

Low Voltage Dual Output PWM Dimmer Modules: DIM14-2W, DIM14-2DIN

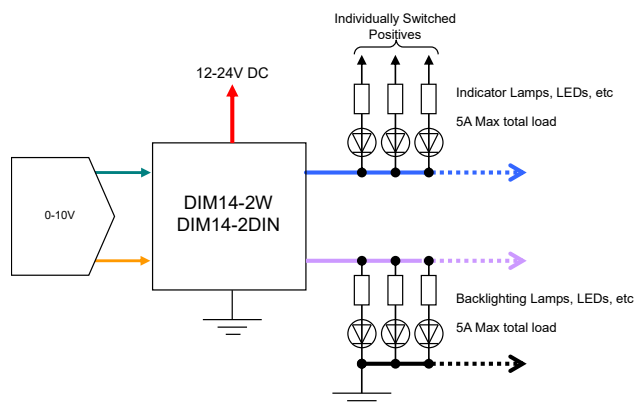
- 12V or 24V DC low voltage operation
- 0-10V brightness control
- Up to 2x 5A load – 2x 120W at 24V
- No minimum load requirement
- Lamp saving soft-start function
- Works with LEDs, incandescent or halogen lamps
- Flickerless dimming of compatible LEDs (240Hz operation)
- Dual Output – High side and Low side
- 16-bit resolution high-accuracy PWM, >30,000 dimming steps
- Fully protected and ruggedized
- DIN-mount or IP68 rated versions

The Abeltronics DIM14-2W and DIM14-2DIN are fully self-contained 0-10V dual output high-side and low-side dimmer modules designed to control the brightness of low-voltage incandescent (filament), halogen or LED lamps rated up to 120W per output at 24V.

Operating from 12 or 24V DC, the modules are designed to be used in automotive and marine dash-panel applications where the backlighting and indicator lamps need to be dimmed simultaneously. The units employ a very efficient PWM (pulse-width modulation) switching technique to provide excellent operation for loads up to 120W, and they are fully protected against intermittent output short-circuits, input over-voltage and under-voltage conditions.

Unlike other dimmers on the market, the modules will control lamp brightness from 0% (fully off) to 100% (fully on). The DIM14-2DIN is mounted in an 18mm wide (M1) vented DIN-Rail enclosure, and will fit in a standard electrical consumer unit or DIN enclosure. The DIM14-2W is functionally identical to the DIN version, and is wire ended and IP68 rated.

The modules also feature our unique cube-law dimming curve which allows finer control of low brightness levels and compensates for the non-linear response of the human eye. The result is an extremely smooth transition between dimming levels with no 'steps' in the dimming



response, and the brightness ramp-up and ramp-down is perceived by the eye to be completely linear. In addition, the modules utilise a soft-start feature at power-on, where the lamp brightness increases gradually to the previous brightness setting. This preserves the life of incandescent lamps as the filament is not 'slammed' on. The soft-start takes less than half a second.

The units have switched positive and negative outputs for controlling common negative and common positive lamps simultaneously. Lamps connected to either output will be controlled to the same brightness. This is ideal for use in situations where panel backlighting is connected to ground (dimmed to positive), and individual control indicators are switched to positive (dimmed to ground). The modules feature protection from output short-circuits, over-temperature, reverse polarity, and input over/under voltage. Please see the applications information section on the following pages for details.

Please note that the PWM dimming technique may not be suitable for non-dimmable encapsulated LED lamps containing internal driver circuitry, such as low-energy replacements for dichroic lamps. Also, the modules are not suitable for connection to standard household lighting transformers as these supply AC and not DC voltage.

Parameter	DIM14-2DIN	DIM14-2W	Comment
Nominal Supply Voltage Range	12V or 24V DC (9 – 32V operational range)		
Peak Supply Voltage Range	5.5 – 40V DC		Operation not guaranteed
Quiescent Current, max	19mA		at maximum operating voltage
Maximum Output Current	5A per output		
Continuous Output Power	60W per output at 12V; 120W per output at 24V		
Peak Output Current	12A		<10sec at nominal operating voltage
Control Input Type	0-10V Voltage		
Control Input Resistance	10 kΩ		Impedance of control inputs
Operating Temperature Range	–5 – 70°C (23 – 160°F)		
PWM Switching Frequency	240 Hz ±3%; 0% – 100% Duty Cycle		
Protection Rating	IP20	IP68	
Dimensions: Dimmer Module	90 × 18 × 58mm	51 × 51 × 31mm	L × W × H ±3% excl. fixings
Mechanical Fixing	DIN Rail	2 × 5mm hole in fixing bracket	
Electrical Connection	6 × 4mm ² Rising Clamp terminals	6 × Wire lead output >30cm long	

