Timpdon Electronics

UltraRad Radio System
Controller Model *URC3*

The ***UltraRad*** Controller Model ***URC3*** is a radio controlled servo controller for live steam vehicles fitted with separate servos for **regulator** and **reverser**, designed to operate as part of the ***Timpdon Electronics UltraRad*** radio control system.

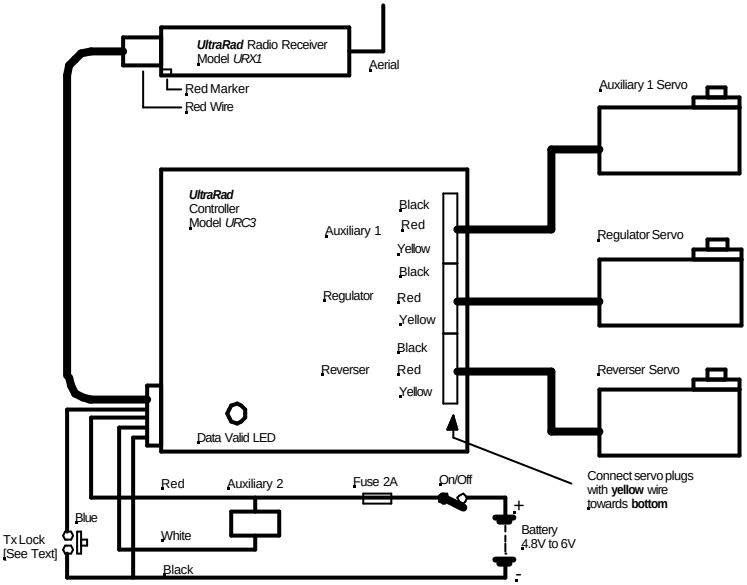
For operation, the ***URC3*** requires the following additional ***UltraRad*** radio system components, supplied separately:

- ***UltraRad* Radio Transmitter Model *UTX2***
- ***UltraRad* Radio Receiver Model *URX1***

Features

- Connects directly to any ***UltraRad*** radio receiver.
- Can be locked to any ***UltraRad*** transmitter.
- Digital microprocessor controlled.
- Three standard servo outputs for control of **regulator**, **reverser** and **steam horn**.
- Additional 1A solid state switch output for control of lights.
- User calibration of all servo settings to match vehicle installation.
- Small size – 35mm x 35mm x 14mm.
- 4.8 to 6 V battery supply.
- Plug connectors for direct connection to servos. Flying lead with plug for connection to radio receiver. Flying leads for battery and Auxiliary 2 output connections.
- Fail safe feature to stop vehicle if radio control is lost.

Installation and Wiring



Notes

1 The ***URC3*** is designed for operation on 4.8 to 6 V battery supplies **only**.

2 Make sure you connect the servos to the ***URC3*** with the polarity shown.

3 Connect the **red** wire to the **battery positive** and the **black** terminal to the **battery negative**. If used, connect the **positive** polarity of the **Auxiliary 2** load to the **red** wire and the **negative** to the **white** wire.

4 **Take care with the battery polarity**. Reverse polarity may damage the ***URC3***, the ***URX1*** or the servos.

5 See below for connection options for the transmitter lock push button switch [**Blue** wire].

6 Fit a power **on/off** switch in the **battery positive** supply lead. Remember the ***URC3***, the ***URX1*** and the servos all use power even when the vehicle speed is set to zero. Current consumption of the ***URC3*** and ***URX1*** ia approximately 15 mA. You are recommended to fit a 2A fuse in the battery lead for battery protection.

Servo Calibration

On the ***URC3***, all servo settings can be fully user calibrated so that you may set them to match the actual servos on your vehicle. As all such settings are made within the ***URC3***, any transmitter can then be used with the ***URC3*** without affecting the settings or performance of the vehicle. There are ten separate servo adjustments available, each of which may be programmed individually:

