



## DIM14 – Low Voltage PWM Dimmer Module Application Note

The DIM14 is a 0-10V Voltage controlled dimmer manufactured by ABELtronics. For optimum performance in operation, please follow the recommended guidelines below during installation. While reading this document, please refer to the most up to date datasheet for the DIM14 which can be found at [www.abeltronics.co.uk/dimmers](http://www.abeltronics.co.uk/dimmers).

The DIM14 senses the voltage present across its 'Control V' and 'Ground' connections and generates a PWM output signal accordingly. It is important that the control voltage remain as stable and as noise-free as possible to prevent spurious signals modulating the control voltage and causing flicker. The DIM14 has been made deliberately sensitive and responds very quickly to changes in control voltage. While this allows much greater flexibility in the patterns of illumination and rate of change of brightness attainable with the DIM14 and suitable controller, it also increases the unit's sensitivity to noise on the control voltage terminal, and ground-droop on the Ground terminal. This application note describes how to maximise the potential of the dimmer.

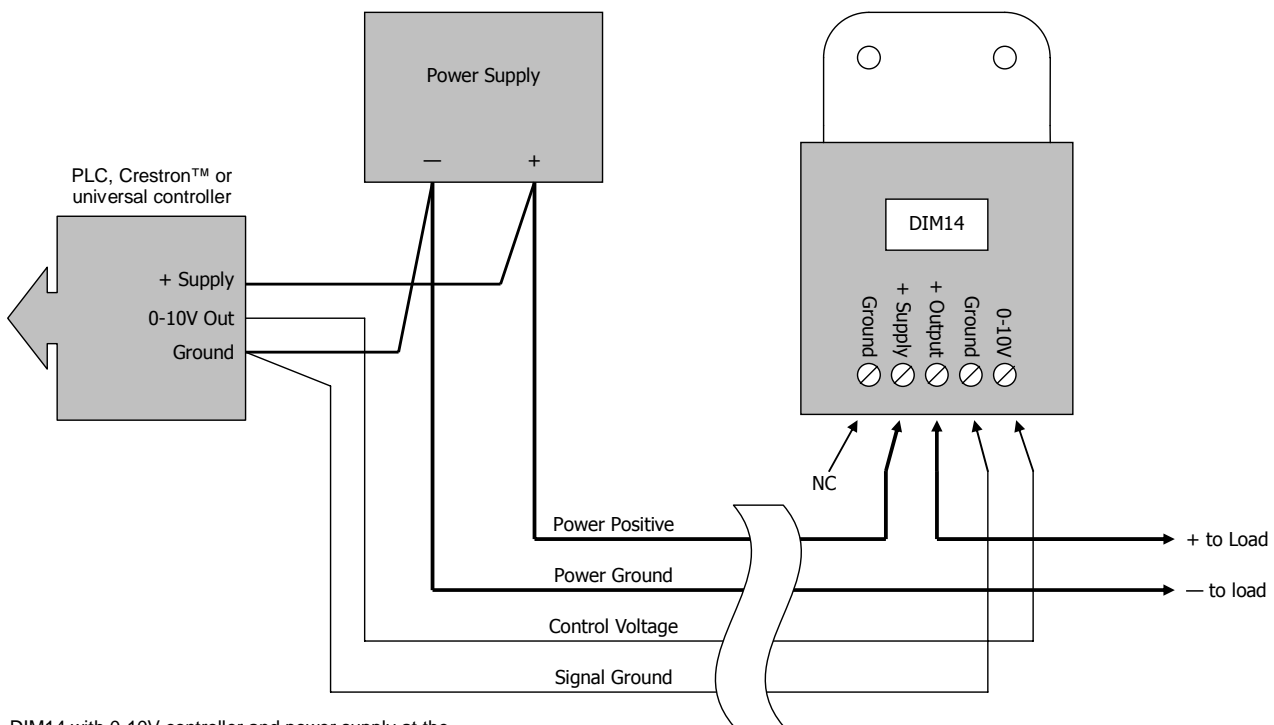
### Hints and Tips

It is important the ground of the DIM14 is not contaminated with spurious voltages, and the high current output ground must be kept separate from the control voltage ground. In all cases, **the negative connection to the load should be returned directly to the negative output of the system power supply**. In a marine or automotive application, the load negative should be returned to the lowest impedance negative point available – e.g. the chassis, negative battery terminal, or high-current ground common.

It is also important the 0-10V control voltage is not influenced by external electrical noise. Where the DIM14 is 3m or more away from the controller, the 0-10V and associated Ground should run down twisted pair cable for noise immunity. In some cases, where the distance between the controller and the DIM14 is significant or where there is an abundance of electrical noise, it may be necessary to use screened cable for the 0-10V control signal. Single-core microphone cable or TV co-ax will be suitable.

