch harnesses or plugs. Any radio switch harness will work, just make sure you have battery polarity correct before turning on the switch. When in doubt, check it with a volt meter. Some radios have “plus” in the middle and some don’t. Keep all the wires as short as possible and as far from any part of the radio as you can.

We like to use a larger than 800 MA pack on the H.D. single or twin system. If weight is not a problem, use a 1200 MA or larger pack. If you use one of the larger packs, make sure you use a charger rated for the battery pack. You must be able to charge the pack at least 10% of its capacity. A 1200 MA battery needs a 120 MA charger. You cannot leave your 500 MA battery charger on for a longer time and get the pack fully charged.

We use a variable charger as you can set just the charge you want. If you get up in the morning and want to go fly and have not charged, you can crank up the rate for a couple of hours. A field charger is very handy too. Along with a proper charger, we couldn’t live without a good ESV. To check your battery pack you must use an Expanded Scale Volt meter with a 500 MA load. Sometimes we have as many as 8 aircraft at the field at one time. It is hard to keep track of all these battery packs. The Ace Voltmaster works very well.

INSTALLING THE IGNITION IN YOUR PLANE

1. Wrap the ignition module in foam, just as you do a receiver. We usually put the module in a plastic baggie before wrapping in foam. Protect from vibration. I have been asked if it is OK to mount the ignition module on the front of the firewall ... beside or below the engine. This is fine but you do need to protect the module from fuel and vibration. I put a couple of cup hooks in the firewall and then place a 1/2" thick piece of foam under the module. The unit is held to the firewall by rubber bands ... simple but effective. Our big engines shake a lot. You MUST protect, the module. Please don’t use Super Glue or RTV to glue the module solid to the airframe.

2. Use a good 4.8 volt battery pack; don’t use an old klunker from an old flight-pack. The majority of the problems with the ignition system are caused by bad or undercharged battery packs. Use a charger
rated for the battery pack. Test with a load tester (ESV).

3. Keep the ignition module, ignition battery, switch and the charging jack as far away from the receiver, receiver-battery-pack, and the receiver battery switch as possible. Keep all wires on the ignition as short as possible.

4. Do not use a metal push rod to the engine throttle or steerable nose wheel. Do not use a metal throttle cable, even if it has nylon ends.

5. Mount the throttle servo at least 8” from the engine.

6. On the H.D. system with the ground pigtail, do not solder a ground terminal lug to the shielded pigtail ... crimp this on. Solder will flow up the lead and then it cannot flex, causing possible breakage. If this ground lead comes off, the engine usually will continue to run, which may cause interference to the radio. The best method is to use a hose clamp and clamp the ground braid to the spark plug hex. DO NOT attach the ground wire to a carb mounting bolt. Some of these bolts just go into a fiber block and are not grounded.

If you want to remove the Bosch cover to get the spark plug wire through a hole in the airframe, unsolder the ground from the Bosch cover and unscrew the cover from the wire. If the cap doesn’t unscrew easily you may have to heat it with a monokote gun to soften the sealant. After you have installed the ignition in the airplane, use a new piece of heat shrink on the plug wire, and screw the cover back on. The cover should be screwed on about four turns. If you want to remove the rubber boot, reach up into the boot with a small screwdriver and push the spring terminal back out of the boot. Use some lube on the spring to help get it back into the boot. You MUST protect the spark plug lead from chaffing. A fiberglass cowl can cut the plug wire in just one flight. Use a piece of vacuum hose or a grommet to protect it.

7. Make sure that none of the wires from the module or battery pack are routed where they may pass over a sharp bulkhead, or are pinched where vibration could cause them to rub through the insulation. This could cause a fire in your airplane. It could happen with radio equipment also I nearly lost my Laser with a short in the battery pack wires, so beware.

8. Range check your radio with the engine off and then running. There should be less than a 15% decrease in range with the engine running.

OTHER SUGGESTIONS

1. If you are in a high humidity area, use some Silicone dielectric grease on the spark plug and cap to prevent “arc over” onto the spark plug.

2. If you are running your engine inverted, run the engine as dry as you can on fuel when shutting down for the day. Store the airplane with the engine upright if possible. If you can’t store with the engine upright, remove the spark plug for storage.

