

Figure 1. Physical Photo of AEL28V90VAC1

FEATURES

- Transformer-less
- Light weight
- Single-ended output
- High efficiency
- Output voltage can be independent or dependant of the power supply input voltage

APPLICATIONS

- Driving an EL (Electroluminescent) lamp with high efficiency.

DESCRIPTION

This inverter converts a low DC input voltage, 19V to 31V, into a high AC output voltage, up to 90V, for driving a large area, up to 70 square inch, EL lamp. It comes with an internal POT (Potentiometer) for adjusting the output voltage magnitude so that the brightness of the EL lamp can be dimmed down when needed. In addition, an external 10kΩ POT can also be used to dim the output further, if needed. The inverter will work fine without connecting the external POT.

Depending on the applications, there are 2 versions for the output voltage control algorithms: the output voltage is independent of the input voltage, AEL28V90VACR; or the output voltage is dependant of the input voltage from the power supply, AEL28V90VAC1. For the dependant version, when setting the internal POT, or both internal and external POTs, to the maximum angle, the relationship between the input and output voltages is as following:

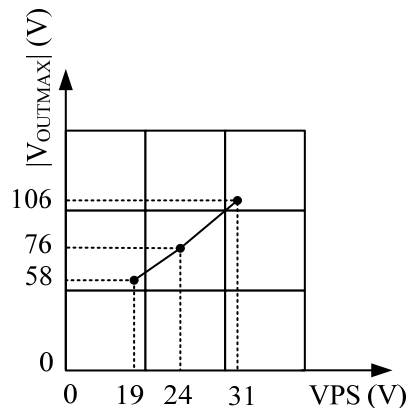


Figure 2. VPS vs. |VOUTMAX|

This version emulates unregulated inverter of which the output voltage magnitude is proportional to the power supply input voltage value. This type of inverter can be used to replace unregulated transformer based inverter directly.

Another type of inverter, so-called regulated version, is available for applications needing constant output voltage magnitude regardless of the input voltage value. The output voltage is solely set by the internal POT or the internal POT combined with the external POT.

Both versions of the controllers have a built-in potentiometer (POT), which can be used for adjusting the output voltage, thus the brightness of the EL lamp. The relationship between this POT and the output voltage is shown in Figure 3. In addition, an external POT can also be used for dimming the brightness further, the output voltage vs. the setting angle of the external POT is shown in Figure 4. The maximum turning angle of internal POT is 260°.

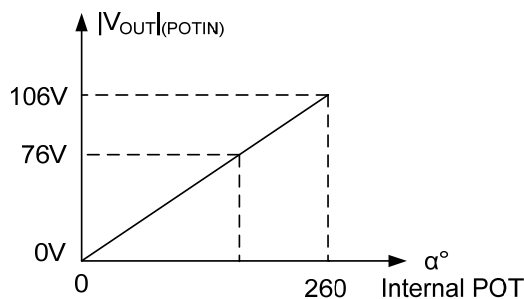


Figure 3. Internal POT Angle vs. $|V_{OUT}|$

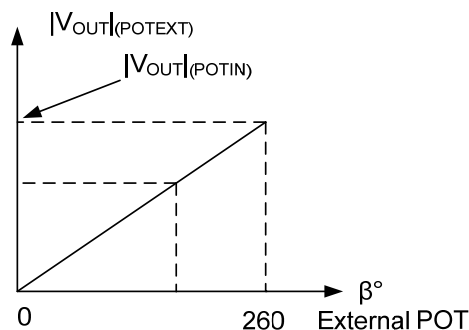


Figure 4. External POT Angle vs. $|V_{OUT}|$

In Figure 3 and Figure 4, where α is the internal POT angle, β is the external POT angle

