OWNERS & USERS MANUAL

CVI-4 Electronic Ignition System

Contents

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LEGAL DISCLAIMER

DRINO products are non-certified aircraft components, and should therefore not be used on aircraft operating under a standard airworthiness certificate. The systems are intended for use on aircraft in the "experimental" category according to European Regulation 2018/1139 Annex I, point (c), or equivalent. The proper installation and operation of DRINO products is solely the responsibility of the owner and/or user of the aircraft to which the products are fitted. DRINO will not be liable for damage to property or personal harm, loss of income or anything else, due to incorrect use of DRINO products. Misuse of DRINO products can result in situations that may be hazardous and in the worst case, fatal.

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Thank you for choosing DRINO aircraft products.
We hope that you will be satisfied with your purchase and wish you many joyful hours of fun and safe flying!

Claus Vad
Founder

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PREFACE

1. Purpose

This manual describes the physical- and electrical characteristics and the installation requirements of the DRINO Electronic Ignitions System, and provides guidelines for installation, timing and operation of the system. Please read the entire manual before commencing installation and operation of the ignition system.

2. Scope

The document applies to the CVI-4 Electronic Ignition System Kits with control unit type CVI-4-V3.

3. Introduction

The CVI-4 is an Electronic Ignition system for normally aspirated 4-stroke combustion engines in GA-class aircraft. The applicable aircraft must be non-certified, e.g. their operation must be according to European Regulation 2018/1139 Annex I, point (c) or equivalent. Experimental aircraft fits this category.

The CVI-4 is for four-cylinder aircraft engines and requires a 12 volt nominal DC power supply able to deliver 1.5 amps of continuous current and 7 amps of peak current for 5 milliseconds.

The CVI-4 is triggered by a dual Hall-effect sensor, that requires triggering by permanent magnets from an engine interface, and must be triggered twice (once with a south-pole, and once with a north pole), per complete revolution of the engine crankshaft.

The system is operated using manual switches located within reach of the pilot-in-command, for powering the system, and for enabling/disabling the ignition coil, and by extension the sparks in the associated spark plugs.

The CVI-4 provides a status signal through an LED indicator, to be incorporated in the aircraft instrument panel. The indicator provides information of power- and operational state of the ignition system. The system can operate in normal state, but also has a build-in automatically engaging safety mode in case of sensor or trigger magnet fault.

For more information, see the chapter “Automatic Safety Mode”.

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DOCUMENT HISTORY

Revision	Revision Date	Remarks
01	21. October 2018	Initial Release
02	19. January 2025	General update of Illustrations
03	01. February 2026	Included UK Declaration of Conformity

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SYSTEM OVERVIEW

CVI-4 Ignition Controller

CVI-4 Dual Magnetic Sensor

Ignition Coil

High Quality Ignition Leads with caps

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Ignition Coil Harness

Auxillaries

LED Indicator, Heavy Duty Switches,

Trigger magnets, 10 A Fuse

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TECHNICAL SPECIFICATIONS

Specification	Characteristic	
Supply Voltage	Minimum	9.5 VDC
	Nominal	12 VDC
	Maximum	16 VDC
Max. Temperature	Controller	90 °C
	Sensor	90 °C
	Ignition Coil	150 °C
Min. Temperature	Controller	-15 °C
	Sensor	-15 °C
	Ignition Coil	-15 °C
Weights	Controller	325 g
	Ignition Coil	985 g
Operational Speed	Nominal	0 – 3000 RPM
	Maximum	5500 RPM
Current Consumption, Max.	Average	1.5 A
	Instantaneous	8 A
Sensor Gap Distance	Minimum	0.5 mm
	Nominal	1.0 mm
	Maximum	2.5 mm
Spark Plug Resistance	Minimum	3 kOhm
	Maximum	15 kOhm

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CONFIGURATION

The ignition system supports variable spark advance in discrete steps, based on engine RPM. This is to accommodate engines, where a lower ignition advance angle is desired for lower engine speeds.

Besides the cranking timing, there are 3 different speed intervals (LOW, MEDIUM & HIGH), for which the spark advance can be specified. The spark advance configuration is selected at ordering, and cannot be changed once manufacturing of the ignition controller is complete.
For this reason each controller unit may be uniquely configured, and means that the right of withdrawal is voided after purchase.

Range	Speed Interval	Spark Timing
CRANKING	0-400 RPM Fixed	5° after TDC Fixed
LOW	400-**[Low Setpoint]** RPM **(Configurable)**	**10°** to **35°** before TDC **(Configurable)**
MEDIUM	Range between Low Setpoint and HIGH Setpoint **(Slave)**	**10°** to **35°** before TDC **(Configurable)**
HIGH	**High Setpoint**-5500 RPM **(Configurable)**	**10°** to **35°** before TDC **(Configurable)**

If all three spark advance angles are set to e.g. 26° before TDC, the electronic ignition system will behave like a standard magneto with impulse coupling.

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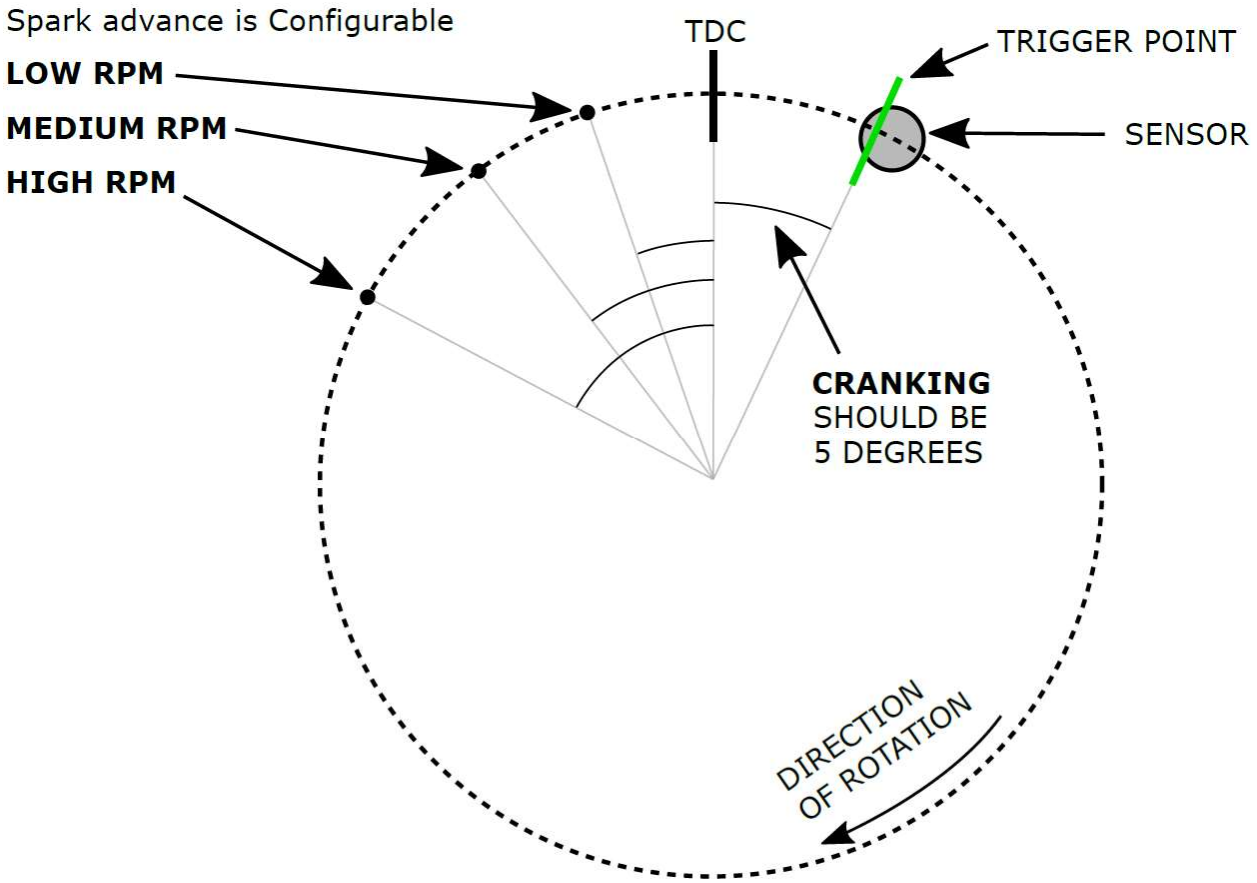

