

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

- 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 and DIM13-2W 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 can be used in a wide variety of applications where DC low-voltage brightness control is desired, such as 12V or 24V automotive or marine dash-panels, low voltage architectural lighting, pond lighting, hazardous area lighting, etc. 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. 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 uses two switches for 'brightness up' and 'brightness down', and has 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 earth (dimmed to positive), and individual control indicators are switched to positive (dimmed to earth). 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	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, max, 12V	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		
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. fixing clips/bracket
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 earth connections, and as such should be connected solidly to the power source. The earth connection should be connected directly to a solid ground point.

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.

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 Guidelines

The DIM13-2W is fully sealed against water and oils and is mounted in an ABS enclosure filled with high temperature epoxy resin. It is 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 function of the wires is summarised below:

Colour	Function	Cable Size
Red	+ Supply	24/0.2 2.4mm dia.
Black	Earth	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.

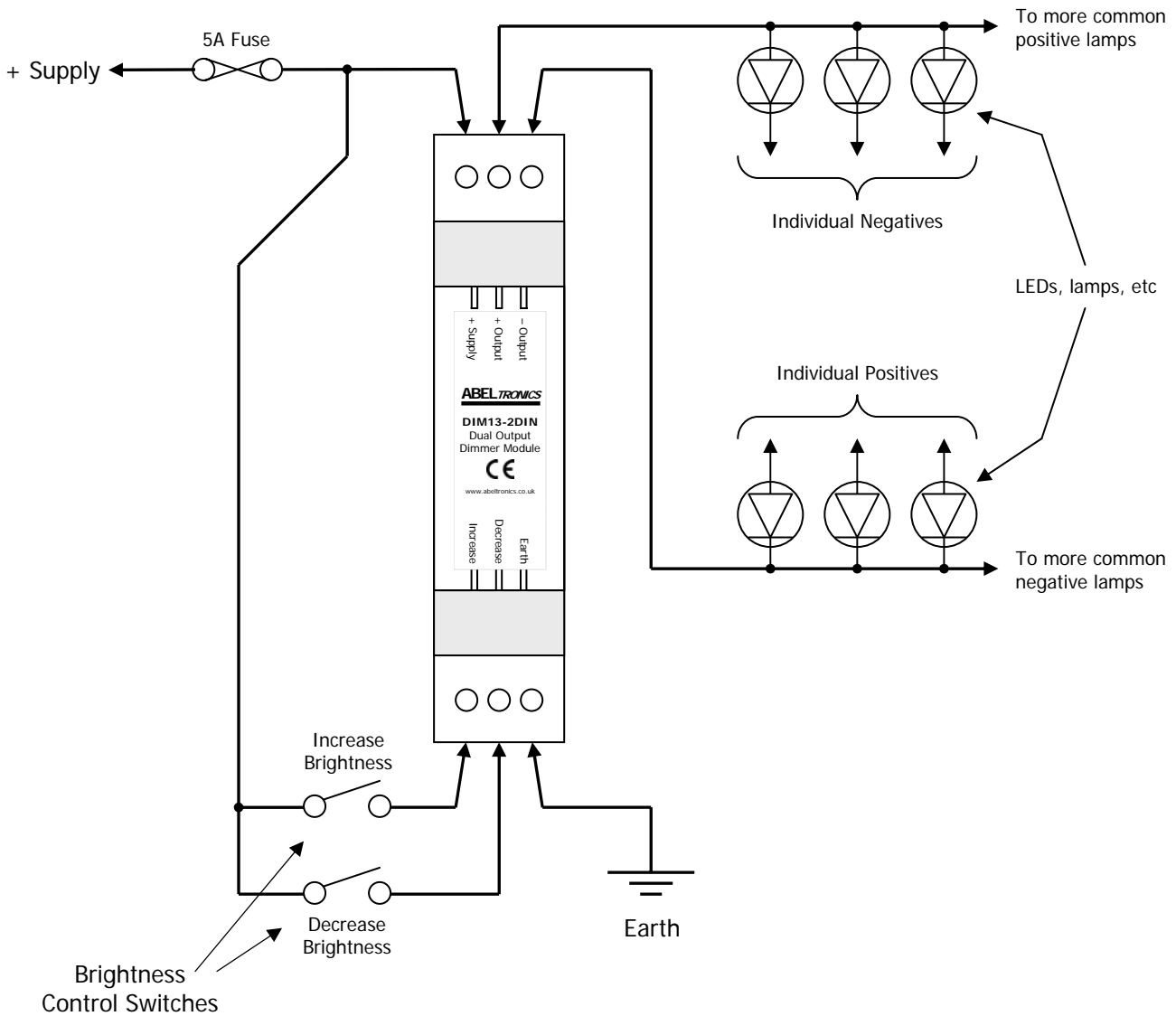
The DIM13-2W fixing bracket is 1.2mm thick zinc plated steel and is 40mm wide. It protrudes 27mm from the module. The fixing centres are 20mm apart and 5mm in diameter. The DIM13-2W will run warm with loads exceeding 3A per channel, and the fixing tab should be securely bolted to a metal chassis to dissipate the heat. The fixing tab is electrically isolated from the internal circuitry.

Please see below for the DIM13-2DIN applications information. The DIM13-2W is connected in the same way, and the function of each of the connections is identical between modules.

Applications Information – DIM13-2DIN

Connections to the DIM13-2DIN are shown below. 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. The negative output is switched directly to the earth terminal on the module. Negative output protection comes from the fuse(s) on the positive side of the negatively switched lamps.

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.