

Low Voltage Dual Output PWM Dimmer Modules: DIM13-2DIN, DIM13-2W, DIM12-2W

- 9 – 32V DC low voltage operation
- 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 LEDs (240Hz operation)
- Dual Output – High side and Low side
- 16-bit resolution high-accuracy PWM, 256 dimming steps.
- Fully protected and ruggedized
- DIN-mount or IP68 rated versions



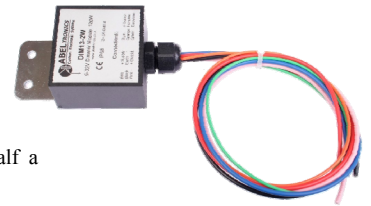
The ABELtronics DIM13-2DIN, DIM13-2W and DIM12-2W are fully self-contained dual output high-side and low-side dimmer modules designed to control the brightness of low-voltage incandescent (filament), halogen or LED lamps rated up to 120W per output at 24V. Operating from 9 to 32V DC, the modules are designed to be used in automotive and marine dash-panel applications where the backlighting and indicator lamps need to be dimmed at the same time. The units employ a very efficient PWM (pulse-width modulation) switching technique to provide excellent operation for loads up to 120 watts, 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 DIM13-2DIN is mounted in an 18mm wide (M1) vented DIN-Rail enclosure, and will fit in a standard electrical consumer unit or DIN enclosure. The DIM13-2W is functionally identical to the DIN version, but is wire ended and IP68 rated. The DIM12-2W is controlled by means of the supplied potentiometer. Please see the end of this datasheet for further information.

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 DIM13-2DIN and DIM13-2W use two switches for ‘brightness up’ and ‘brightness down’, and the DIM12-2W uses the supplied potentiometer. 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	DIM13-2DIN	DIM13-2W	DIM12-2W	Comment
Nominal Supply Voltage Range	9 – 32 V DC			
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	Up/Down Switch		Remote Potentiometer	
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		

DIM12-2W Optional Potentiometer Module – ENCPOT10K

Dimensions: Potentiometer module	31 × 21 × 23mm	L × W × H ±3% excl. pot. bush and shaft
Resistance	10 kΩ ±20%	
Electrical Connection	2 × 4mm ² Rising Clamp	
Bush	10mm dia. × 6mm long	fixing nut and washer supplied
Shaft	6mm dia. × ~30mm long	plastic shaft can be cut to required length
Rotational Indexing	280°	±10%



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.

The DIM13-2DIN and DIM13-2W are controlled by two switches for 'Increase Brightness' and 'Decrease Brightness'. A brief press of the respective switch will increase or decrease the brightness a small amount. If the switch is pressed continuously, the brightness will increase or decrease for as long as the switch is held, until either the fully-on or fully-off state is reached. The 'switch' can be any kind of switch, including relay contacts or pushbuttons, or both switches can be combined into a centre-off rocker switch. If both switches are pressed simultaneously the brightness remains unchanged. The other end of the switches (or rocker switch common) must be connected to the positive supply voltage, after a fuse. Please see the applications section on the next page for a schematic. Please note neither module is supplied with a switch, this allows the user to specify a switch to suit his/her application. We are able to supply switches on request.

The DIM12-2W is controlled by means of the supplied rotary potentiometer. The potentiometer is mounted remotely from the DIM12 and is connected using 2-core cable. The terminals of the potentiometer should be soldered to one end of the 2-core cable; the other end of the cable is connected to the DIM12-2W as shown in the diagram. Turning the potentiometer shaft clockwise will increase the lamp brightness, anti-clockwise will decrease the lamp brightness. The DIM12-2W features a fail-safe feature whereby in the event of an open circuit between the DIM12-2W and the potentiometer module, the output will default to full brightness.

The DIM12-2W can be used with any 10kΩ linear potentiometer, other than the supplied potentiometer. Only two terminals of the potentiometer need to be connected to the DIM12-2W: the wiper (central) terminal and left-most terminal with the shaft facing you. An optional fully enclosed potentiometer module is available separately – please see www.abeltronics.co.uk/products/encpot10k.

DIM13-2DIN Guidelines

The DIM13-2DIN 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.

