

DYNAMIC INTELLIGENT VALVE OPTIMIZATION (DIVO) INSTALL GUIDE



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IMPORTANT SAFETY INFORMATION



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated 'dangerous voltage' within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle and "WARNING" are intended to alert the user to the presence of important operating instructions. Failure to heed the instructions will result in severe injury or death.

Read these instructions, keep these instructions. Heed all warnings, follow these instructions.

WARNING: Amplifiers and components inside them contain potentially fatal high voltages. Voltages are present when the amplifier is turned on and also for some time after the amplifier has been turned off. You can still get an electric shock when an amplifier is turned off and disconnected from the power.

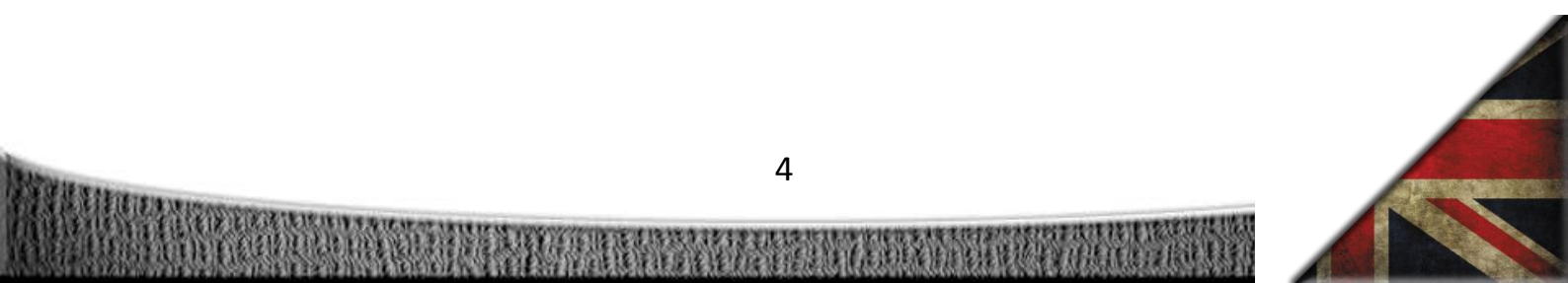
All installations and product adjustment / removals must be performed by an Orange Amplifier approved fitting centre.

Disclaimer: Orange Amplifiers, its suppliers and subsidiaries accept no liability for any damage(s), injury(s) or death incurred from or while installing or using this product.

It is the responsibility of the authorised installer to perform the installation strictly in accordance with the installation guidelines. The installer will take full responsibility for the installation. Orange Amplifiers will only accept liability for their own branded product. For the avoidance of doubt, not the customer's amplifier or installation work undertaken.

Do not open the equipment case. There are no user serviceable parts in this product. Refer all servicing to qualified service personnel. Unauthorised modification of this equipment is strictly forbidden.

If the product does not operate normally when the operating instructions are followed, then refer the product to a qualified service engineer. All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or local authorities.



WHAT IS INCLUDED?

- OV4 module.
 - Valve Interceptors and wiring harness to connect the valves from the amplifier to the OV4 module:
 - 2 x interceptors for two output valve amplifiers (DIVO OV2)
- OR**
- 4 x interceptors for four output valve amplifiers (DIVO OV4)
-
- 1 x Green Earth wire.
 - 1 x strip of Velcro to attach the main OV4 module to your amplifier. An external mounting bracket option (sold separately) is also available from your Authorised Orange dealer.
 - All DIVO OV2/OV4 Modules purchased from Authorised Orange Dealers are also eligible for a free End User Interface to enable custom bias settings (see pp.15-17). If this has not been included, please contact your dealer.

Please take the time to read this guide in full before attempting the installation. If you are unsure or uncomfortable with any aspect of the instructions herein contact a qualified technician.

1. GETTING STARTED

Firstly ensure that the amplifier selected for the installation is a suitable amplifier for the OV4. If unsure, please contact the amplifier's manufacturer.