Mounting and Connection Guidelines

The positive supply typically comes from a suitably rated low-voltage DC supply in the range 9 – 32V which must be fused at 5A or less to protect the module. The full lamp current is drawn from BOTH the Power and ground connections, and as such should be connected solidly to the power source. The ground connection should be connected to a solid ground point via a 5A fuse. The negative fuse is necessary to protect the module from short-circuits on the negative output line.

DIM14-2DIN Guidelines

The DIM14-2DIN will run warm with loads exceeding 3A per channel, and the vent holes on the top and bottom of the module must not be obstructed. The module is rated at IP20, and will fit in a standard DIN enclosure.

Connection terminals are high quality rising-clamp terminal blocks capable of receiving up to 4mm² cable. The connectors are spaced 5mm apart and are on both the top and bottom of the module. To maximise the potential of the modules, cable rated at currents exceeding the lamp load by 1.5 times should be used to connect the module, and the use of a bootlace ferrule at the terminals is recommended.

DIM14-2W Guidelines

The DIM14-2W is fully sealed against water and oils and are mounted in an ABS enclosure filled with high temperature epoxy resin. They are wire-ended and the cables terminate to the module enclosure with a cable gland. The cap of the cable gland is removable without any loss of ingress protection, and can be removed to form a neat termination with flexible conduit or sleeving. The wire terminations are 30cm or greater in length (greater lengths available on request), and should be connected to external circuitry with a suitable junction box or connection block.

The DIM14-2W will run warm with loads exceeding 3A per channel, and the fixing tab should be securely bolted to a metal chassis to dissipate the heat. The fixing tab is electrically isolated from the internal circuitry.

DIM14-2W Connections

Colour	Function	Cable Size
Red	+ Supply	24/0.2 2.4mm dia.
Black	Ground	24/0.2 2.4mm dia.
Pink	+ Output	24/0.2 2.4mm dia.
Blue	- Output	24/0.2 2.4mm dia.
Orange	0-10V Ground	16/0.2 1.6mm dia.
Green	0-10V Input	16/0.2 1.6mm dia.