The speed intervals can be configured.

The spark advance angle can also be configured.

The actual engine speed will (via the intervals) determines what spark advance angle is used.

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WHAT IS IN THE BOX

QTY	DESCRIPTION
1	CVI-4 IGNITION CONTROLLER
1	IGNITION COIL
1	CVI-4 DUAL MAGNETIC SENSOR
1	CVI-4 IGNITION COIL HARNESS
1	CVI-4 POWER SUPPLY CABLE
4	IGNITION LEAD CABLES (INCL. CAPS)
1	FUSE HOLDER (INCL. 10A FUSE)
1	LED INDICATOR
2	HEAVY DUTY SWITCHES
2	NEODYMIUM MAGNETS
1	INSTALLATION AND OPERATION MANUAL (this document)

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INSTALLATION & TIMING

1. Preparation for installation

Make sure the electrical system of the plane is de-energized and that the magnetos of the plane are in the off-position.

Remove the magneto to be replaced, along with its harness and spark plugs. The P-lead for the magneto is not needed for the installation of the CVI-4 ignition system and can also be removed, if practical.

2. Install the CVI-4 Ignition Controller

The CVI-4 Ignition Controller is designed to be mounted on a plate, such as the firewall of the airplane. The ignition controller is not suitable for mounting directly on the engine due to high vibration loads.

- Make sure the mounting surface and fasteners can support the weight of the ignition controller on all load scenarios allowed for the airplane, such as approved positive- & negative G-loads.

- Make sure the fasteners for the ignition controller is secured from coming loose by using e.g. drilled bolts with castellated nut and cotter-pin or similar.

- Make sure there is sufficient space for the connectors and cable routing, avoiding bending cables or stressing connectors excessively.

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3. Install the Ignition Coil

The ignition coil is, like the controller, designed to be mounted on a plate, such as the firewall of the airplane.
The ignition coil can also be mounted directly on the engine, but special precaution must be taken to ensure the dimensioning of the mounting assembly can withstand the all loads it will be subjected to in its operational lifetime, such as extreme loads (G's) and vibration loads (fatigue).

- Make sure the surface and fasteners can support the weight of the ignition coil in all load scenarios allowed for the airplane, such as approved positive- & negative G-loads and vibration loads (fatigue).

- Make sure the fasteners for the ignition coil is secured from coming loose by using e.g. drilled bolts with castellated nut and cotter-pin or similar.

- Make sure there is sufficient room for connecting the ignition coil harness without bending or kinking the cables excessively.

- Make sure there is enough room for routing the HT leads away from the ignition coil towards the spark plugs.

  Note 1: The connectors for the ignition coil HT-leads have a 90-degree bend.

  Note 2: The ignition coil HT leads should be planned to be routed to the spark plugs without coming in close vicinity of other sensitive electrical wires and cabling due to radiated electrical noise emissions.

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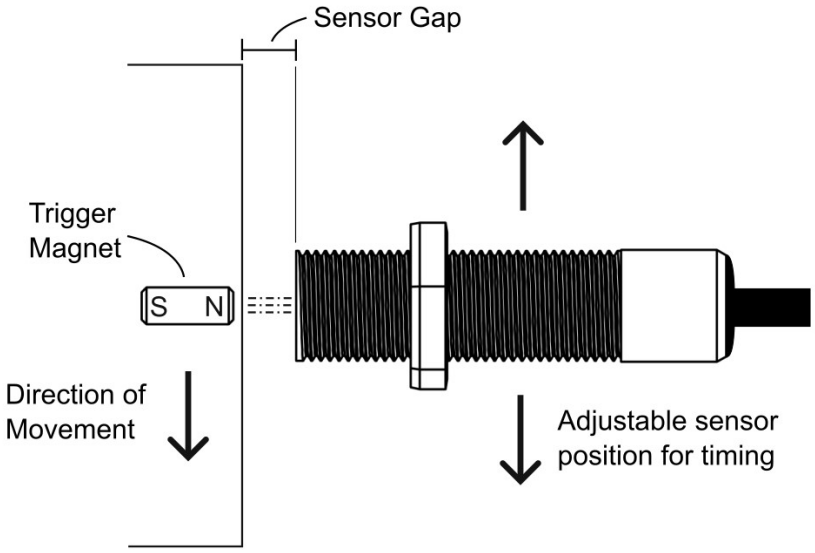
4. Install the Sensor & Trigger magnets

The CVI-4 Dual Magnetic Sensor has an M12x1.0 outer thread, making it suitable for mounting in a through-hole configuration. A suitable bracket must be fabricated to hold the sensor securely in place. The sensor must be positioned, so that the trigger magnets are axially aligned with the sensor, and facing the end of the sensor like depicted in below figure.



For timing purposes the bracket holding the sensor should be able to move a bit along the tangential direction of motion of the trigger magnets, and once the position of the sensor is right, it should be secured in place.

Note 1: After installation the sensor gap should be adjusted to compensate for a bit of play in the trigger magnet enclosing object. There should be 1 mm sensor gap at all times. The sensor should trigger successfully with a sensor gap as high as 4 mm, although maximum allowable gap is 2.5 mm.

Note 2: The sensor will be triggered before the magnet and sensor are axially aligned due to the nature of the magnetic field shape. See Section 7 about the timing procedure.