DIM13-2W and DIM12-2W Guidelines

The DIM13-2W and DIM12-2W are 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 DIM13-2W and DIM12-2W fixing brackets are 1.2mm thick zinc plated steel, 40mm wide, and protrude 27mm from the enclosure. The fixing centres are 20mm apart and 5mm in diameter. The DIM13-2W and DIM12-2W 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.

DIM13-2W 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	Increase brightness	16/0.2 1.6mm dia.
Green	Decrease brightness	16/0.2 1.6mm dia.

DIM12-2W Connections

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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 x2	Potentiometer	16/0.2 1.6mm dia.

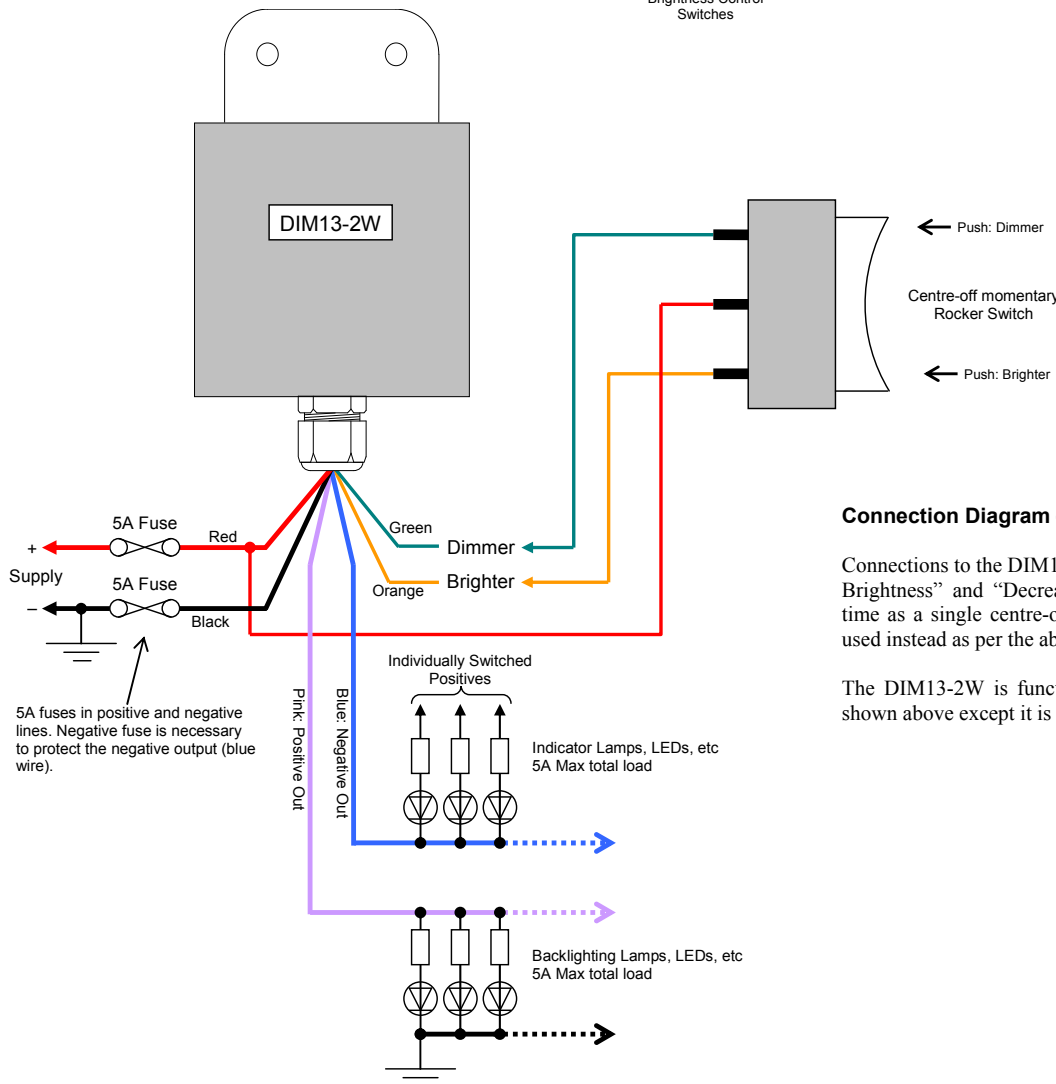
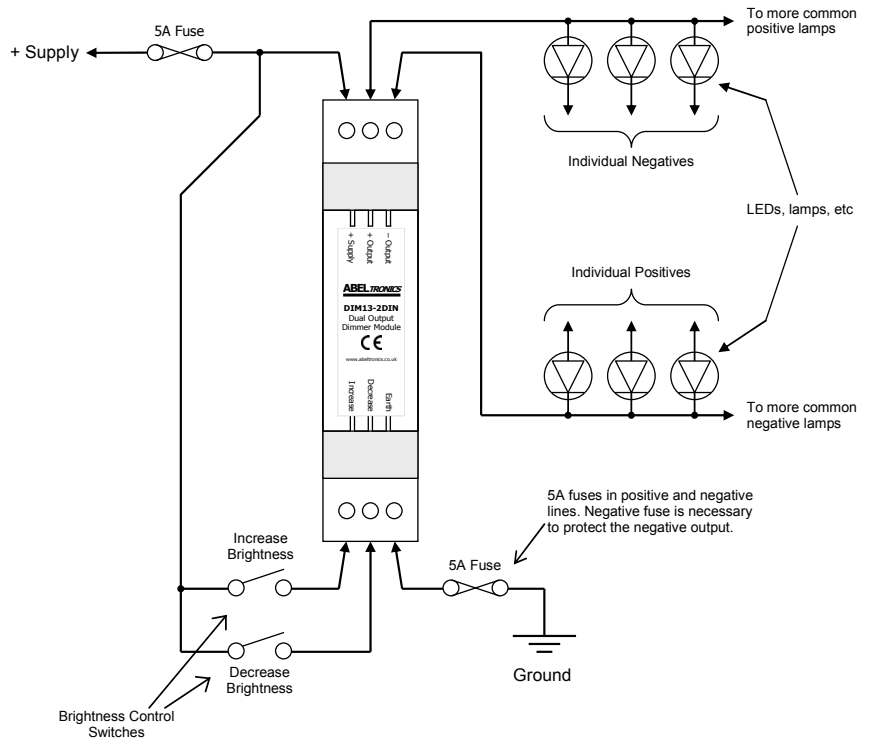
Connection Diagram – DIM13-2DIN