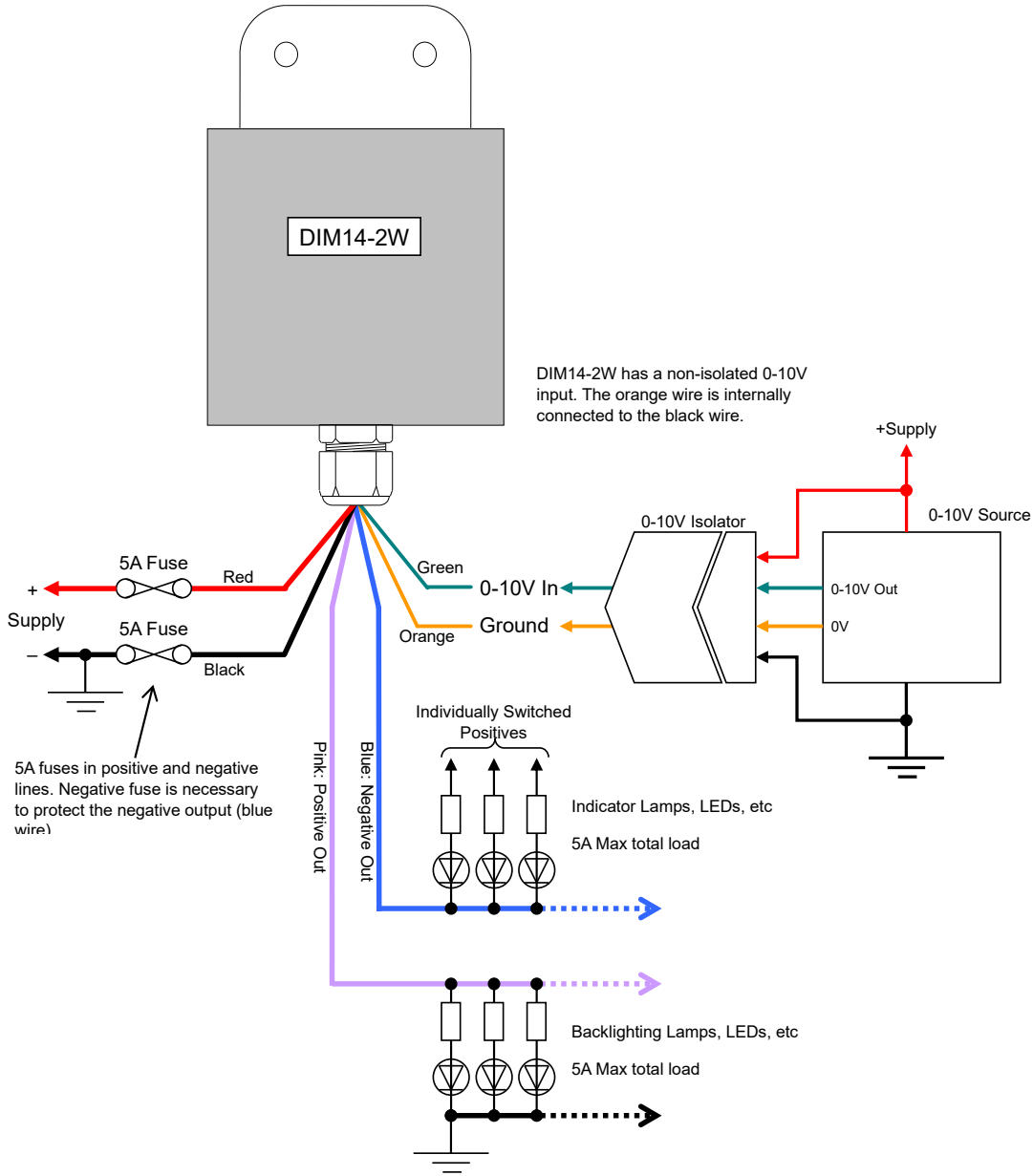
DIM14-2W Applications Information

The DIM14-2W and DIM14-2DIN are controlled by a universal 0-10V analogue voltage input. The control input is designed to accept an analogue 0-10V control signal from a PLC, lighting controller, Crestron™ or Lutron™ controller, or similar, as long as the controller is a current-sourcing type. As the input signal is varied between 0 and 10V the connected lamps change in brightness. An input of less than 0.2V turns the lamps fully off, and more than 9.8V turns them fully on.