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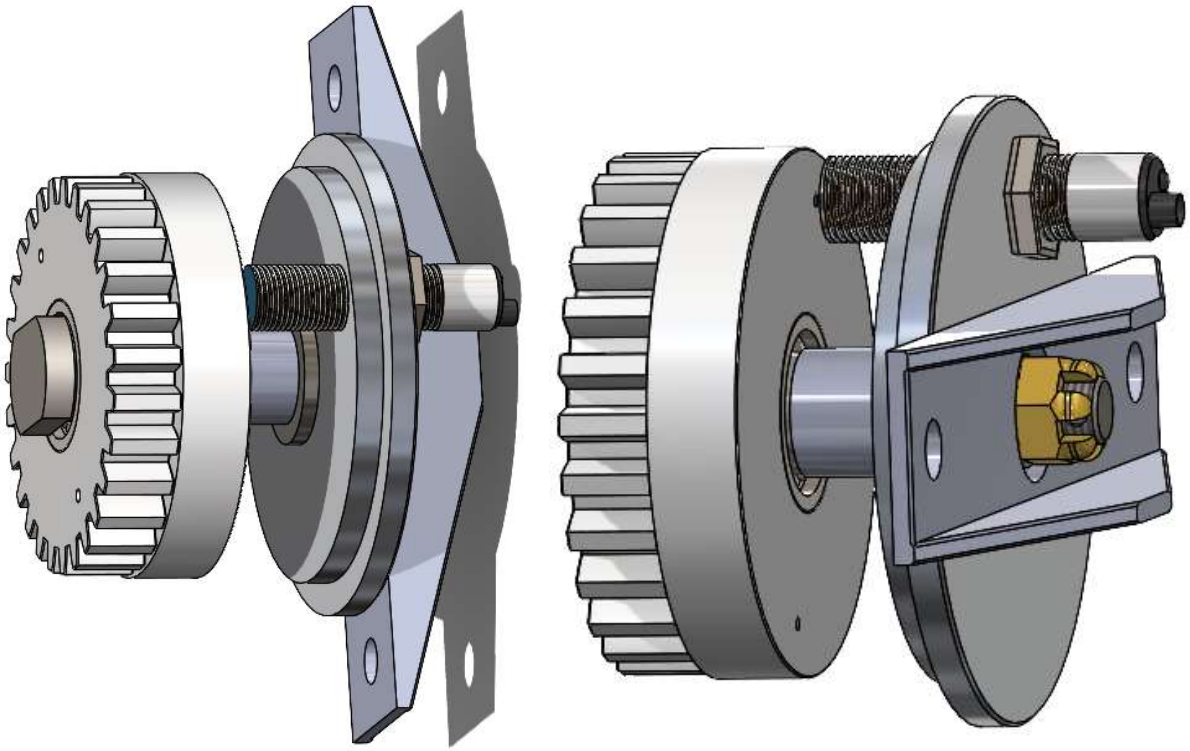
The two trigger magnets should be arranged so that the one trigger magnet has it south-pole facing the sensor, and the other has its north-pole facing the sensor.

The trigger magnets should be arranged 180 degrees apart in a secure enclosure that will perform one complete revolution per complete revolution of the engine crankshaft. See an example of the sensor triggering unit for a Lycoming engine magneto slot below.

Note 1: Various sensor triggering units, and alternators with integrated trigger magnets for common engine types are sold separately.
See www.drino.dk for available unit types.

Note 2: In case other magnets than the ones supplied with the system are used for sensor triggering, please make sure that they have minimum the same field strength as the magnets supplied with the system. Otherwise correct triggering of the sensor cannot be guaranteed.



Example sensor triggering arrangement for a Continental engine (with inpulse).
This accessory, along others can be bought separately on www.drino.dk

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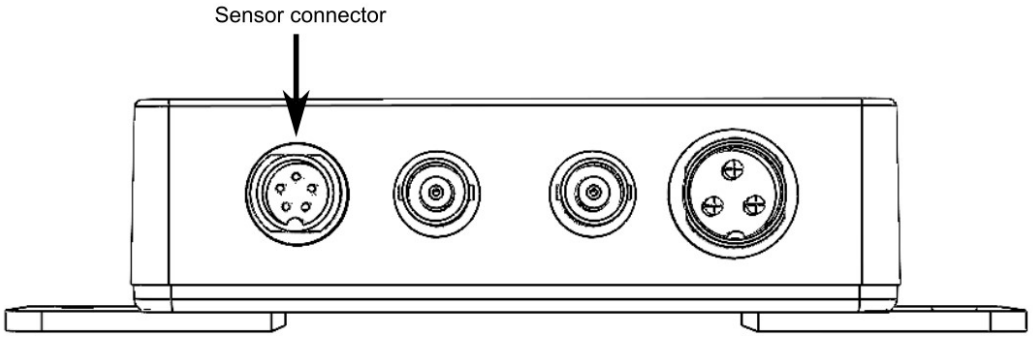
Route the sensor cable to the sensor connector on the CVI-4 Ignition controller, and secure it by tightening the connector gland.



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5. Install the Fuse, Power Supply Cable, Switches & LED indicator

First, make sure the battery power is disabled, and the switches to be installed are in the OFF position. See below:

Switch In the OFF position

The power supply cable has an outer insulation layer, a braided shield, and 3 conductors, with 1 & 2 having number-identification. See picture below.

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For this installation some extension wires may have to be fabricated.

Note: See the connection diagram in Appendix A as a supplement to below description of the installation.

The fuse holder and the 10 A Fuse should be installed to the positive terminal of the 12 VDC power source.

The downstream conductor of the fuse should be connected to the first switch, hereafter called the "Ignition Switch". The Ignition switch shall toggle the power for the ignition controller and for the second switch, called the "Coil Switch".

Downstream of the Ignition switch, the conductor numbered 1 of the power supply cable shall be connected.

The conductor numbered 2 and the cable shield shall be connected to common / ground.

The conductor that is green/yellow shall be connected to the positive terminal of the LED Indicator.

The power supply cable shield shall be connected to common / ground.

The negative terminal of the LED Indicator shall be connected to common / ground.

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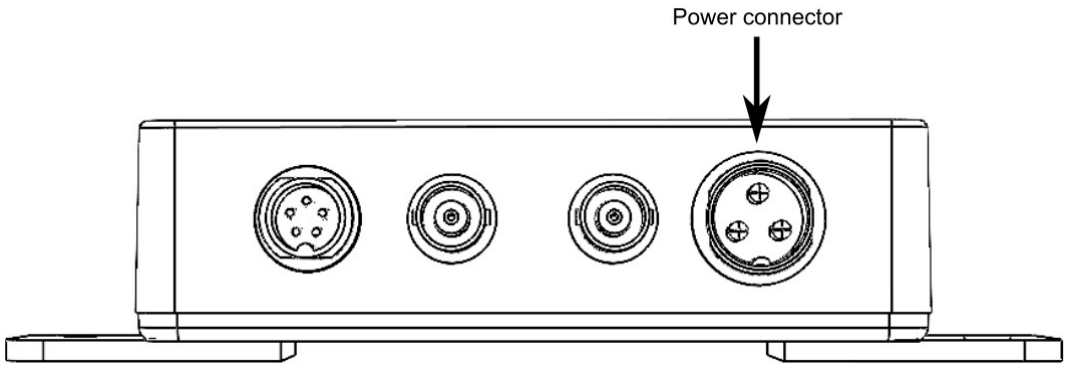

