

TWO YEAR WARRANTY

REDARC Electronics warrants to the original purchaser that the product(s) on the reverse side of this sheet ("Product") will be free, under normal use and maintenance, from defects in material and workmanship for a period of TWO YEARS from the date of purchase, subject to the conditions shown below.

1. Warranty

Unless otherwise stated in this warranty, Redarc Electronics will at its sole discretion either replace or repair any of the Product that is defective in material or workmanship within the abovementioned period without charge to the original purchaser.

2. Other Warranty

Subject to any terms implied by law, this warranty contains the whole of the Redarc Electronics' obligations and any distributor and the agents, officers and employees of such distributor and of Redarc Electronics are not authorised to vary or extend the terms of the warranty. The benefits conferred by this warranty are in addition to the conditions and warranties implied by applicable legislation conferring rights upon consumers, which apply only to the extent to which they may not by law be excluded.

3. Exclusions

This warranty shall not apply to, or include, any of the following:

- 3.1 Any defect or failure due to accident, misuse, abuse, movement of the Product to a new site, negligence, non-observance of any of the instructions supplied with the Product including the instructions on the reverse side of this sheet ("Operating Instructions") or local regulations on the part of any user, choice of location, improper installation, configuration or connection, or faulty power supply.
- 3.2 If the Product is installed, repaired or serviced by a person who is not a qualified auto electrician or electronics technician, or if non-approved parts have been fitted.
- 3.3 Failure to obtain proper maintenance for the Product or any associated equipment or machinery.
- 3.4 Failure to pay for the products in full or comply with Redarc Electronics' Trading Terms.
- 3.5 If the Product is used other than for any reasonable purpose for which it was manufactured, or is used in a way not specified by Redarc Electronics.
- 3.6 If the original purchaser sells, leases or otherwise parts with possession of the Product.
- 3.7 Deterioration due to normal use and exposure, including abnormal environmental conditions such as lightning strike, flood and extreme heat.
- 3.8 Any freight, packing and insurance expenses relating to transportation of the Product.
- 3.9 Any expenses relating to installation and/or removal of the Product.
- 3.10 Any damage, indirect or incidental, of whatever nature.

4. Limitations

4.1 Redarc Electronics is not liable for any consequential, indirect or accidental loss or damage or for any service not expressly provided herein (including without limitation liability for any loss or damage caused by a fault in the Product or its external wiring connections) and the liability of Redarc Electronics under this warranty is limited to the repair or replacement of defective material or workmanship by a qualified auto electrician or electronics technician, provided such person and work is approved by Redarc prior to commencement. Subject to **clause 2**, Redarc Electronics is hereby excluded to the maximum extent permitted by law from all other liability in respect of the Product.

4.2 While Redarc Electronics warrants, where applicable, that the Product is free from defects in materials and workmanship under normal use at the time of delivery, Redarc Electronics does not warrant that the Product will meet any user specific requirements or that the operation of the Product will be uninterrupted or error-free.

5. Owner's Responsibilities

- 5.1 Maintenance of the Product and associated equipment and/or machinery is the responsibility of the owner. The owner must retain evidence that proper maintenance has been performed on the Product by Redarc Electronics or a qualified auto electrician or electronics technician. Claims made during the warranty term will not be accepted if resulting from lack of maintenance rather than faulty material or workmanship.
- 5.2 The owner must operate the Product in accordance with all of the Operating Instructions.
- 5.3 Upon discovery of a fault the owner must return the Product to the distributor with full details of the nature of the fault. Removal of the Product must be done by a qualified auto electrician or electronics technician to ensure that the warranty remains valid. A written report describing the circumstances of failure must accompany the returned Product with proof of purchase which clearly shows the date of such purchase by the original purchaser.
- 5.4 If the Product is found to be working satisfactorily on return to Redarc Electronics a reasonable charge will be made for the cost of testing, packing and freight. The Product will be returned on receipt of the amount charged.

FREE TECHNICAL ASSISTANCE



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KOLO Series Keys ON Lights ON Controller

Headlights aren't just for night time and inclement weather use. Recent US statistics show that by driving with your headlights on at all times, even on bright sunny days, you reduce the likelihood of being involved in a collision by as much as 32% (source: State of Michigan). Turning on your headlights lets the other driver see you first; because the human eye is light-seeking, drivers, pedestrians, and cyclists will see an oncoming car sooner and be less likely to pull into its path.

While the biggest advantage of the system is when natural light is low, such as at dusk or dawn or when skies are overcast, research indicates that they are also an advantage even on bright, sunny days. Drivers will see an oncoming car, truck or bus sooner and make a more accurate estimate of its rate of approach.

FUNCTION

The microprocessor controlled KOLO is used in a negative earth vehicle to turn on the headlights whenever the ignition switch is on. Both 12V and 24V models are available as shown in the table below.

OPERATION

The KOLO has three internal 30A relays, all controlled by the microprocessor. These relays are turned on by the ignition switch +12V/+24V input. The relay contacts are "voltage free" (not connected to any other circuit internally) and can be used to switch +12V/+24V or ground either direct to lights or to lighting relays.

