System Overview

The T150 / R160 is a portable, long range, programmable radio remote control system. Designed as a compact and easy-to-use product, this member of the ORIGA family puts complete control of your crane where it’s needed most, with the operator. It’s robust, easy to install and has complete self-diagnostics. This system can be a simple cable replacement or add intelligence to make it a total crane control package. It’s a radio, a PLC and a valve driver all in one.

The R160 Receiver is designed to be powered from a 12VDC or 24VDC system. It features 19 solid state, high-side driver input / output controls and a reliable E-Stop control.

The T150 Transmitter uses standard, long lasting AA batteries. Each T150 Transmitter uses a unique ID code to ensure that no two systems will conflict at a job site.

The ORIGA T150 / R160 system uses 900MHz Frequency Hopping Spread Spectrum (FHSS) technology. FHSS devices concentrate their full power into a very narrow signal that randomly hops from frequency to frequency within a designated band. This transmission pattern, along with CRC-16 error-checking techniques, enables signals to overcome interference that commonly affects licensed radios.

Features

- FCC, ISC, CE approved
- License free
- 1200 foot range
- Hand held / weatherproof / ergonomic
- Simple “wire-and-use” installation
- Resilient to impact and shock
- Available with optional trigger for proportional control
- Available with an optional tether cable
- Factory configurable for all custom applications.

Specifications

<table>
<thead>
<tr>
<th></th>
<th>R160 Receiver</th>
<th>T150 Transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>5.1” x 4.7” x 1.4” (130mm x 119mm x 36mm)</td>
<td>7.9” x 4.2” x 4.1” (200mm x 125mm x 105mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.78lbs (0.345kg)</td>
<td>1.7lbs (0.78kg)</td>
</tr>
<tr>
<td>Construction</td>
<td>High impact plastic, weatherproof</td>
<td>High impact, low temperature plastic, weatherproof</td>
</tr>
<tr>
<td>Input Power</td>
<td>+9V to 30VDC</td>
<td>4AA alkaline batteries</td>
</tr>
<tr>
<td>Battery Life</td>
<td>N/A</td>
<td>&gt;120 hours (continuous use)</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-40F to 158F (-40C to 70C)</td>
<td>-40F to 158F (-40C to 70C)</td>
</tr>
<tr>
<td>Outputs</td>
<td>3A (max) each (sourcing), 10A (max) each (combined)</td>
<td>N/A</td>
</tr>
<tr>
<td>Antenna</td>
<td>Internal</td>
<td>Internal</td>
</tr>
<tr>
<td>Approvals</td>
<td>USA- FCC part 15.247 Canada- ISC RSS 2210</td>
<td></td>
</tr>
</tbody>
</table>

ORIGA T150 Faceplate

Radio / Tethered System

Includes:
- T150 Transmitter
- R160 Receiver
- R160 Output Cable
- Tether Cable

Radio Only System

Includes:
- T150 Transmitter
- R160 Receiver
- R160 Output Cable
Install the Receiver

Use the Wiring Diagram and the Connector Diagram below to connect the Receiver pins directly to the appropriate contacts of the machine electronics. R160 Output Cables are provided with every system to simplify the wiring process. Refer to the Anti 2 Block Wiring section below to correctly connect the A2B circuit. Tips on mounting, power connections and filtering are also provided under Installation Considerations.

Wiring Diagram

<table>
<thead>
<tr>
<th>Pins</th>
<th>I/O</th>
<th>Wire Colors</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7</td>
<td>19</td>
<td>Black/Red</td>
<td>Factory Configurable Only</td>
</tr>
<tr>
<td>B8</td>
<td></td>
<td>Black/White</td>
<td>Factory Configurable Only</td>
</tr>
<tr>
<td>B12</td>
<td>18</td>
<td>White/Black</td>
<td>A2B Installed Input</td>
</tr>
<tr>
<td>B11</td>
<td>17</td>
<td>Blue/White</td>
<td>Dominator Selected Input</td>
</tr>
<tr>
<td>B10</td>
<td>16</td>
<td>Blue/Black</td>
<td>Proportional Control</td>
</tr>
<tr>
<td>A1</td>
<td>15</td>
<td>Black/White</td>
<td>Compressor Output (Latching)</td>
</tr>
<tr>
<td>A2</td>
<td>14</td>
<td>Green/White</td>
<td>Engine Stop Output</td>
</tr>
<tr>
<td>A4</td>
<td>13</td>
<td>Red/White</td>
<td>Engine Start Output</td>
</tr>
<tr>
<td>B9</td>
<td>12</td>
<td>Orange/White</td>
<td>Extension Out Output</td>
</tr>
<tr>
<td>B6</td>
<td>11</td>
<td>White</td>
<td>Extension In Output</td>
</tr>
<tr>
<td>B5</td>
<td>10</td>
<td>Green/Black/White</td>
<td>Winch Up Output</td>
</tr>
<tr>
<td>B4</td>
<td>9</td>
<td>Red/Black/White</td>
<td>Winch Down Output</td>
</tr>
<tr>
<td>B2</td>
<td>8</td>
<td>White/Red/Black</td>
<td>Lower Up Output</td>
</tr>
<tr>
<td>B1</td>
<td>7</td>
<td>Orange/Black</td>
<td>Lower Down Output</td>
</tr>
<tr>
<td>A12</td>
<td>6</td>
<td>Orange/Red</td>
<td>Rotate CW Output</td>
</tr>
<tr>
<td>A10</td>
<td>5</td>
<td>Blue/Red</td>
<td>Rotate CCW Output</td>
</tr>
<tr>
<td>A11</td>
<td>4</td>
<td>White/Red</td>
<td>Speed High Output (Latching)</td>
</tr>
<tr>
<td>A9</td>
<td>3</td>
<td>Red/Green</td>
<td>Speed Relay Output</td>
</tr>
<tr>
<td>A8</td>
<td>2</td>
<td>Orange/Green</td>
<td>E-Stop Out (Switches to Power with Link)</td>
</tr>
<tr>
<td>A7</td>
<td>1</td>
<td>Black/White/Red</td>
<td>Power Input (+9V to 30VDC)</td>
</tr>
<tr>
<td>A6</td>
<td></td>
<td>Red</td>
<td>Ground</td>
</tr>
<tr>
<td>A3</td>
<td></td>
<td>Black</td>
<td></td>
</tr>
</tbody>
</table>