3. Do not install a micro switch on top of a servo as a radio operated kill switch and run wires ahead to the ignition. If you want to use a micro switch for a kill switch (a good idea) or smoke pump, use an Ace switch box and a Ny rod to operate it.

If all else fails, read the instructions and trouble shooting guide one more time. If you still have a problem, give us a call. We are not always in the shop or office. Keep trying.

HINTS AND TROUBLE SHOOTING FOR ALL ENGINES WITH C & H IGNITION SYSTEMS

1. The number 1 problem is still with the battery. Check battery pack voltage with a good load tester. (We use the Ace Voltmaster.) Check the battery pack voltage with an ESV. Then check voltage at the center pin of the female 3-pin Deans plug coming out of the module. It’s red, white, black. Unplug the pulse switch from the module sensor switch, then switch “on.” of course! This should be the same as battery pack voltage. If the voltage is OK here, the battery pack and switch are OK. If no voltage appears, make sure the battery and switch are wired correctly.

2. With the ignition switch on, ground the white wire on the female 3 pin Deans plug (same plug as
When you break this ground, the ignition should fire the plug. If it does, then the problem is the pulse switch or the magnet reversed... check the pulse switch or replace it with a known good one.

3. The black end of the magnet must go toward the pulse switch. If up to this point everything checks OK, “flag” the pulse with the other end of the magnet or use another magnet. Just pass the magnet back and forth past the pulse switch. We could have marked the magnet wrong. If this check makes the system fire, then the magnet must be turned around.

4. It is normal to hear a spark fire inside the module case if you trigger the ignition with the spark plug wire removed and not grounded. Do not do this unnecessarily. If you get a double spark once as the magnet approaches and once when it leaves the pulse switch, then the battery is bad or needs recharging.

5. If after making the above tests you do not have a spark... send the module to us for repair or replacement. I would like to have the battery pack switch harness and pulse switch also, if possible. If the system came from an engine manufacturer, send it directly to C & H for repair. If the system is under 90 days old it will be repaired or replaced under warranty.

6. Make sure the chain saw type engines are using a resistor type spark plug.

7. The new McDaniel spark plug 1/4x32 cap is working very well and has just about stopped all complaints of R.F.I. The McDaniel plug caps go on the spark plug very hard at first. VERY IMPORTANT - With this cover you must push it over the hex on the spark plug and then turn it to lock it on the spark plug.

When all else fails... read the instructions. If after doing this you still cannot get a spark or get your engine to run right... do not fight it for days on end... or take it to your “local engine expert.” Give me a call. If we cannot figure it out over the phone, I will be happy to look at the complete set up and test run or test fly it if necessary (in season!)

**TIMING**

Now for the fun part. If you are installing a C.H. Ignition system with the CTC and are satisfied with the way your engine currently runs at full throttle, you will just need to lock your timing plate at the full throttle position.

The easiest way to lock the timing plate is to drill (#36 drill) into the side of the plate and tap for a 6/32 set screw. It is better to pull off the prop hub and timing plate to do this, but you don't have to. Just drill straight in until the drill bit touches the aluminum timing plate bushing. Now run in a bottoming tap in until it stops. Be careful and do not strip the threads. Now you tighten the set screw and material at the bottom of the hole will lock the timing plate.

If you would want to go back to the throttle coupled system you will have to remove the timing plate and clean things up as the timing plate will probably bind up even when you loosen the screw. You can use a bolt in place of a set screw. If you do not have a tap you can drill a hole and use a sheet metal screw. Just screw it in and lock the plate.

If your engine is set-up with a TCSA mechanical system or you need to set the timing for your CTC equipped engine just follow these steps to set timing.

To install the CTC module, just unplug the pulse switch and plug the CTC between the pulse switch and the ign box. The Deans plugs are correct for a C.H. Ignition. That is all there is to installing the CTC module.

If you have a C.H. Ignition module with the CTC built-in, just plug it in the same way you would an ignition for a TCSA equipped engine.
The CTC module or the complete ignition module can be wrapped in foam and tied down.

For an engine using TCSA, set the timing to 28-32 deg Before Top Dead Center (BTDC) at full throttle and 2-8 deg BTDC at idle. This is approximately 26 degrees of total movement. To adjust the amount of movement, move the push rod in or out on the bell crank. To adjust the timing, change the length of the pushrod.