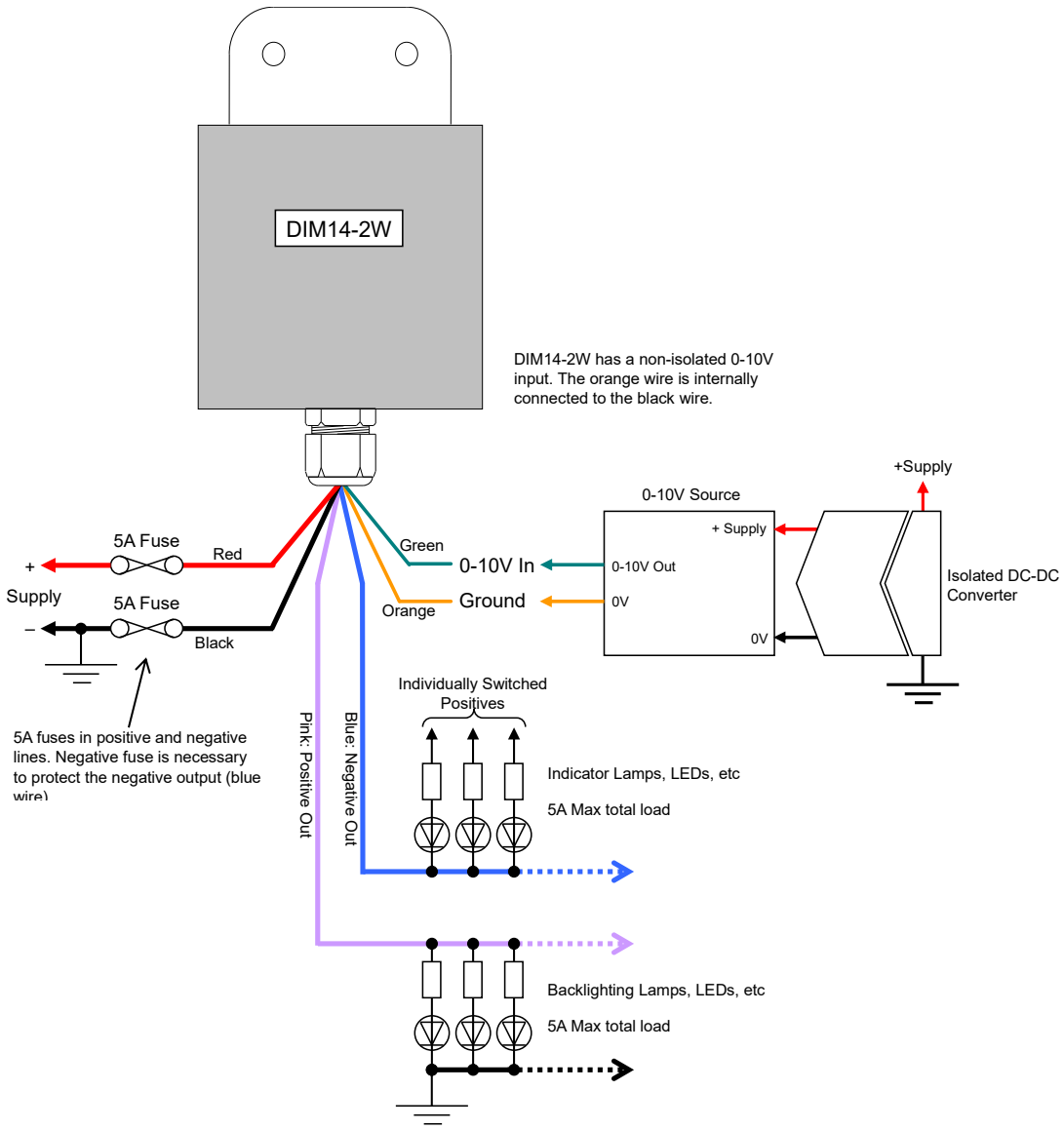
The 0-10V input is a current-sinking type which means it must be connected to a current-sourcing controller. (The controller must provide the 0-10V signal; the DIM14-2x does not output any voltage back down the 0-10V line). The 0-10V input is protected against over-voltage, although it should never exceed the module's supply voltage.

The control voltage input and the module supply voltage are not electrically isolated from each other and share a common ground. The two ground terminals on the DIM14-2DIN are internally connected together, and the black and orange wires on the DIM14-2W are connected together. To prevent ground loops, and to ensure the PWM action of the negative output does not couple into the 0-10V input signal, it is highly recommended that the 0-10V source does not share the same ground potential as the dimmer. This can be accomplished by using a 0-10V isolator, or powering the 0-10V source from an isolated DC-DC converter.