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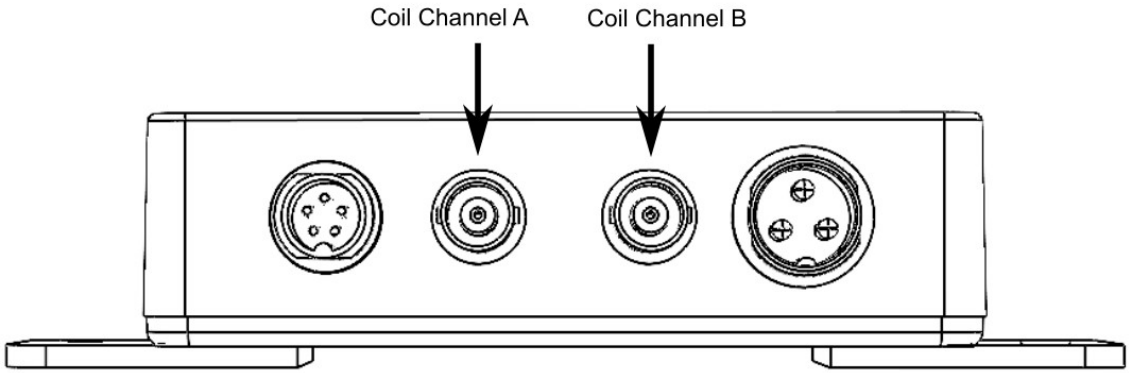
6. Install the Ignition Coil Harness

Connect the BNC connectors of the Ignition coil harness to Coil Channes A and B on the Ignition controller.
It does not matter which cable goes to which channel, as this will be determined during engine timing.

- Connect the Conducter 1 of the harness power cable to The Coil-Switch.
- Connect the Conductor 2 to common / ground.
- Connect the cable shield to common / ground.



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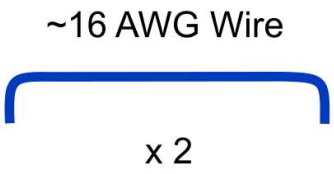
7. Ignition Timing

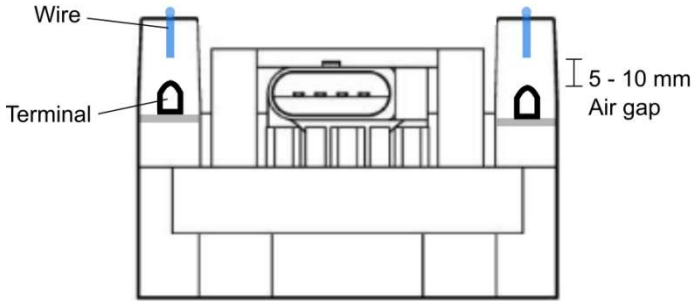
Prepare for Timing

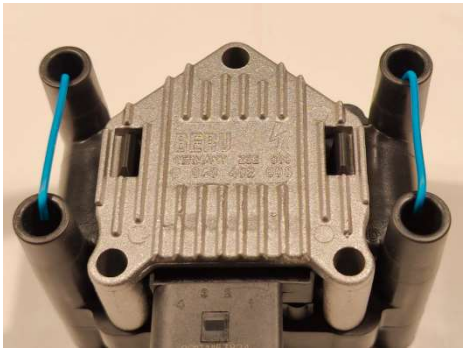
Prior to timing the power to the electronic ignition system shall be switched off to avoid potential electrical shock hazard at the ignition coil, and other ignition systems, such as a magneto should be confirmed to be in the 'OFF' position.

For timing the ignition system 2 pieces of insulated wire should be fabricated and bent 90 degrees about 10 mm in from each end, like depicted in the figure below.



The two pieces of bent wire should be placed across the terminals of each channel of the ignition coil, like shown below. Secure each wire with a bit of tape.





The air gap between the wire end and the exposed terminals in the ignition coil should be between 5 and 10 mm.

Note: The pieces of wire in the ignition coil are essential to not overstress the ignition coil during timing. The insulation in the ignition coil may be damaged if timing is attempted performed without the wires in place.

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The sensor should be positioned in a way that the trigger point of the sensors lies 5 degrees after TDC. Please note that the sensor will be triggered before the magnet is axially aligned with the sensor, due to the nature of the magnetic field shape.

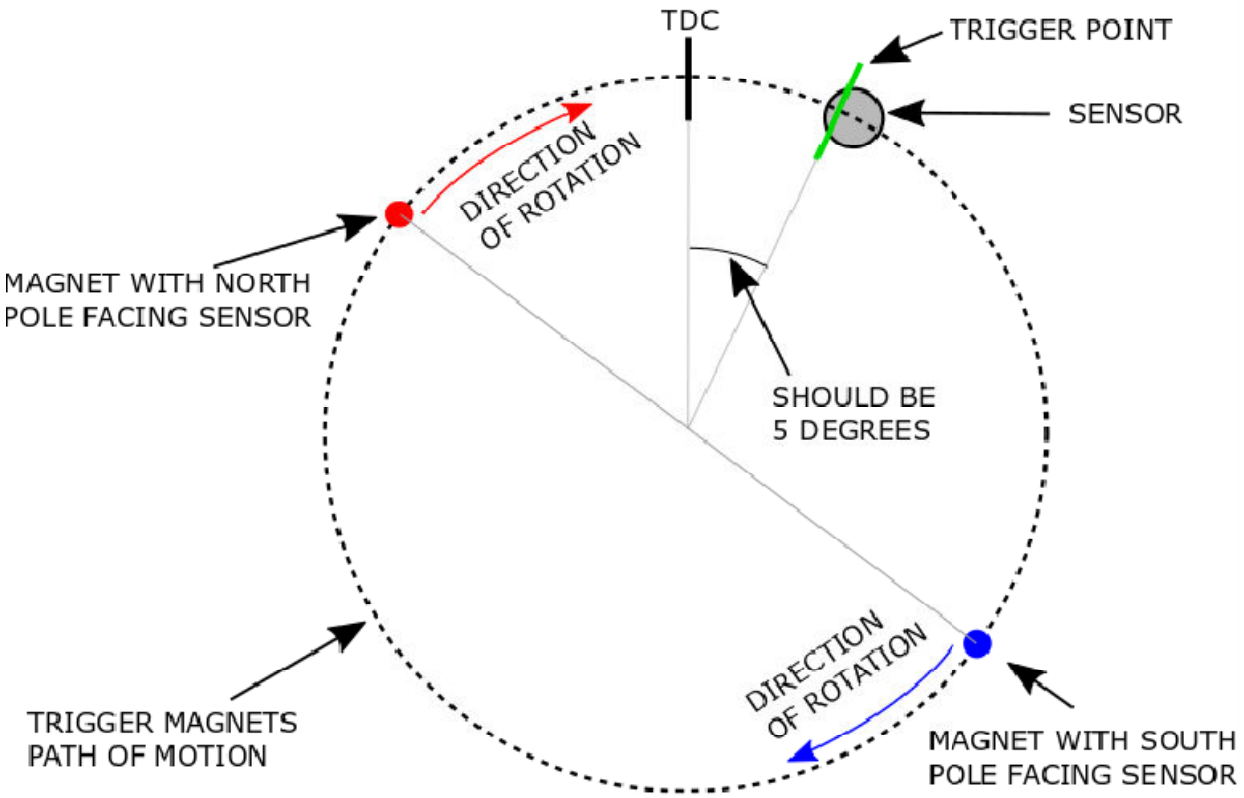
The timing should be performed according to the below figure. This will ensure the pre-fire angle during operation will be as specified.

