

Orion2 Safety Precautions

The following guidelines in this manual will ensure proper product operation the first time. Failure to install the product correctly may damage it or other equipment permanently. These failures will solely be the responsibility of the installer and no guarantees will be given by us. Make sure you have read the [Terms and Conditions](#) in this manual or on the website www.spitronics.co.za before you install this product. By installing the product, you automatically agree to these conditions. All equipment is tested before it leaves the factory. We accept no liability for malfunctioning of the equipment, or to injury that may result from installation or the use of the equipment. We also accept no liability for costs of traveling of transportation of the equipment or parts or vehicle recovery due to failures of any equipment. Please read the instructions and drawing and make sure you understand before you begin.

Operator Safety

- Use only proper tools and products suited for auto installations. Substandard products and installation procedures may cause failure to the equipment having your customer break down in dangerous areas.
- Use correct thickness of wire to carry the entire current requirement for that circuit. Too thin wires will heat up and may start a fire causing injury.
- Use fuses to protect each circuit separately. Joint circuits require large fuses which may heat and melt lesser circuits causing fires.
- Solder joints, and cover it with shrink sleeve to prevent loose connections which may cause fires. Space solder-joints so that they do not sit next to each other in the harness thus minimizing the chance of a short circuit.

Connecting

- Never connect an **Orion2** on other harnesses that have the same connectors.
- Connect the ECU earth strap and the harness Earth wires to a proper earth on the body.
- Leave the output connectors P2, and P3 disconnected when you switch the ECU on the first time.
- Test the installation before connecting the ECU. This will prevent damage due to faulty wiring.
- Make sure that relay pin numbers of the relay correspond with the drawing. Some relays differ on the contact pattern and may damage the ECU.
- Make sure that the coils and injectors get their power from the Orion2 power relays. This relay will only switch on after the ECU has select the logic level for the driver. Powering them from the vehicles power will damage the drivers and coils.
- Check that coil connections are secure. Loose connections will damage the coil driver Mosfets.
- The TPS must be connected correctly as it may damage the ECU or TPS permanently.
- Do not put cutout switches from coil negative to earth as this will damage the coil permanently. Rather break the supply line through a switch so that the module does not have power.
- Do not connect the ECU outputs directly to solenoids or fuel pumps unless it is shown on a drawing. Check the current rating or the outputs in the Specifications.
- Test the coil resistance to see which type coil you are using and if it is still functional. This is important to program the correct parameters. See Coil Selection. If you are not sure take it to your agent for a test, or start with the lowest Coil charge time values namely 1 or 2 milliseconds.
- Make sure of the type of injectors and connect them according to the recommendations. There is a wiring difference between low and high impedance injectors.
- Never connect direct injection injectors to the ECU. Their resistance is very low and will damage the ECU and the Injector.

- The trigger input may **not** be connected to coil negative. The high voltage spikes on coil negative will damage the unit permanently.
- Make sure about the correct Jumper Settings before you switch the ignition on.
- Do not disconnect high tension leads and let them hang loose. It creates feedback voltage that may destroy the ECU.
- Never run HT leads with ECU harnesses. A crack in the HT lead will cause a spark to jump to the ECU harness and damage it.

Power

- Ensure that fuses are the minimum value required value to hold the current. Too large fuses will not blow resulting in driver or coil destruction.
- Connect the relay supply power directly to battery positive via a fuse as shown in the drawings, otherwise voltage drops will cause lean mixtures.
- Connect the injectors to its own relay if mechanical relays are used as other items will cause a voltage drop and result in leaner mixtures.
- Do not connect screen wires on the engine. The starter will draw current through then melting the harness. It will also bring all the engine interference in the ECU.
- Ensure a proper earth between battery negative and chassis and also between battery negative and the engine. Do not earth the engine on the body or the body on the engine.
- Do not disconnect the battery while engine is running. The alternator will create high voltage spikes which will damage the ECU permanently.
- Ensure that all connections from the battery and alternator are secure.
- Connect the alternator charge wire directly to battery positive and not to the harness somewhere. This cause voltage spikes on the common wire.
- Never switch the power on, if the ECU earth strap is not earthed properly – this may damage sensors or the ECU.

Programming

- If you are reprogramming the Orion2 via the bootloader, never switch the power off before programming is finished. it will change the ECU and then it is a tedious process to get it running again.

Interference

- Install free-wheel Diodes on other relays to prevent spikes from interfering with the ECU. Always put the stripe side of the diode to the positive side of the signal. See the drawings for correct connections.
- Connect screen input wires as close to the sensor wires to minimise exposure of open wires to electro-magnetic noise.
- The spark plug leads can cause interference with the ECU wiring. Keep the ECU wires away from the ignition leads wherever possible. If it is necessary to cross the ignition leads, cross it at right angles.

Wiring Reliability

- The wiring is critical for reliable operation of the ECU. The following points will help to ensure that the wiring is reliable:

Earth Wiring

- One of the most common wiring problems is poor earth wiring. The earth wire must be earthed properly to the chassis and there must be no paint or anodizing between the earth wire and mounting point. Temporary wiring is likely to cause problems, use the proper terminal that is securely crimped to the earth wires. These comments apply to both the ECU earth wire and the ignition system earth wires.

Power wiring

- The power required for the fuse box must be wired by the shortest possible path to the battery via relays activated by the ECU. This power must not be fed directly from the ignition switch because it won't be able to handle the required current. The relay must be in good condition and the wires must be crimped securely to the appropriate terminals.

Terminal crimping

- Use the correct crimping tool for each type of terminal. Do a pull test on a sample wire and terminal to verify that the crimp is properly done. In theory the wire should break before the wire pulls out the crimp. Most crimp tools are only designed for a certain range of wire sizes so be sure to test the crimp with the particular wire size being used. Soldering the terminal is the last resort if the correct crimping tool is not available.

Terminal Damage

- Connector terminals are easily damaged if probes are inserted into them. If checking a circuit for continuity gently touch the side of the terminal only.

Wire splicing

- Use a crimp splice to join wires. If you solder a wire in a splice ensure that wire movement near the splice is avoided because a fracture might occur at the stress point created by the solder. Use heat shrink to insulate and provide support to the wires. Never simply connect wire splices without solder or a crimp splice. These types of joins will corrode rendering it without connection. Never use 'Vampire Taps' & 'Plastic Butt Splices'. The first is an absolute NO. Vampire taps only work under ideal conditions and wire thickness. Too big and they make a poor connection, too small and they chop the wire in half. Both of these failures are acceptable for stereo systems, but not when you're hooking up things like injectors or ignition coils.

Wire strain

- Avoid pulling wires tight at the connectors. Ensure that wires are kept away from hot or sharp parts in the engine. Also ensure that engine movement does not put strain on the wires, as metal fatigue will break the wires in time, resulting in ECU failure.