The amplifier must:

- Be a Class A/B valve amplifier with either two or four octal power valves in the output stage, e.g. KT88, EL34, 6L6, 6V6, KT66 etc.
- Be a fixed biased (**not** Cathode biased).
- Have a **maximum** plate voltage that does not exceed 500V. *If you are unsure, please contact your amplifier manufacturer for more information.*

IMPORTANT! 6V6 valves run at a lower bias setting. If 6V6 valves are installed in your amplifier, the bias settings should be reduced to 25mA (maximum) on the 'Custom' setting using the Bias Runner software/ interface kit. Please refer to point 11, pp.15-16 'Bias Settings' for further details.

Before attempting installation, ensure the amplifier does not exhibit any unusual behaviour under 'normal' playing conditions. If the amp has any existing faults, these must be addressed by a qualified technician, as recommended by the amplifier's manufacturer, prior to the OV4 installation.

It is also worthwhile performing a quick check prior to installation to ensure that there is sufficient space within the amp to house the OV4 module. If necessary, the OV4 module can also be mounted externally, however the external mounting bracket should be used to ensure all leads are shrouded.

2. TOOLS REQUIRED

- A screwdriver set.

For the purpose of this installation guide our test amp is an Orange Rockerverb 100 MKII equipped with four EL34 output valves.

3. REMOVE CHASSIS AND OUTPUT VALVES

Disconnect the amplifier from the mains power supply and make sure all the valves are cool to the touch.

For access to the output valves, it may be necessary to remove a number of screws in order to remove the amplifier chassis from the main cabinet/sleeve.

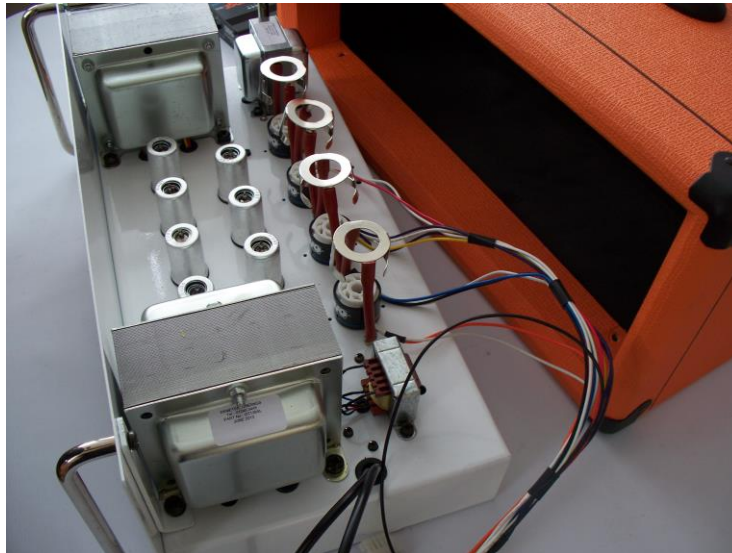
It is essential that no contact is made with the inner components, PCB or circuit(s) housed inside the chassis. Doing so may damage the amplifier and cause serious injury. Heed all warnings stipulated by the manufacturer, as printed on the amplifier and in the user manual.



Very carefully remove each output valve from the valve socket. Slacken or remove any valve retainers where necessary. Hold the valve at the valve base and gently move or rock the valve in a circular motion whilst applying an upward force.

4. TEST FOR VALVE INTERCEPTOR WIRING HARNESS CLEARANCE

Plug the valve interceptors into the valve bases in numerical order (1, 2, 3 and 4), ensuring they are firmly seated. The interceptors can be fitted from left to right or right to left, providing they are numerical in order!



Check where the wiring harness will route. Make sure that no wires come into contact with any part of the amplifier likely to generate heat (e.g. valves and transformers). These factors will help determine the best location for mounting the OV4 module.

N.B. It may be necessary to mount the OV4 module externally if there is not sufficient space within the amplifier's cabinet/sleeve.