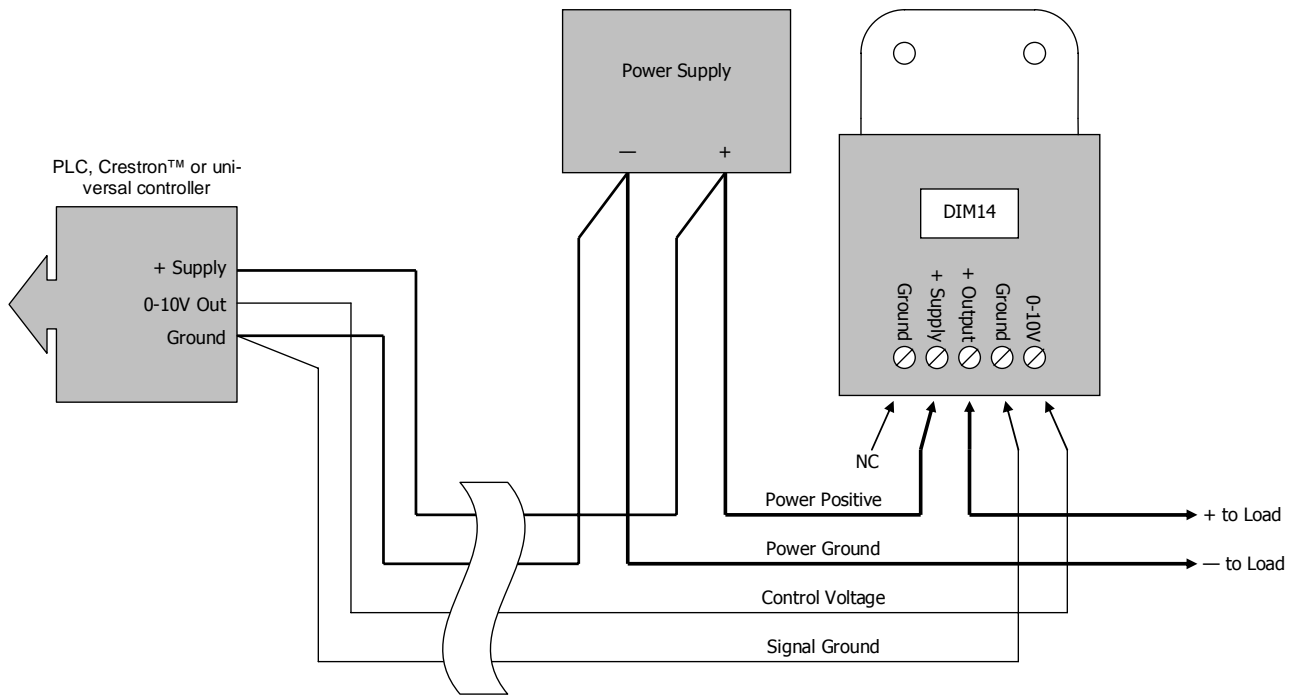
The connection diagrams below show the recommended configuration for a variety of applications.

### Single Power Supply



DIM14 with 0-10V controller and power supply at the controller-end

This diagram shows the recommended connection configuration if the DIM14 is away from the power supply and 0-10V Controller. In this scenario the power supply is common to both the load and the controller. There are two grounds in the system, Power Ground and Signal Ground. They should be tied together at the ground terminal of the 0-10V controller. This is to prevent voltage drop on the ground line (ground droop or ground bounce) caused by the load current from interfering with the DIM14 operation.