Connections to the DIM13-2DIN are shown to the right. The “Increase Brightness” and “Decrease Brightness” switches are shown below as momentary pushbutton switches, or can be combined together in a centre-off momentary rocker switch.

The common positive and common negative outputs are shown connected to LEDs (LED series resistor not shown), but can be connected to incandescent lamps, halogen lamps etc, as long as the current rating of the module is not exceeded.

The main supply fuse is shown here as 5A to ensure the module’s current rating is not exceeded. The fuse in the positive line only protects the positive output, and the fuse in the negative line protects the negative output.

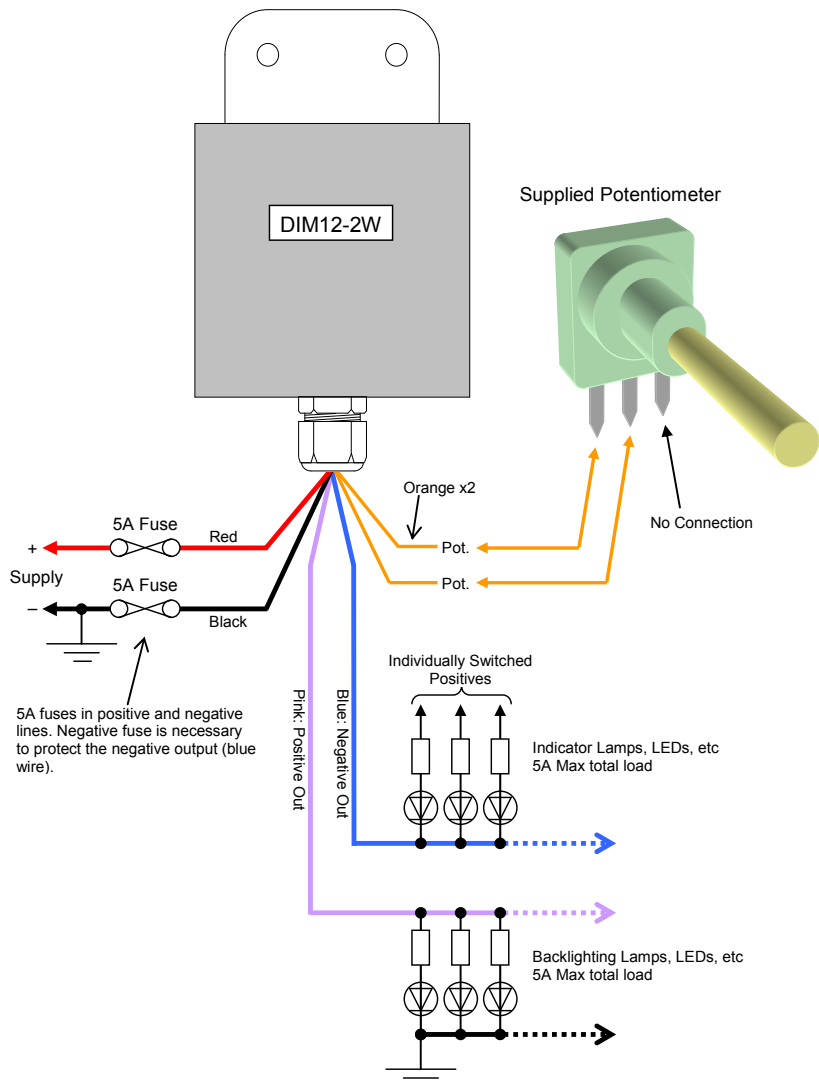
Both the positive and negative outputs are rated at 5A each meaning at 24V, the module is capable of controlling 240W of lighting in total.



Connection Diagram – DIM13-2W

Connections to the DIM13-2W are shown to the left. The “Increase Brightness” and “Decrease Brightness” switches are shown this time as a single centre-off rocker switch, but pushbuttons can be used instead as per the above diagram.

The DIM13-2W is functionally identical to the DIM13-2DIN as shown above except it is IP rated.



Connection Diagram – DIM12-2W

The DIM12-2W is connected as shown to the left. The diagram shows the dimmer connected to the supplied potentiometer – it is necessary to solder the orange wires to the potentiometer terminals. The optional enclosed potentiometer, ENCPOT10K, has terminal blocks to facilitate easier connection. Please see www.abeltronics.co.uk/products/encpot10k for further details.

Further Information

For more information, links to other products and to download the most current datasheet, please visit www.abeltronics.co.uk/dimmers. If you have any questions or queries, or require one of our dimmers to be modified to fit your application, please contact us by visiting www.abeltronics.co.uk

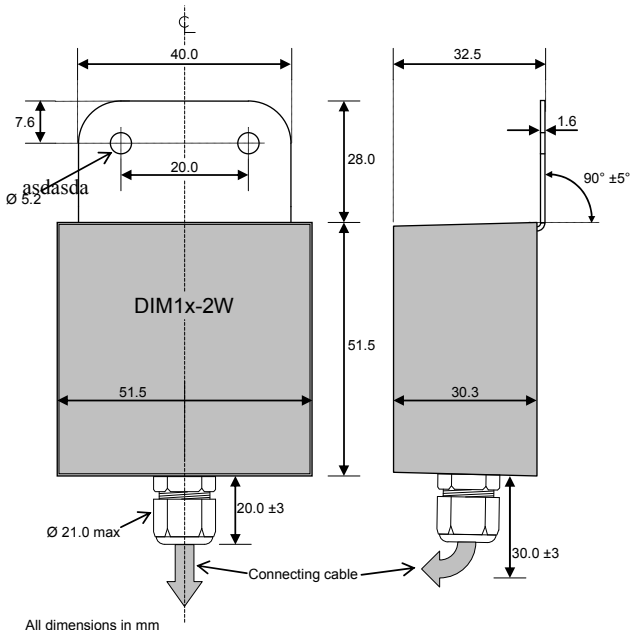
Also Available

- DIM10 – Power booster for DIMxx Modules
- DIM15 – Radio Controlled remote dimmer

Please visit www.abeltronics.co.uk/dimmers for more information.

Dimensional Drawings

DIM12-2W, DIM13-2W:



DIM13-2DIN:

