Timpdon Electronics

UltraRad Radio System Controller Model *URC11*

For operation, the ***URC11*** requires the following additional ***UltraRad*** radio system components, supplied separately:

- ***UltraRad* Radio Transmitter Model *UTX1, UTX2 or UTX3***
- ***UltraRad* Radio Receiver Model *URX1***

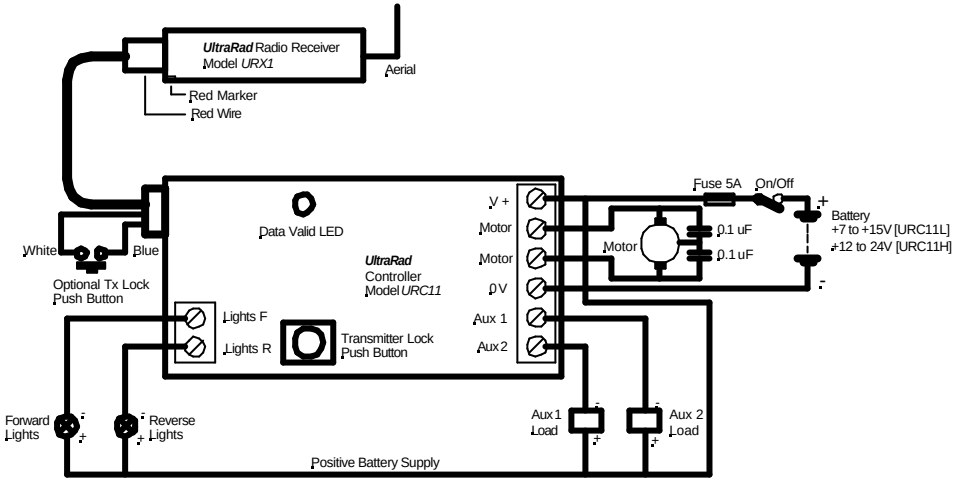
The ***UltraRad*** Controller Model ***URC11*** is a radio controlled PWM motor speed controller for battery electric vehicles, designed to operate as part of the ***Timpdon Electronics UltraRad*** radio control system.

In addition to motor speed control, it incorporates two additional radio controlled solid state switches for the control of, for example, horns and lights and two solid state switches for the automatic control of directional Forward and Reverse lights.

Features

- Connects directly to any ***UltraRad*** radio receiver.
- Can be locked to any ***UltraRad*** transmitter.
- Digital microprocessor controlled bi-directional motor speed controller.
- High efficiency, pulse width modulated motor output for accurate speed control, especially at low speeds.
- Automatic directional forward / reverse lighting.
- Small size – 70mm x 37mm x 16mm.
- Wide battery voltage range – 7 to 15 V d.c. [URC11L] or 12 to 24 V d.c. [URC11HJ
- 2.5 A maximum continuous motor load current. 1 A maximum load on Auxiliary and Lighting outputs.
- Screw terminals for external motor, lighting, auxiliary and battery connections. Flying lead for connection to radio receiver.
- Fail safe feature to stop vehicle if radio control is lost.

Installation and Wiring



Notes

1 Connect the **V+** terminal to the **battery positive** and the **0V** terminal to the **battery negative**. Connect the two **motor** terminals to the motor. Keep the motor leads as short as possible and twist them together, to minimise electrical interference.

If, on testing, the direction of travel is opposite to that you expected, reverse the **motor** connections at the terminal block.

2 Note that the ***URC 11*** is available in two supply voltage ranges:

URC11L 7V to 15V supply
URC11H 12V to 24V supply

Ensure that you have selected the correct model for your supply voltage, or vice versa !

3 **Take care with the battery polarity**. The ***URC11*** is **not** protected against reverse supply polarity.

Reversed polarity will result in very high currents and may damage the ***URC11*** and the radio receiver ***URX1***. You are recommended to fit a 5A fuse in the positive battery lead for protection.

4 Fit a power **on / off** switch in the **battery positive** supply lead. Remember the ***URC11*** and the ***URX1*** use power even when the speed is set to zero. The quiescent current is approximately 20 mA plus an additional 25 mA when the reverser is set to the **reverse** position.

5 Connect any auxiliary loads between the appropriate auxiliary terminals and the **V +** terminal.
Each auxiliary output can switch a maximum of 1 A.

6 Connect directional lighting loads between the appropriate lighting terminals and the **V +** terminal. Each lighting output can switch a maximum of 1 A. You may use either incandescent lamps or LEDs. If LEDs are used, suitable series resistors must be incorporated to limit the LED current. Refer to ***Technical Note 1 – Using LED Indicators***, available from the *Timpdon Electronics* website, for more details.

7 Plug the flying lead into the connector on the ***URX1*** radio receiver. Make sure that the **red wire** or **red marker** is on the **same side** as the **red marker** on the ***URX1***. **If you apply power with this connector reversed, you may irreparably damage the *URX1*.**

8 If the ***URC11*** is mounted in an inaccessible position, you may fit an external transmitter lock push button connected between the **White** and **Blue** wires, if desired. These wires are connected to the same points as the internal push button.

9 Two 0.1 µF motor suppression capacitors are supplied loose with the ***URC11***. Connect one capacitor directly between each motor terminal and the metal body of the motor.

Data Valid LED

The **Data Valid** LED will flash once each time a valid radio control data packet is received from the ***UltraRad*** transmitter.

In general, data is transmitted approximately once every second, increasing to a maximum of one transmission every 300 milliseconds when settings values are being changed.

On first power up, this LED may not flash, as when the ***URC11*** is shipped, it is not normally locked to any transmitter.

On first use, therefore, you must lock it to your transmitter, following the instructions below.

Transmitter Lock

The ***URC11*** will respond only to a single ***UltraRad*** radio transmitter, to which it has been locked. The transmitter to which it will respond can be changed by the user at any time, using the following procedure.

1 Ensure that only the ***UltraRad*** transmitter to which the ***URC11*** is to be locked is powered up in the vicinity.

2 Apply power to the ***URC11*** and ***URX1***.

3 Press and hold the **transmitter lock** push button for two seconds, and then release it.

4 If the ***URC11*** has correctly locked to the transmitter, the **Data Valid** LED will start flashing in synchronism with the **Transmit** LED on the ***UltraRad*** transmitter.

5 Your radio control system is now fully operational, and will remain locked to the selected transmitter until you change it again. The lock setting will be remembered when you remove power from the ***URC11***.

Fail Safe

In normal operation, the vehicle will maintain the control settings sent in the last valid transmission received by the ***URC11***. However, if no valid data is received for a continuous period of 10 seconds, the vehicle will be halted automatically. Normal operation will be resumed when radio control is re-established.

Reverser Operation

Whenever the transmitter reverser is switched from **Off** to **Forward** or **Reverse**, motor power is inhibited until the transmitter speed control is first reduced to zero speed, and then increased. This feature ensures that your loco can not be accidentally reversed at high speed.

The directional lighting outputs are directly controlled by the transmitter reverser switch setting. When the reverser is set to **Off**, both **Forward** and **Reverse** lights are extinguished.