SPECIFICATIONS

Table 1. Electrical Characteristics

All the parameters were measured under the ambient temperature $T_{Ambient} = 25^{\circ}C$, unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit/Note
Input Voltage	V_{IN}	Nominal load $I_{IN} \leq 260mA$	19	28	31	V
Input Current	I_{IN}				500	mA
Output Voltage	V_{OUT}	Load: 130Ω in serial with a 470nF capacitor	0		106	VAC
Output Current	I_{OUT}			260		mA
Output Frequency			495	560	625	Hz
Temperature Range				-40~85		°C
Load	An EL lamp of 70 in ² , equivalent circuit: 130Ω in serial with a 470nF capacitor.					
1. The internal POT adjusts the output voltage between 0 to 100% of its maximum output voltage. 2. The external POT, 10K 2W, can be added to adjust the output voltage which is set by the internal POT between 0 to 100%. The final output voltage = $K_{IN} \times K_{EXT} \times V_{MAX}$.						

$$|V_{OUT}| = \frac{\alpha}{260} \times \frac{\beta}{260} \times 106V,$$

If the external POT is not present, $\beta=260^{\circ}$.

The wiring diagram is shown in Figure 5. Please notice that the input power supply and the output share one ground wire, brown color; while the other ground wire, black color, is reserved for connecting the external POT.

The total inverter assembly with the wires is shown in Figure 6. The default wire length is 1 meter, it can be optionally specified by customers.

SAFETY PRECAUTIONS

1. Never touch the output wires when the inverter is working, since the output voltage very dangerous to touch by a human.
2. Do not run the inverter without a load at the output.
3. Do not short circuit the output wires to any other wires during the inverter's operation.
4. The output wires can only be touched 30 seconds after turning off the power.
5. The inverter can only be powered by a DC voltage of between 19V to 31V, otherwise, it might be damaged permanently.



THE CONNECTION DIAGRAM OF MODULE'S PERIPHERAL CIRCUIT

The leads colors in the figure below are identical with those in the physical AEL28V90VAC1.

