Timpdon Electronics

UltraRad Radio System

Receiver/Controller Model *URC12*

For operation, the ***URC12*** requires the following additional ***UltraRad*** radio system component, supplied separately:

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

The ***UltraRad*** Controller Model ***URC12*** is a combined ***UltraRad*** radio receiver and PWM motor speed controller for battery electric vehicles, designed to operate as part of the ***Timpdon Electronics UltraRad*** radio control system.

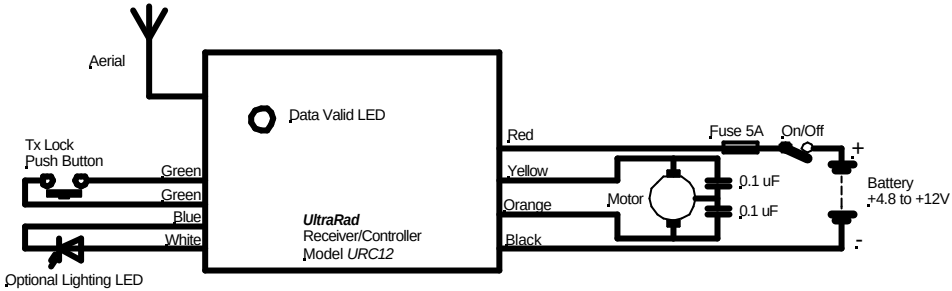
It is designed to give the same performance as other ***UltraRad*** controllers for battery electric vehicles, within a smaller footprint.

In addition to motor speed control, with both **full** and **shunt** speed ranges, it incorporates one additional radio controlled solid state switch for the control of a LED lighting circuit.

Features

- Built in ***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, with **full** and **shunt** speed ranges controlled by **Aux 1** transmitter switch. 2.5 A maximum continuous motor load current.
- Additional LED lighting output, controlled by **Aux 2** transmitter switch.
- Small size – 52mm x 42mm x 15mm.
- Wide battery voltage range – 4.8 to 12 V d.c.
- Flying leads for motor, lighting, transmitter lock and battery connections.
- Fail safe feature to stop vehicle if radio control is lost.

Installation and Wiring



Notes

1 Connect the **red** wire to the **battery positive** and the **black** wire to the **battery negative**. Connect the **yellow** and **orange** wires to the motor. Keep the motor leads as short as possible and, ideally, twist them together, to minimise electrical interference.

If, on testing, the direction of travel is opposite to that you expected, reverse the **yellow** and **orange** wires at the motor.

2 **Take care with the battery polarity**. The ***URC12*** is **not** protected against reverse supply polarity.

Reversed polarity will result in very high currents and may damage the ***URC12***. You are recommended to fit a 5A fuse in the positive battery lead for protection.

3 Fit a power **on/off** switch in the **battery positive** supply lead. Remember the ***URC12*** uses power even when the speed is set to zero. The quiescent current is approximately 15 mA plus an additional 25 mA when the reverser is set to the **reverse** position.

4 Connect the transmitter lock switch supplied to the two **green** wires. You may replace this switch with another **normally open** push button switch, if desired.

5 Optionally, connect a single lighting LED directly between the white [anode] and blue [cathode] wires, as shown. Refer to ***Technical Note 1 – Using LED Indicators***, available from the *Timpdon Electronics* website, for more details on using LED indicators.

6 Two 0.1 µF motor suppression capacitors are supplied loose with the ***URC12***. 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 ***URC12*** 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 ***URC12*** 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 ***URC12*** is to be locked is powered up in the vicinity.

2 Apply power to the ***URC12***.

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

4 If the ***URC12*** 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 ***URC12***.

Shunt and Full Speed Operation

The ***URC12*** has two speed ranges, **full** and **shunt** speed, selected by the **Aux 1** transmitter switch. In addition, the motor voltage at low controller settings is stepped to overcome the dead band caused by the minimum motor voltage required to overcome brush drop, thus giving a wider control range.

Full Speed Range **Aux 1** switch in **off** position.
Motor control range is 0 to 100% of battery voltage.

Shunt Speed Range **Aux 1** switch in **on** position
Motor control range is 0 to 70% of battery voltage.

Fail Safe

In normal operation, the vehicle will maintain the control settings sent in the last valid transmission received by the ***URC12***. 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.