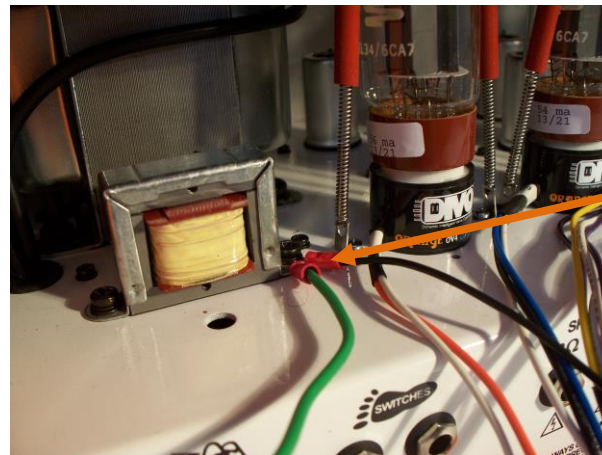
5. RE-INSTALL OUTPUT VALVES

Once the valve interceptors are securely seated, carefully re-insert the output valves (in any order) into the valve interceptors.

6. RUNNING THE ZERO VOLT WIRE

The black wire on the wiring harness is called the Zero Volt wire. This needs to be securely attached to the true Zero Volts of the amplifier (a reference to ground). In most cases this is the chassis, i.e. the external metalwork of the amplifier.

For this example we are using the bolt which attaches the reverb transformer to the chassis. Loosen the bolt, thread it through the Zero Volt wire's eyelet, and firmly re-attach.



Zero volt wire
Connected to
amplifier's chassis

If you are unsure please ask a qualified technician for advice!



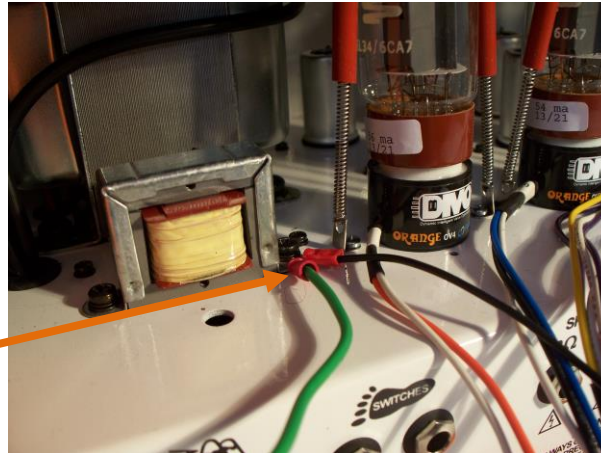
7. RUNNING THE EARTH WIRE

The final wire is the green earth (ground). The eyelet end must be securely connected to a suitable reference to ground, exactly as described in 'Running the Zero Volt Wire'.

In our example we have connected it to the same location as the Zero Volt wire. See the picture below for guidance.

The other spade connector slides onto the prong on the OV4 module (labelled 'EARTH').

Green earth wire
connected to
amplifiers chassis



If you are unsure please ask a qualified technician for advice!



8. MOUNTING THE OV4

Reassemble the amplifier, ensuring the chassis is firmly seated in its cabinet/sleeve and secured in its original position.

In our example, we have chosen to mount the OV4 onto the rear of the amplifier using the external mounting bracket (see overleaf). As noted earlier, the OV4 module can be mounted inside amplifier's cabinet/sleeve, or externally, providing the wiring harness will reach the socket labelled 'TUBES' on the OV4 module.

Remember: make sure that the wires do not come into contact with any heat sources (e.g. valves/transformers).



9. ATTACHING THE WIRING HARNESS TO THE OV4 MODULE

Once satisfied that the OV4 is in the correct location and is mounted securely, insert the wiring harness into the socket labelled 'TUBES' on the OV4 module. This should 'click' firmly into place.

If the green earth wire has not been connected at this stage, slide the spade connector on the end of the wire onto the prong on the OV4 module labelled 'EARTH'.

Ensure the switch on the OV4 module labelled 'BIAS' is set to the 'STANDARD' setting.



10. TEST THE AMPLIFIER

IMPORTANT! Before switching the amplifier on, be sure that all controls are set to the minimum position and that the amplifier is connected to a suitable load (i.e. a speaker cabinet).