Besides the basic operation there are other features that may be used if required:

- Park/tail lights may also be turned on.
 - Parklight switch inputs (use either the ground input or the +12V/+24V input depending on vehicle wiring) to switch off the headlights, if parklights are required without headlights.
 - High beam may be disabled if only the low beam is required with ignition (this feature is disabled when parklight/headlight switch is turned on).
 - Disable input that (when grounded) will switch the unit off. This may be grounded (e.g.) by the handbrake switch, neutral switch, door switch or a manual switch to turn the headlights off at these times.
- The KOLO operates in the following way (where relevant wiring options are chosen).
- All three relays are turned on 10 seconds after ignition is turned on.
 - When the parklight switch is turned on, relays 1 & 3 are turned off, 2 remains on.
 - If the disable input is grounded, the ignition input is over-ridden and all three relays are turned off. Note that if the parklight switch is on, relay 2 will remain on in this case.

The following feature is available in the KOLOxxDUO models only.

- While lights are turned on by ignition, turning the parklight switch on then off again in less than one second will over-ride the unit and turn all three relays off. This function can be reset by turning the parklight switch on then off again or by turning the ignition off then on again.

Unused inputs or outputs should be folded back and taped.

OPTIONS

Various options can be programmed into the microprocessor during assembly, for example:

- The turn on delay can be decreased or increased (reducing battery starting load).
- A turn off delay can be included (useful at night).
- Lights can be held off until vehicle voltage reaches 13V (26V) (reducing battery starting load).

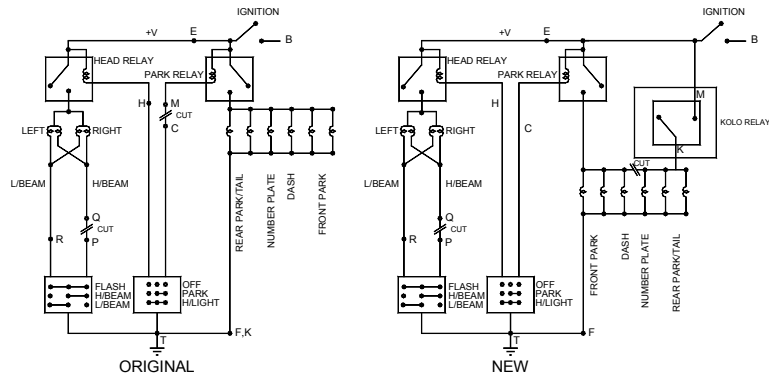
MODEL	KOLO12DU	KOLO12DUO	KOLO24DU	KOLO24DUO
Voltage Range	10-15VDC	10-15VDC	20-30VDC	20-30VDC
Override Option	NO	YES	NO	YES
Dimensions	90x70x32mm	90x70x32mm	90x70x32mm	90x70x32mm
Weight	400g	400g	400g	400g
Warranty	2 years	2 years	2 years	2 years

FREE TECHNICAL ASSISTANCE, contact Redarc Electronics
Ph (08) 8322 4848, Fax (08) 8387 2889
or Email power@redarc.com.au
Specifications are subject to change without notification.

FREQUENTLY ASKED QUESTIONS

QUESTION: When I install the KOLO on a vehicle which has an electronic dash readout, the display goes dim when I start the car. This makes the display almost impossible to read during day light. Why is this and how can I stop it?

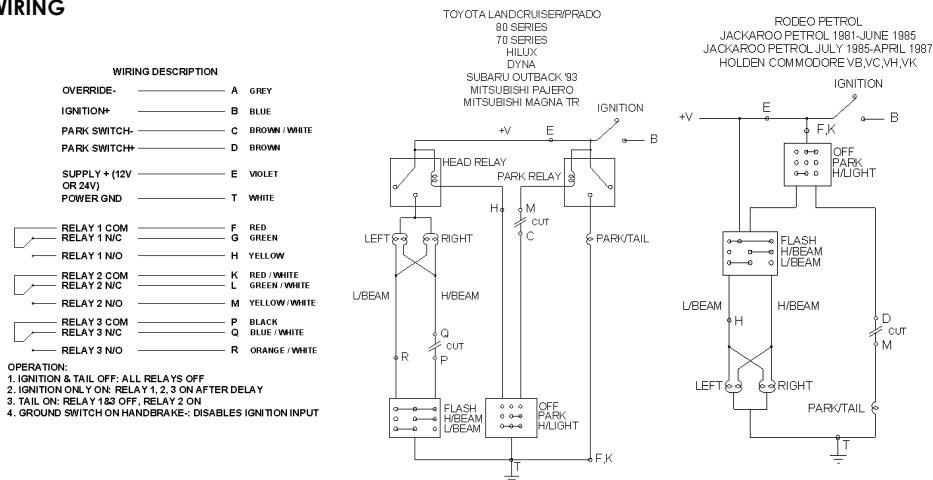
ANSWER: These displays are designed to dim when the lights are turned on, which normally occurs when it is dark, and hence stops the driver from being "blinded" by the bright display. Normal KOLO wiring activates the tail light circuit, which is normally directly connected to the dash lights. Hence, when the KOLO turns on the tail lights, the dash circuit assumes the lights have been turned on and dims the display. The fix is quite easy, and essentially only requires the rear tail light circuit to be isolated from the rest of the circuit. This can often be done under the driver's side door sill. An example of what needs to be done is given below. The example is for a 1993 Subaru Outback. The wiring diagrams are from the standard ones shown in this instruction sheet, but the single tail globe has been expanded to show more accurately what really exists on a vehicle. Basically all that has been done, is that the KOLO relay which normally activates the total park/tail circuit has been re-allocated to only power the rear tail light after they have been isolated from the rest of the circuit. This same arrangement can be applied to other vehicle applications, but if in doubt contact Redarc.