For an engine using a CTC equipped ignition set the timing by at 28-32 degrees BTDC.

Most of the Sachs engine builders have settled on 30 degrees BTDC. Ask us about other engine recommendations. The setting depends somewhat on fuel altitude and outside temp.

The only way to set timing accurately is with a degree wheel.

A degree wheel print-out link is at the end of this page.

Buy a 6 inch protractor and a paper clamp at your local discount store. Drill the protractor for your prop shaft then cut out and glue the degree wheel to the protractor. You can also use a piece of lite-ply or whatever you have around the shop.

Attach a pointer to the clamp. Now you have a timing kit.

Mount the degree wheel to your engine crank shaft. Now all you have to do is find your engine's Top Dead Center (TDC).

You can do this with a piston stop or a dowel stuck down in the spark plug hole.

Here is another way I have found TDC for many years. Leave the spark plug in and bring the engine up on compression, let the compression bleed off, on some engines you may have to loosen the spark plug a little. You will notice you have about thirty degrees of free travel as the engine toggles back and fourth past TDC right in the center of this free travel is T.D.C. With the timing pointer clamped onto to a cyl head, set the degree wheel so that the free travel at TDC is equal on both
sides of zero on the timing plate.

We have found the average engine to have about 20 to 30 degrees of free travel, if there is more than this check your engine. Do this several time to make sure your pointer is on the zero mark when the engine is exactly on TDC.

Keep in mind the pointer and zero degrees do not have to be set at the top of the engine, this is only a reference.

Making sure you do not disturbed your timing pointer, put a spark plug in the plug cap, ground the plug, hook up the ignition and turn it on. Turn the engine over and make sure you have a spark at the plug. Turn the engine slowly and see when the ignition is firing. Set the correct timing by moving the timing plate.

**DO NOT RUN THE ENGINE WITH THE DEGREE WHEEL INSTALLED.**

Now set up and start your engine. Observe all Warnings and Safety Precautions and use a helper to restrain your airplane.

We should always wear a heavy glove when starting model engines, as we do not heal up as fast as we used to. Keep in mind any engine with the right (or wrong conditions) can hurt you.

Let your engine warm up and bring it up to full throttle and hold this setting for at least thirty seconds. You may have to set your carb a little richer on the low needle to get the correct throttle response. Now tach your engine at fun throttle. Record this figure.

If your R.P.M. is O.K Leave as is and go fly.

When you have your engine set where you want it check the timing with a degree wheel and record this for future reference.

If you want, we will set up your engine with the CTC and test run for best performance for $35.00 service charge plus handling. This is labor only and does not include any ignition or engine parts. If you send your engine, send the ignition system, battery pack and switch.

**Click here for printable timing degree wheel**

**CUSTOMER SERVICE**

If you should need service on your system for any reason, return it to the factory prepaid, with the following information. Your name, address (UPS), phone number (DAYS), copy of your sales slip or invoice, description of difficulty, and authorization to return C.O.D. or charge card (if not warranty) for repairs and handling. Send complete system (Module pulse switch, battery pack). Replacement parts are available from the factory, and any part can be replaced by the factory.

**LIMITED WARRANTY**

C&H ignitions and related parts are warranted to be free from defects in material and workmanship for a period of 90 days from the date of purchase.

Limitation warranty on engines or engine work done at our shop. The above warranty does apply to new ignition systems and related parts installed at the time we work on the engine.

This warranty does not cover any incidental or consequential damage or bodily injury caused by or resulting from a defect in material or workmanship or other equipment failure. This means that no responsibility is assumed for any damage or injury to any model or any other item or person involved.
in the use of this equipment. Parts under warranty must be returned postpaid to C&H and will be repaired or replaced at our option and returned postpaid.

**WARNING**

C&H ignition systems are designed and built for model airplane hobby use only. They are not designed for use in man-carrying vehicles, nor should they be used in any ultralight, paraplane or home built type aircraft. We assume no responsibility for damage or injury from the above use. Large engine-powered model airplanes are not toys. Keep children away and use extreme caution whenever flying or winning engines. Please read the safety report found in every Model Aviation Magazine.

Thank You, Bill Carpenter

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