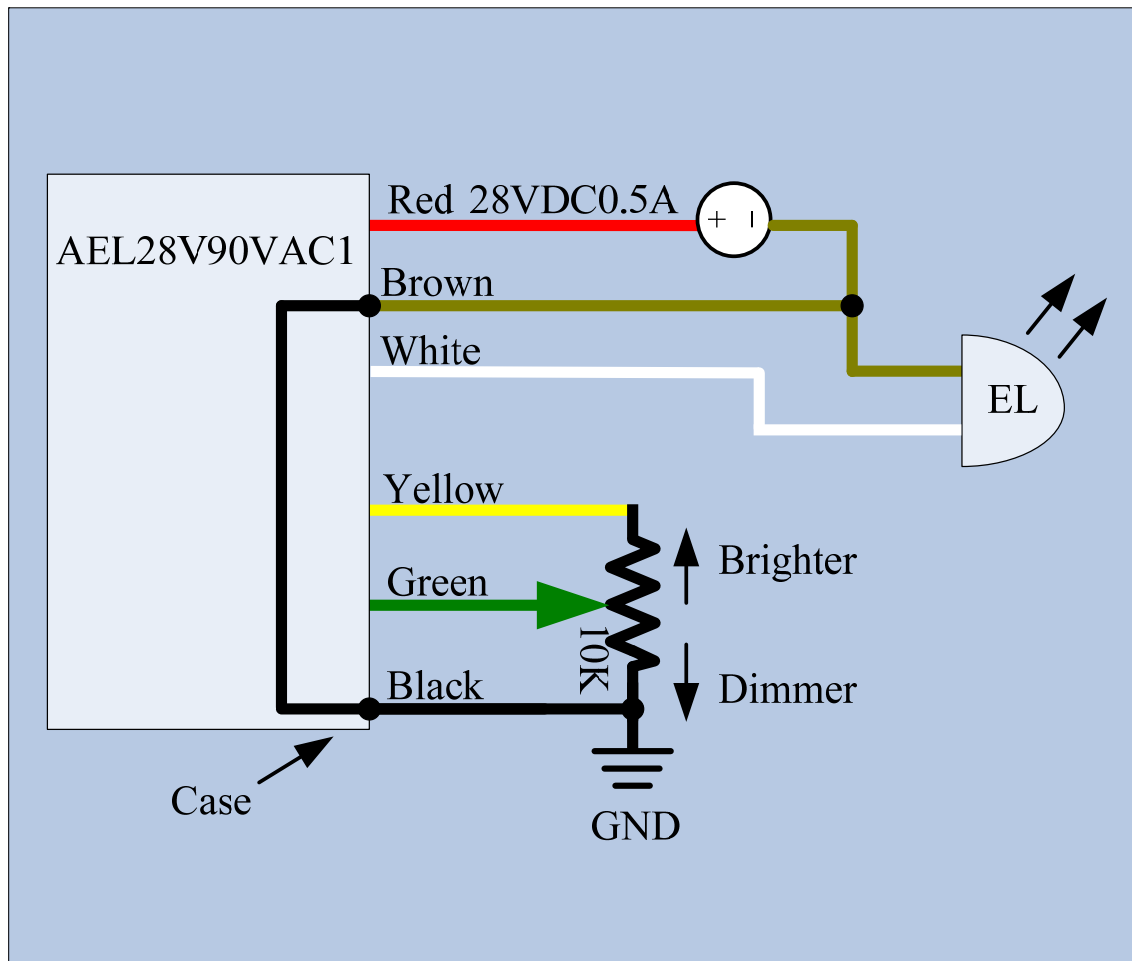


Figure 5. External Connection



DIMENSIONS

I. Dimension of the leads.



Figure 6. Leads of AEL28V90VAC1

II. Dimension of AEL28V90VAC1.

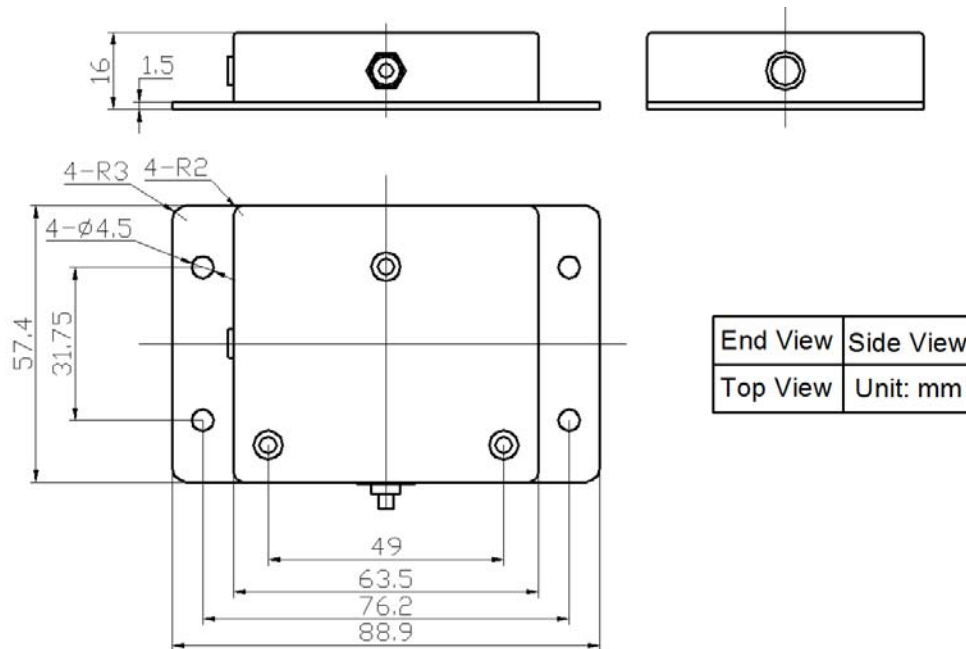


Figure 7. Dimensions for AEL28V90VAC1\



ORDERING INFORMATION

Part Number	Description	1 – 4 (PCs)	5– 24 (PCs)	25– 99 (PCs)	≥100 (PCs)
AEL28V90VAC1	Unregulated version, output voltage magnitude changes with power supply input voltage	\$420	\$380	\$300	\$250
AEL28V90VACR	Regulated version, output voltage magnitude does not change with power supply input voltage	\$410	\$370	\$290	\$240

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