The high-RPM pre fire angle of the ignition controller is the middle-element of the controller serial number.

E.g. Serial Number: "2402-28-CI1", means the controller will provide a 28 degree pre-fire angle if the trigger point of the sensor is located 5 degrees past TDC.

In case a bit more or less advance is wanted the angle of 5 degrees can be offset by a few degrees.

Increasing the angle gives less spark advance, and decreasing the angle gives more advance. Please make sure not to get too close to TDC (angle less than 2 degrees), as there will be a risk of "kickback" that could be a hazard if you hand-crank the propeller - or it may damage your starter system.



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Perform Timing

WARNING!

During timing the ignition coil will be in a 'Live' state and sparks will be created across the coil terminals using the installed wire. There will be a potential electrical hazard in close vicinity of the ignition coil and no persons should be within 50 cm of the ignition coil during this phase.

During timing care should be taken not no come within close vicinity, e.g. 50 cm of the ignition coil, as it will be live and create sparks through the affixed wires.

- Connect the power source of the airplane securely and toggle the Ignition Switch to the 'ON' position. After about 1 second the LED Indicator will light up and remain lit.
- Toggle the Coil Switch to the 'ON' position.
  The ignition controller is now active and the ignition coil is energized, so it will create a spark once the sensor is triggered by a magnet. – in other words the Ignition is 'Live'.
- Slowly turn the engine in the direction of normal operation. When near the 5-degrees past TDC position you should hear a distinct "click"- sound from the spark in the ignition coil.
  Stop moving the engine and determine the position.
  If the engine is at an angle less than 5 degrees past TDC, retard the sensor position a bit and repeat this step.
  If the engine is at an angle larger than 5 degrees past TDC, advance the sensor position a bit and repeat this step.
- The ignition system is timed when both trigger magnets trigger the ignition at 5 degrees past TDC.
- Secure the sensor in place.
- From a safe distance, and no less than 50 cm, look into the ignition coil terminals on the creation of a spark to determine combustion cycle position versus the active coil.
  The coil channels can be reversed by interchanging the BNC connectors on Channel A and B on the ignition controller.
- Toggle the Coil switch and the Ignition switch to the 'OFF' position.

Note: Once two concecutive sensor triggering has taken place with magnets of opposite polarity the LED Indicator will switch off. This is normal, as it indicates the ignition is being triggered on both channels, as expected. If multiple consecutive sensor triggering happen with a magnet of the same polarity, the LED Indicator will light up again, to indicate one channel is not being triggered.

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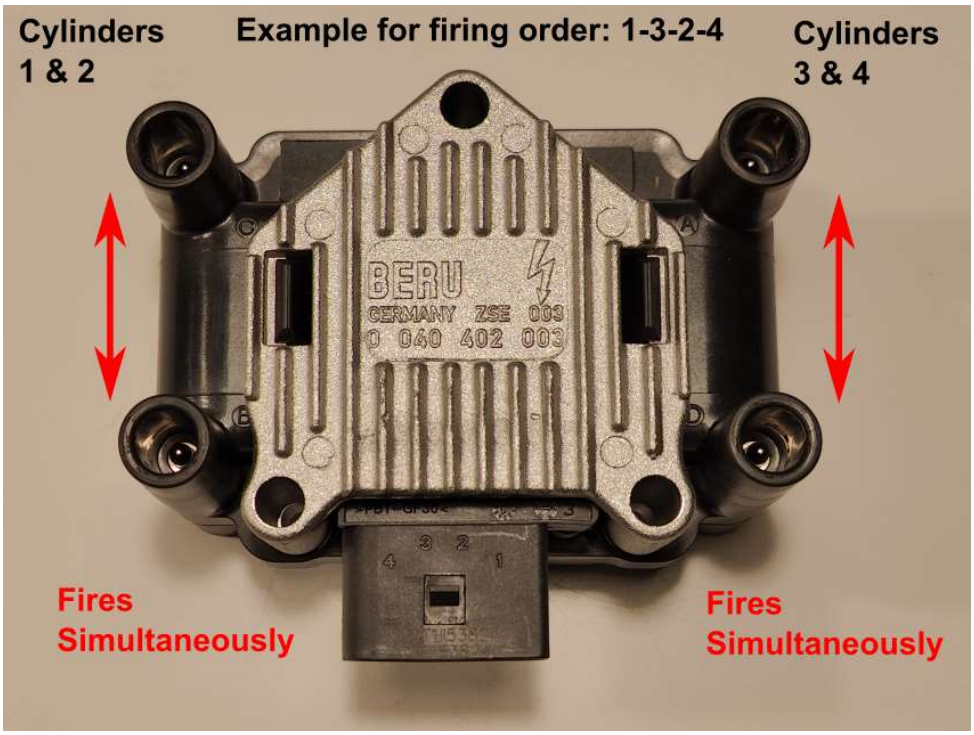
8. Install the HT Leads & Spark Plugs

The High-Tension Leads routes the spark energy created by the ignition coil to the spark plugs.

The as the ignition system is a wasted-spark system it only uses two channels to operate 4 spark plugs, as two of the spark plugs always fires simultaneously. See figure below, for a top view of the ignition coil.



Remove the terminal wires on the ignition coil from the timing sequence, and prepare for routing the HT leads.
The cable for the sensor and the HT leads should be routed so that a minimum separation of 100 mm is kept at all times, if possible.
The reason for this is that the sensor cable carries small signal amplitudes, while strong electrical fields exist around the HT leads while sparks are being fired, and these may cause noise on the electrical signals from the sensor.

The HT leads comes with a pre-crimped connector and mounted coil-side boot, and the length of the HT leads should be adjusted and the screw-in style spark plug boot can be mounted on the end of the lead.

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Make sure the boot screw is centered in the copper-core conductor.
It should be twisted in until a slight increase in resistance is felt, and a gentle pull on the spark plug boot can confirm the attachment to the HT-lead.

Note: The HT Leads provided with the system are 7 mm copper-core cables.
In case other HT cables are wanted, please make sure that they are of the same type, as the system is not designed for silicon/carbon leads.

The spark plug boot is meant to be used with an M4 spark plug thread, so the spark plugs must provide this interface for the boot to be mounted correctly.
Some spark plugs have a screw-on terminal that can be removed to gain the M4 thread interface.
The spark plug boot should be firmly pushed over the M4 thread and several "clicks" should be audible when the securing pin travels over the threads.
Once installed a gentle pull should be done on the spark plug boot to ensure it is securely fixed in place.

9. Finalization

Once installation and timing routines are complete, the cables and other engine-bay or cabin panels that have been removed / disassembled should be secured back in place.

Cables should be tied to supports by appropriate means as necessary to avoid wear, grinding on edges or other hazards.