- **Regulator Minimum Position**
  The regulator servo position when the **speed setting** control is set to **minimum**.
- **Regulator Maximum Position**
  The regulator servo position when the **speed setting** control is set to **maximum**.
- **Regulator Rotation Rate – Increasing Speed**
  The maximum rotation rate of the **regulator** servo for an **increase** in speed setting.
- **Regulator Rotation Rate – Decreasing Speed**
  The maximum rotation rate of the **regulator** servo for an **decrease** in speed setting.
- **Reverser Stop Position**
  The reverser servo position when the **reverser** switch is set to **stop**.
- **Reverser Forward Position**
  The reverser servo position when the **reverser** switch is set to **forward**.
- **Reverser Reverse Position**
  The reverser servo position when the **reverser** switch is set to **reverse**.
- **Reverser Rotation Rate.**
  The rate at which the servo will turn when the **reverser** switch setting is changed.
- **Auxiliary 1 Off position**
  The auxiliary 1 servo position when the **Aux 1** control switch is set to **off**.
- **Auxiliary 1 On position**
  The auxiliary 1 servo position when the **Aux 1** control switch is set to **on**.

All servo calibration is performed from the ***UTX2*** transmitter, operating in a special calibration mode. Refer to the ***UTX2*** user manual and **Technical Note 6 – *UltraRad* Controller Model *URC3* – Servo Calibration Procedure** for details.

All servo calibration settings are stored in non-volatile memory within the ***URC3***, and are retained when power is removed.

Transmitter Lock

The ***URC3*** will respond only to a single ***UltraRad*** radio transmitter, to which it has been locked.

There are two methods of locking the ***URC3*** to a transmitter, **local** and **remote**, and the transmitter to which the ***URC3*** is locked can be changed at any time.

See also **Technical Note 8 – *UltraRad* Transmitter Lock Procedures.**

Local Lock

1. Connect an external normally open **Tx Lock** push button switch between the blue and black wires, as shown in the connection diagram above.
2. Ensure that only the ***UltraRad*** transmitter to which the ***URC3*** is to be locked is powered up in the vicinity.
3. Apply power to the ***URC3*** and ***URX1***.
4. Press and hold the **Tx Lock** push button.

Remote Lock

This method can only be used with a *UTX2* transmitter.

1. Omit the **Tx Lock** push button switch shown in the connection diagram above, and connect the **blue** wire to 0V [the **black** wire], permanently.
2. Power up the ***UTX2*** transmitter
3. Apply power to the ***URC3*** and ***URX1***.
4. Within 20 seconds, press and hold the ***Tx Lock*** push button on the ***UTX2*** transmitter.

As soon as the ***URC3*** locks to the transmitter, the **Data Valid** indicator will start to flash in synchronism with the **Tx** indicator on the ***UltraRad*** transmitter.

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 ***URC3***.

Data Valid Indicator

The **Data Valid** indicator 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 ms when settings values are being changed.

On first power up, this indicator will not flash, as when the ***URC3*** is shipped, it is not locked to any transmitter.

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

Fail Safe

In normal operation, the vehicle will maintain the control settings sent in the last valid transmission received by the ***URC3***. 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.

Operation with a UTX1 Transmitter

Although the ***URC3*** is designed to be used with a ***UTX2*** transmitter, it can also be operated using a ***UTX1*** transmitter, with certain limitations:

1 The remote transmitter lock option is not available, so you will need to lock the ***URC3*** to the ***UTX1*** using a local **Tx Lock** push button switch.

2 The servo calibration functions are not available. However, once these have been set for a particular vehicle using a ***UTX2*** transmitter, they should not need to be changed.

3 The reverser trim functions of the ***UTX2*** transmitter are not available. The reverser servo will always set to the calibrated maximum positions.

Other Timpdon UltraRad Radio Control Products

Transmitters

Model ***UTX1***

For battery electric vehicles
Analogue speed channel
Digital Forward/Stop/Reverse channel
Two digital auxiliary channels

Model ***UTX2***

For live steam vehicles
Analogue speed channel
Analogue Forward/Stop/Reverse channel
Two digital auxiliary channels

Receivers

Model ***URX1***

Compatible with all ***UltraRad*** transmitters

Controllers

Model ***URC1***

For battery electric vehicles
Bi-directional PWM speed controller

Model ***URC2***

For battery electric vehicles
Bi-directional PWM speed controller
Two digital auxiliary channels for horn and lights

Model ***URC4***

[Under Development]
For live steam vehicles with combined regulator and reverse servo
Two servo outputs
- Regulator / Reverser
- Auxiliary – for steam whistle

One digital auxiliary channel – for lights