DIM14-2W Connection Diagram – 0-10V Isolator Used

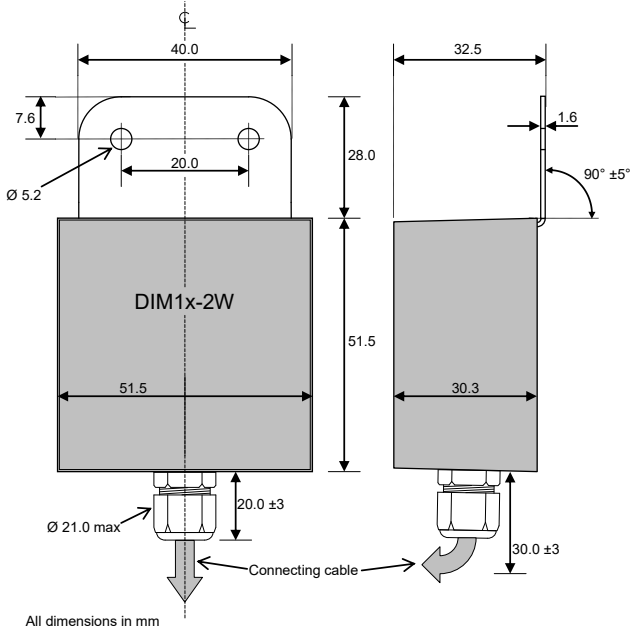


DIM14-2W Connection Diagram – Isolated DC-DC Converter Used

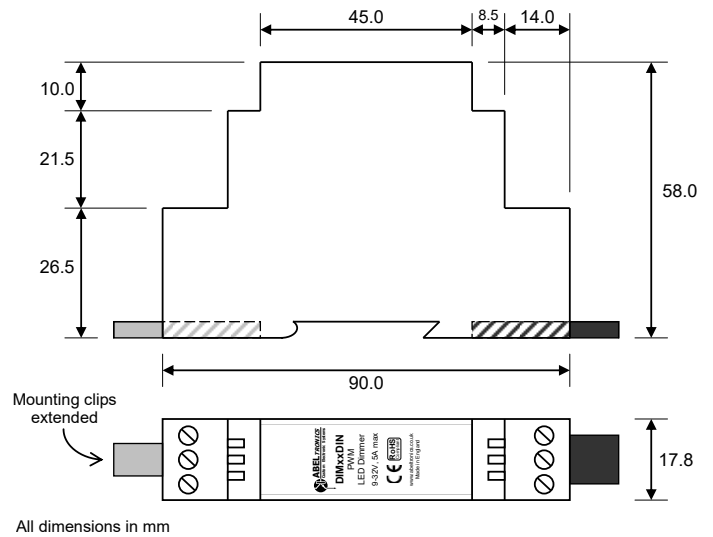


Dimensional Drawings

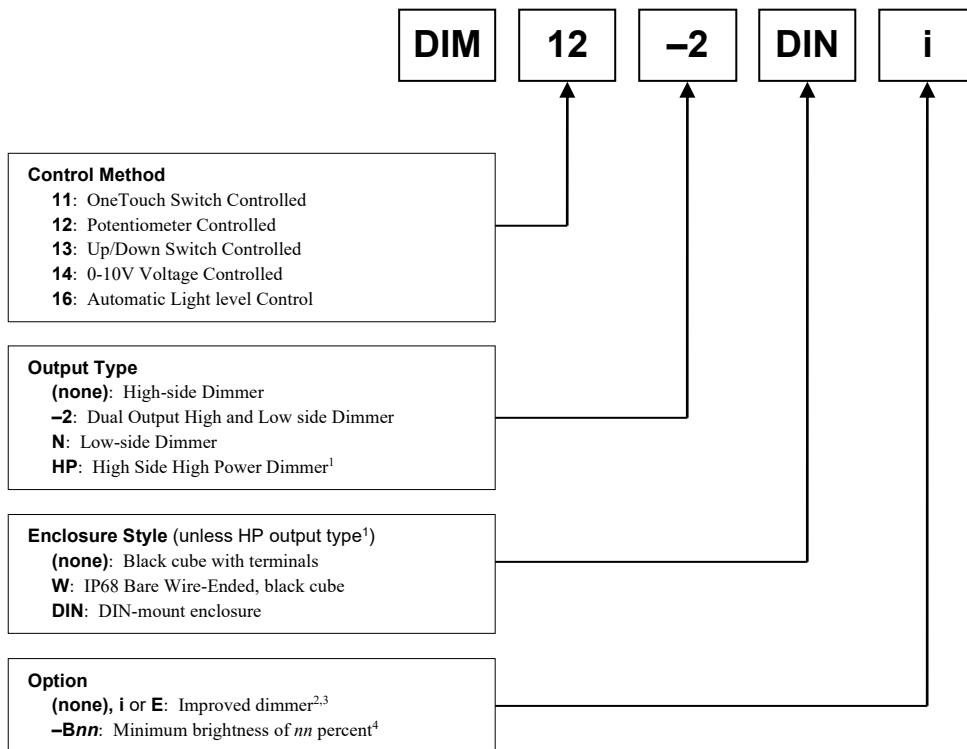
DIMxx-2W:



DIMxx-2DIN:



Part Number Nomenclature



Not all part numbers are available in all combinations. Please contact us for clarification if required.

1. HP dimmers have no enclosure style section in the part number. HP dimmers are always IP68 and wire-ended.
2. The i option formerly meant 'improved dimmer' where the dimming response and transient voltage immunity were improved. All dimmers manufactured from 2015 are now 'improved'. This option is therefore now redundant, but still exists in some part numbers.
3. The E option formerly meant 'extended temperature range'. All dimmers manufactured from 2015 are now extended temperature range. This option is therefore now redundant, but still exists in some part numbers.
4. Minimum brightness setting in percent follows the B option. For example, -B15 means the minimum brightness has been set to 15%. If the -Bnn option is present, it is not possible to turn off the dimmer's output.