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OPERATION

WARNING!

Once in a 'Live' state, the ignition system will not be able to distinguish if the engine is being (hand) turned forwards or backwards and will fire near top dead center regardless.
Always de-energize the electronic ignition if you are turning the engine without the intention to start it!

1. POWERING UP

Once the system has been correctly installed and timing has been adjusted the system is ready for operation. The recommended procedure is as follows (after the aircraft main switch has been toggled to the 'ON' position):

1. With the coil switch in the 'OFF' position, toggle the ignition switch to the 'ON' position.
   The ignition controller takes ~1 second to power up, and when it is ready it will light the LED Indicator and keep it lit.
2. Now toggle the coil switch to the 'ON' position.
   The ignition system is now 'Live' and will produce sparks once the trigger magnets pass the sensor.
3. Crank the engine, and once steady idle has been reached (oil pressure checked, etc.) the indicator LED will have turned off. In fact, it turns off as soon as it has registered 2 consecutive magnet triggerings of opposite polarity. This way the system validates that both trigger magnets and sensor elements are in active and fully functional.
4. Check that the indicator LED stays steadily off (not lit) for a couple of minutes of idling the first time you fire up the engine after fitting the ignition system. – if this is the case, the system is functioning normally.
   Further description of the indicator LED behavior is described in the 'Automatic Safety Mode' chapter.

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2. Initial Testing

Once in an engine-running and idle state it is time to perform the initial testing.

The testing is individual on each plane and depends on the amount of other systems installed.

It should be verified that all other systems can be operated as intended without having any impact on the electronic ignition system and vice versa.

A ground test of the ignition system should also be performed, covering all power setting combinations to verify normal operation. The engine should run smoothly in all scenarios, and all power setting transitions should also be smooth.

A normal ignition system test routine should also be performed, where the engine runs on both ignitions systems, then only on the CVI-4 Ignition system and only on the alternative. The engine should show normal characteristics in this regard.

After inititial testing the engine should be shut down by de-energizing both ignition systems (coil swith toggle to 'OFF' position).

The ignition system and all its components should be inspected to still be securely in place before continuing to first flights.

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AUTOMATIC SAFETY MODE

Normally, each of the sensing elements (there are two) in the sensor, will control one of the channels in the ignition coil. Each channel in the ignition coil operates two spark plugs. In the event that one of the trigger magnets, or one of the sensing elements in the sensor should fail, the ignition controller has a continuously operating safety monitor. If the monitor detects that one of the channels stops responding, while the other is still operating, the automatic safety mode will engage after one second.

Once in the safety mode, the controller will switch to operating both channels of the ignition coil from whichever sensor channel is still providing input. This effectively means that all 4 spark plugs, will still be operating normally, and the engine will run as normal with two fully functional individual ignition systems.

To indicate that the automatic safety mode has been engaged, the LED indicator will turn on and remain constantly on, while the system is in the safety state.

If the automatic safety mode engages during flight, troubleshooting and identification of the cause should be done, and the issue should be corrected before the next flight.

Once the safety monitor detects both channels from the sensor the LED indicator will turn off, and the controller will resume normal operation.

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PLACARDS & POH

Placards should be placed near the Ignition Switch, Coil Switch & LED Indicator for clear identification, and the pilots- and operators handbook (POH) should be updated with a reference to this manual.

Any users of the plane before retrofitting the CVI-4 Electrinic Ignition System must be made aware of the information contained in this manual before continuing use of the airplane after the retrofit of the system for safety reasons.

Warning placards should be affixed in relevant places to inform of the necessity to de-energize the electronic ignition system before turning the engine forwards or backwards, if the intention is not to start the engine.

Not de-energizing the electronic ignition and having the engine turned, e.g. in reverse in a scenario of a drowned engine, can pose a serious hazard, and should be avoided by all means.

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info@drino.dk, CVR: 46176383

MAINTENANCE

Once the system has been installed and timed on the motor the only maintenance needed is to make sure all fasteners are still tight (controller, coil, sensor, trigger magnets, etc.), wires and cables are undamaged and not subjected to mechanical wear/grinding, and to exchange the spark plugs when needed. The maintenance should be planned as part of normal annual inspection.

NEED HELP?

You are always welcome to contact DRINO on info@drino.dk for support and advice.

WARRANTY

All CVI-4 Electronic Ignition Systems comes with a 2-year warranty from date of sales.

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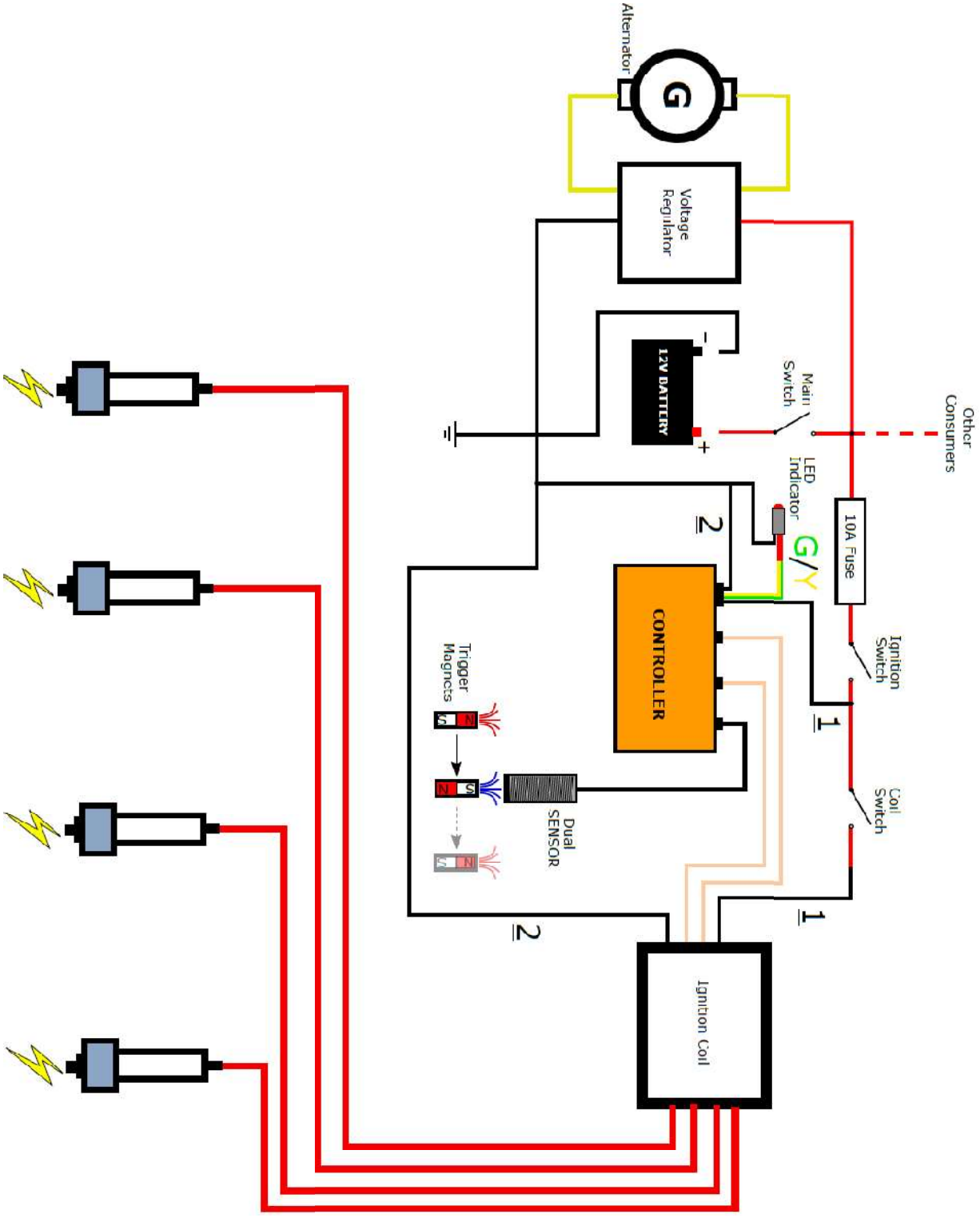
ELECTRICAL DIAGRAM