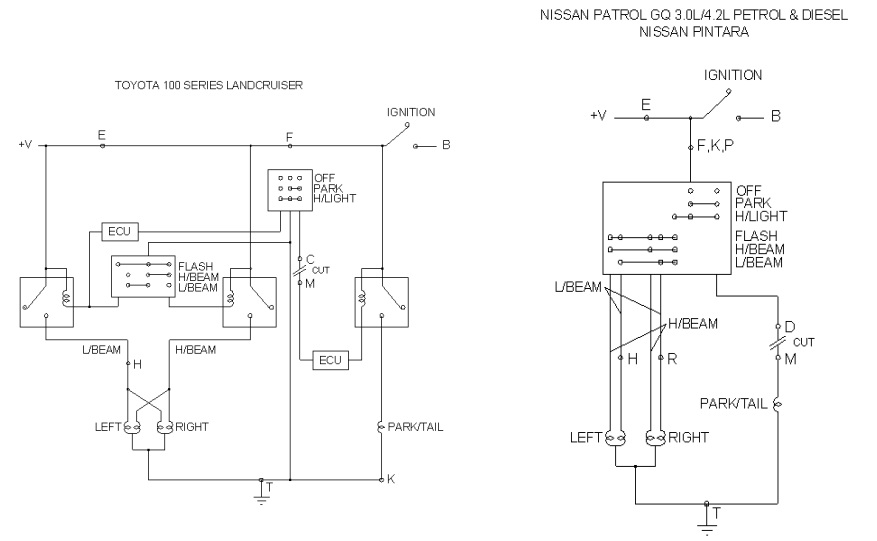
QUESTION: Can the vehicle headlights remain off until the vehicle battery voltage reaches say 13V?

ANSWER: Yes. REDARC can customise the products to include this feature. This is a good idea to reduce the battery load. It also automatically switches off the headlights when the vehicle is having maintenance performed on it in a workshop (with the engine off but ignition on, the battery voltage will fall below 13V and the headlights will turn off). Please note that some mining companies insist that the headlights remain on at all times and therefore this feature would not be allowed.

WIRING

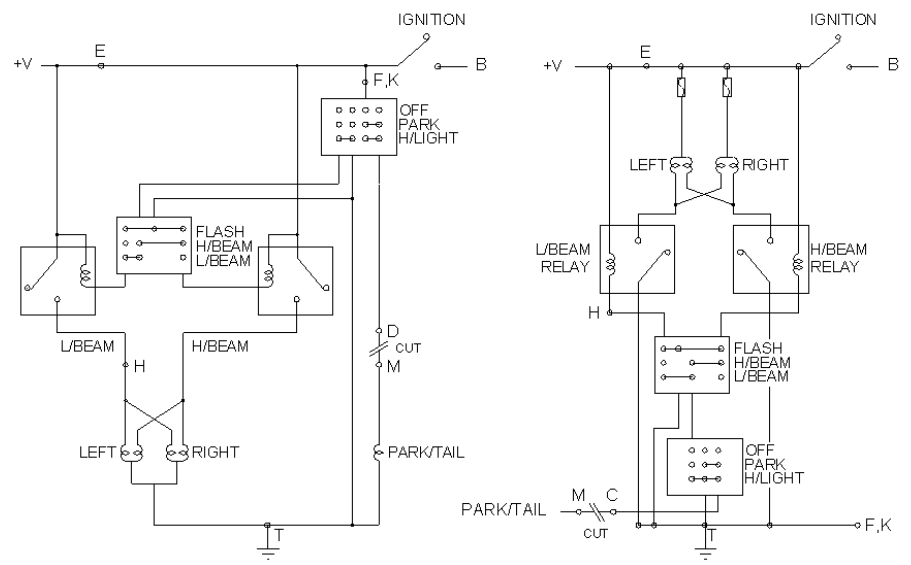


NOTE: The following wiring diagrams are examples only and may not compare to the original wiring diagrams. Please refer to www.redarc.com.au for up to date wiring diagrams and/or further troubleshooting information.



JACKAROO PETROL MAY 1987-APRIL 1992
COMMODORE VL,VN,VP

HOLDEN COMMODORE VS, VT, VY



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