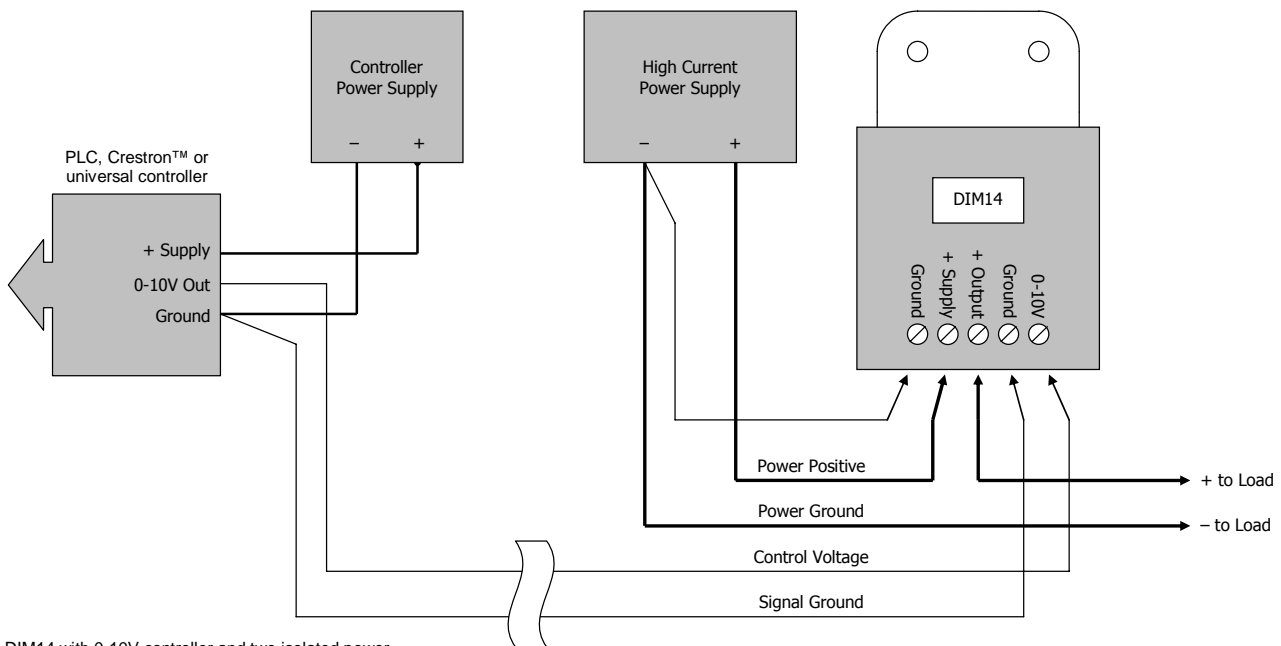


DIM14 with 0-10V controller and power supply at the load-end

The above diagram shows the connection arrangement if the 0-10V controller is away from the DIM14 and the power supply. This is a redrawn version of the previous diagram.

### Dual Isolated Power Supplies

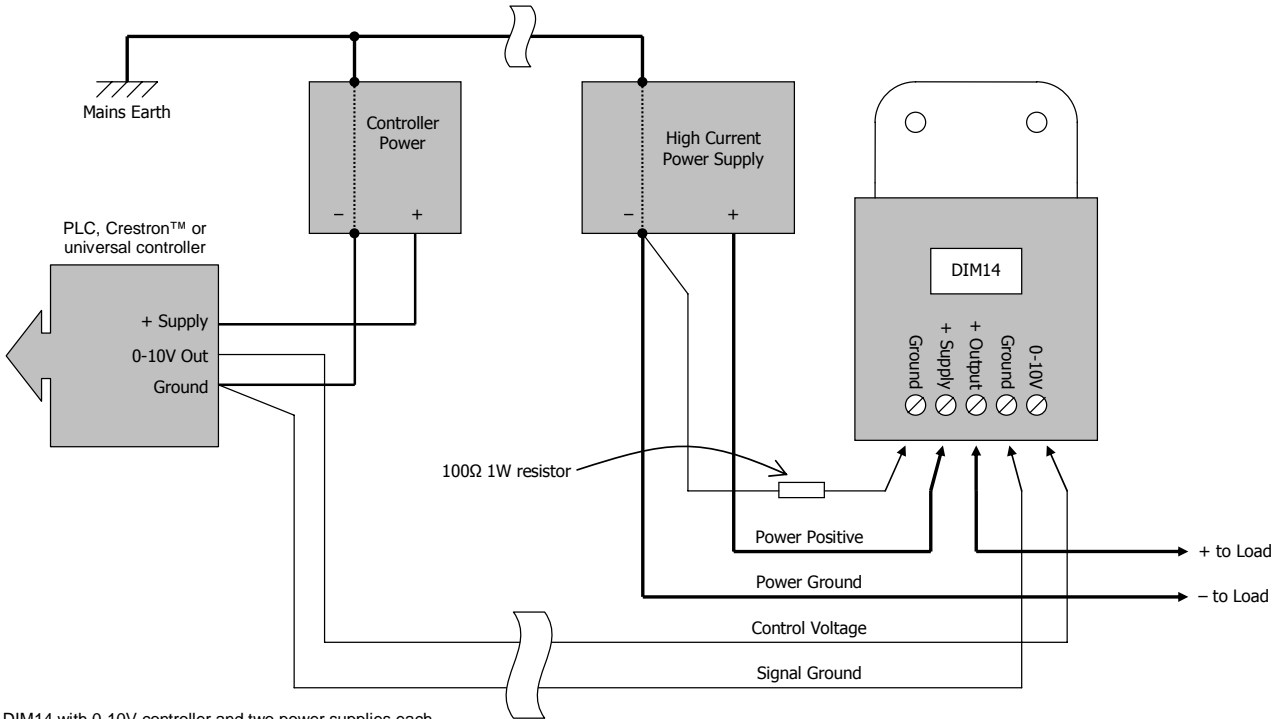
The diagram below shows the connection configuration if two separate power supplies are present in the system – a low current supply for the 0-10V controller and a high current supply for the load. This configuration assumes the negatives of each power supply are isolated from each other – if the negative outputs of each power supply are connected to mains earth, as is the case with some switched-mode power supplies, a ground-loop will form around the ground circuit and may superimpose noise on the 0-10V control voltage depending on the supply topology. See the next page for the correct configuration.



DIM14 with 0-10V controller and two isolated power supplies



**Dual Non-Isolated Power Supplies**



DIM14 with 0-10V controller and two power supplies each with their negatives connected to mains earth

This is the recommended configuration for a system comprising two separate power supplies, both having their respective negatives connected internally to mains earth. The 100Ω resistor between the left-hand ground connection and the negative of the high current supply serves to prevent the formation of a ground-loop between the power ground, signal ground and mains earth, while still providing power for the DIM14.