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EC Declaration of Conformity

We

DRINO ApS
Ring Byvej 15
DK-8740 Braedstrup
Denmark
WWW.DRINO.DK
CVR: 46176383

declare under our sole responsibility, that the following product

CVI-4 Electronic Ignition System

is in conformity with the

General product safety regulation, 2023/988, (GPSR)
Restriction of Hazardous substances directive, 2011/65/EU (RoHS)
Waste electrical and electronic equipment 2012/19/EU, (WEEE)

Date: 1 February 2026

Manufacturer / Authorized Representative:

Claus Vad, CEO.

UK Declaration of Conformity

We

DRINO ApS
Ring Byvej 15
DK-8740 Braedstrup
Denmark
WWW.DRINO.DK
CVR: 46176383

declare under our sole responsibility, that the following product

CVI-4 Electronic Ignition System

is in conformity with the

The General Product Safety Regulations 2005 No. 1803.

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032.

The Waste Electrical and Electronic Equipment Regulations 2013 No. 3113

Date: 1 February 2026

Manufacturer / Authorized Representative:

Claus Vad, CEO.

APPENDIX A – Photos of Installations

CVI-4 Installation on Gipsy Major – DH Chipmunk, OY-ATD

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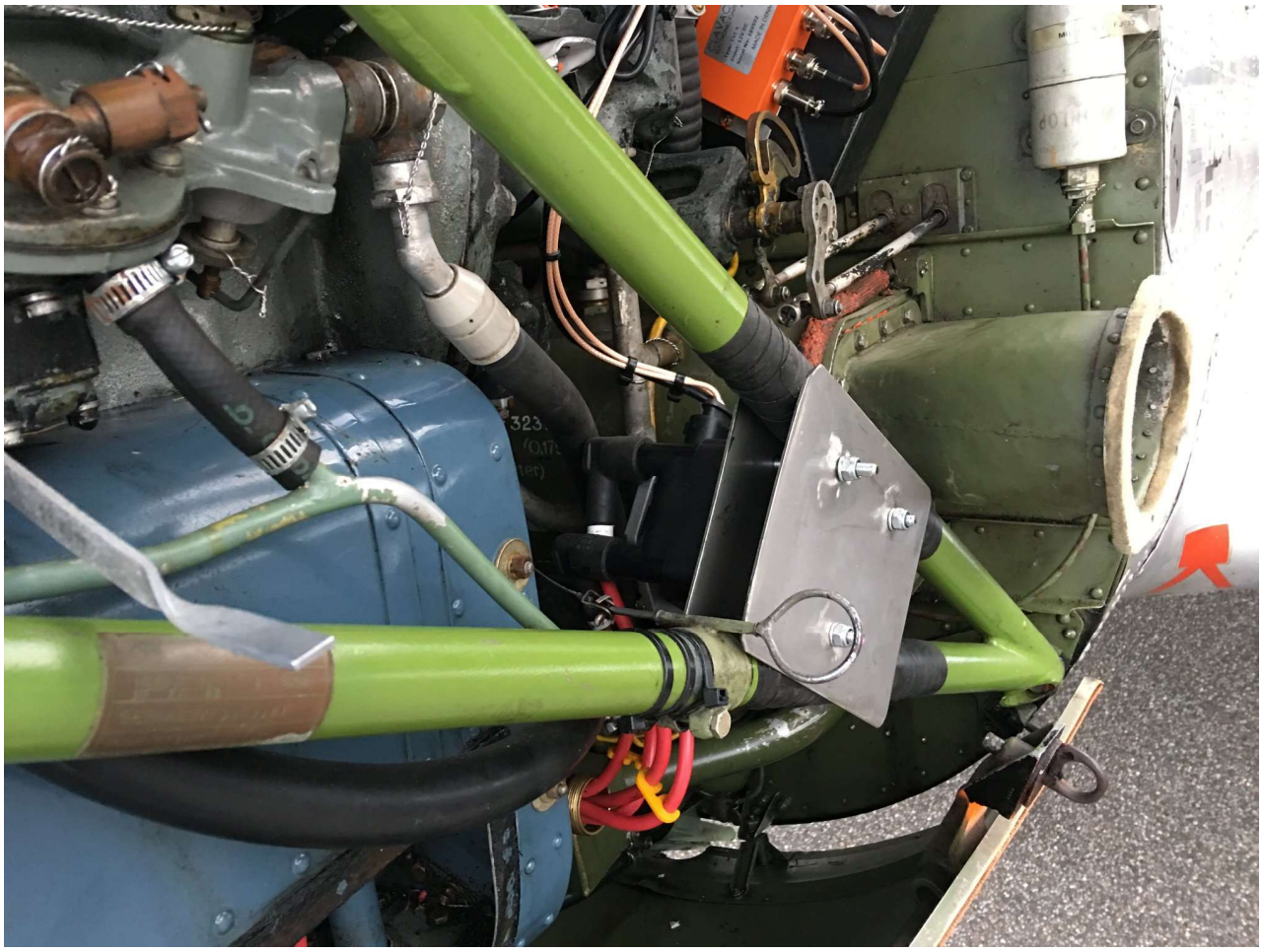