- Connect the amplifier to the mains supply.
- Switch the amplifier to 'Standby'.
- Wait two to three minutes whilst the OV4 performs its calibration routine (indicated by the fault indicator LEDs flashing).
- Turn the amp's controls to the desired position, switch the amp from 'Standby' to 'On/Play' and play a note on the guitar. The OV4 will then store the calibration value at this point and this will complete the calibration process.
- Once the calibration routine is complete, the fault indicator LEDs will extinguish.
- After calibration, a check is performed to see if the 'Standby' switch is open or closed. In the event that the switch is open, the system does not attempt to re-bias the amp and will restore the last known working value of grid bias voltage for the amplifier. It will not re-bias the amplifier until the first 'silent' period, when corrective biasing will take place.

After the very first time of use, the OV4 will 'learn' your amplifier and it will no longer be necessary to wait for the full calibration routine.

If any of the fault indicator LEDs remain on after the calibration routine, this will indicate a faulty valve, and this should be replaced. Each LED refers to the corresponding valve interceptor.

11. BIAS SETTINGS

There are two preconfigured bias settings on the OV4 module, 'Standard' and 'Custom'. The default factory settings are:

- Standard: 30mA (no drop back bias feature)
- Custom: 35mA with a drop back to 20mA when no audio has been detected for 2 minutes. This helps preserve the life of the valves when not in use.

The OV4 allows users to further configure their own Custom bias setting using the additional DIVO Bias Runner software, included with the DIVO End User Interface. This is available free of charge with any DIVO OV2 or OV4 purchased from your Authorised Orange Dealer. Should you wish to use the Custom bias function, install the software included in the DIVO End User Interface kit and follow the onscreen instructions.



Bias Settings Continued...

The Bias Runner software allows users to select the specific valve type installed in the amplifier for optimum performance. It also allows users to adjust the bias according to personal preference within safe pre-defined operating parameters.

The software also allows users to configure the amp to use different valve types other than those originally installed. When configuring Custom bias settings, always adhere to the manufacturer's recommendations.

IMPORTANT NOTICE FOR 6V6 VALVES:

- **6V6 valves operate at a lower bias voltage than the 'Standard' setting on the OV4. If 6V6 valves are fitted in the amplifier, the bias settings should be reduced to 25mA (maximum) on the 'Custom' setting using the User Interface and Bias Runner Software.**
- **6V6 valves produce less power than other octal output valves and 6V6 equipped amplifiers are designed with these tolerances in mind. Installing other types of octal valves in their place may cause damage to the amplifier. Where 6V6 valves are factory fitted in the amplifier, Orange recommends that the DVO should only be used to regulate and monitor their health and operation, rather than be used to experiment with alternate valve types.**
- **6V6 valves operate at lower voltages than other types of octal valves commonly used in 50 and 100 Watt amplifiers. For this reason, 6V6 valves should not be used in place of other octal output valves. If unsure, please contact Orange.**



Bias Runner Software

Green 'saved' icon appears here to indicate data has been successfully saved to the OV4.

The screenshot shows the TubeSync software interface with the following annotated features:

- Device Status:** Information (Status: Connected, Version: 402, Serial No.: 69, Amp Serial No.), Timers (Total Service Hours: 0, Hours Driven With Audio: 0, Total Hours Idle: 0), and Fault (T1, T2, T3, T4) counters with reset icons.
- Device Settings - History:**
 - Bias Current Audio Present (mA):** Individual Values checked, with input fields for Tube 1 (35), Tube 2 (35), Tube 3 (35), and Tube 4 (35).
 - Bias Current Idle (mA):** Individual Values checked, with input fields for Tube 1 (35), Tube 2 (35), Tube 3 (35), and Tube 4 (35).
 - Audio Threshold Value:** Input field set to 50.
 - Fault Time (Seconds):** Input field set to 1.
 - Fault Currents (mA):** Min 10, Max 100, with an Edit Fault Currents checkbox.
 - Notes (for history):** A text input field for notes.
- Buttons:** Disconnect, History, and Save.

Annotations include: Amp serial number cross-reference entry (pencil icon), Amp service hours, Fault reset, Always disconnect before unplugging hardware, Displays the history of all entries, Under normal circumstances audio threshold, fault times and fault currents should remain at the factory set conditions and should not be modified, Valve bias settings with and without audio, Notes field, and When save is pressed the values entered will be saved to the hardware.

More information about the features and operation of the DVO OV4 can be found here on the Support section of our official website:

<https://www.orangeamps.com/support/downloads/>