CVI-4 Installation on Gipsy Major – DH Chipmunk, OY-ATD

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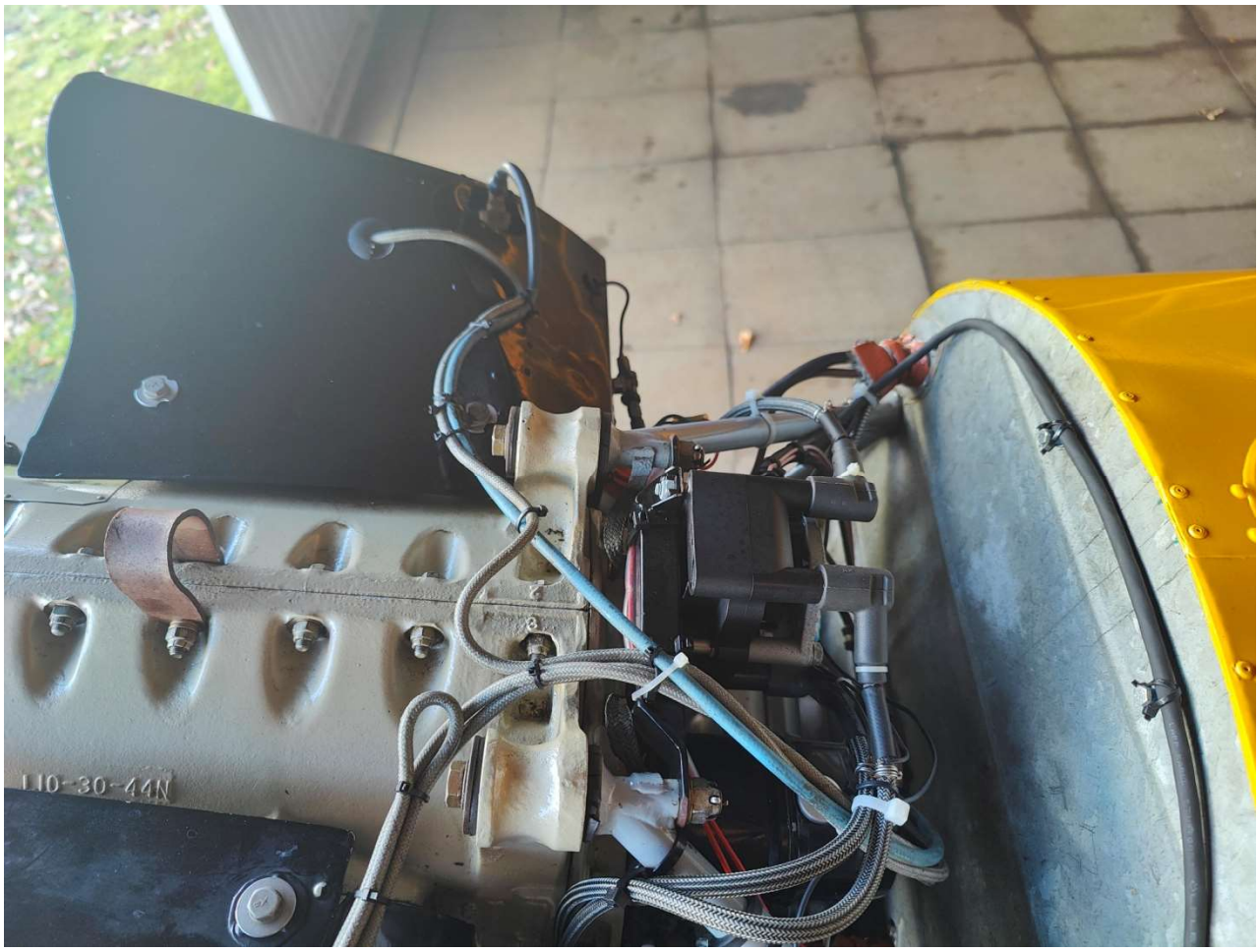
Power Supply Alternator with sensor holder on Lycoming O-360



Ignition Coil Installation – Piper Cub, OY-AFW

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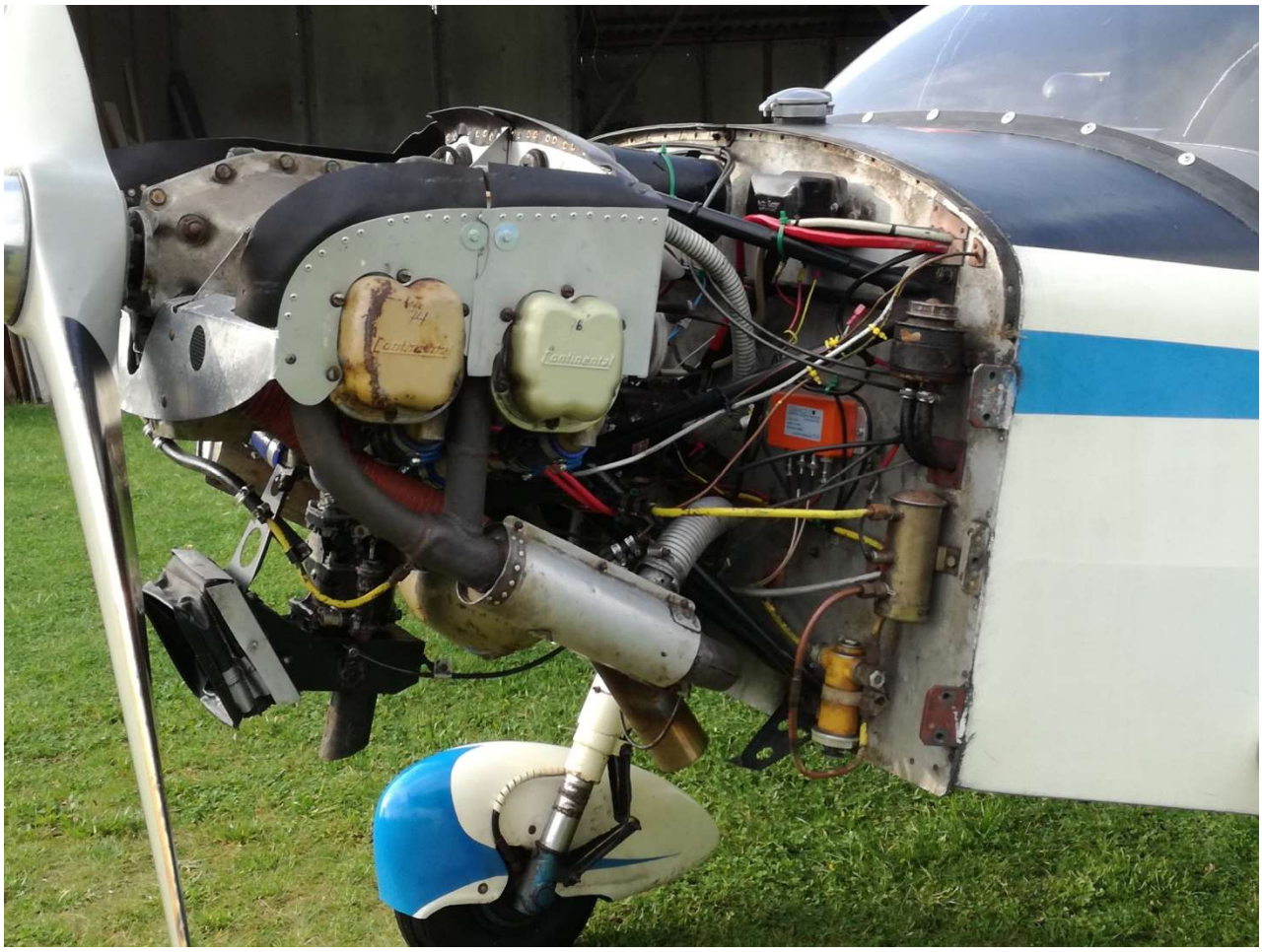

CVI-4 Installation – Piel Emeraude, OY-DEY

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