R160 Operation Notes

Dominator Selected Input must be wired to Power.
Speed Relay Output is on when any proportional function is operated and will remain on for 2 seconds after the last function is released.

Anti 2 Block Wiring

When installing the ORIGA system to the vehicle, an optional Anti 2 Block (A2B) system can be wired to the Receiver.
Use this wiring option if the A2B circuit is independent of the Receiver and operates by breaking Ground from the desired solenoids.

Proper Wiring: Wire the A2B Input Pin (B12) to Battery.

Installation Considerations

Mounting and Installation
The Receiver can be mounted by fastening two ¼” bolts through the two mounting holes in the unit’s enclosure. When mounting, ensure that the Receiver is oriented so that the text is reading right.

When selecting a mounting point for the Receiver, it is recommended that the location require only a minimal length of wiring to connect it to the control panel, that it will be in a visible area where it has good exposure to the operator and that it is mounted on a surface that is protected from the weather and sustains minimal vibration.
It is also recommended that the Receiver have the best possible line of sight with the Transmitter.

Power Connections and Wiring
Whenever a power connection is made to an electronic device, it is a good practice to make both the Power (+) and Ground (-) connections directly to the Battery and avoid connecting the power from the charging side of existing wiring or making use of existing “ACC” or other peripheral connection points.

Make sure that wire of sufficient gauge and insulator type is used when connecting the outputs of the Receiver to the control panel. Observe any component manufacturer’s instructions and recommendations for proper integration of their product. This includes the power ratings and requirements of such components as relays, valves, solenoids, etc.

Filtering and Noise Suppression
Whenever a solenoid or electromagnetic switch is controlled by the Receiver, it is a good practice to install a Diode across its terminals to ensure that surges and spikes do not continue back into the circuit. Appropriate 36V Bi-directional Diodes kits can be ordered under the OMNEX part number “AKIT-2492/01”.

Opening the R160 Case
The cap on the R160 enclosure is held on by two plastic tabs at opposing sides, which can be unlatched as shown using a screwdriver. Once the cap is free, the R160 can slide open.
Power the Transmitter

When the Receiver has been installed, install batteries into the Transmitter and turn it on as explained below.

1) Install Batteries
Remove the battery cover on the back of the Transmitter using a slotted screwdriver and insert 4 "AA" alkaline batteries. Orientation of the batteries is embossed inside the battery housing. No batteries are required when the Transmitter is connected to the Receiver by a Tether Cable.

2) Turn on the Transmitter
Refer to the Light Legend below for diagram details.

If the Transmitter's (Active) light does not flash, check the battery orientation.
To turn off the Transmitter, press the [E-Stop] button.

Test the Transmitter / Receiver Link

Follow these steps to ensure that there is a Radio Link between the Transmitter and Receiver.
Refer to the Light Legend below for diagram details

The ORIGA system is now ready for use.

Download ID Code (Use in case of Link Test failure)

Follow these steps to download the Transmitter’s unique ID Code into the Receiver. This will allow the Receiver to establish a Radio Link with that Transmitter.
Refer to the Light Legend below for diagram details.

NOTE: It is necessary to download the ID Code when replacing either the Transmitter or the Receiver.
NOTE: When the Transmitter is connected to the Receiver with a Tether Cable, it is not possible or necessary to download the ID Code.

Calibrating Proportional Controls

The Transmitter's Trigger controls the Receiver's proportional output. The Trigger is used in conjunction with any of the Transmitter's switches. The proportional output can be activated when a switch is held UP or DOWN; it will become active at an increasingly high level as the Trigger is pulled. The minimum and maximum levels of the proportional output can be calibrated by following these steps.
Refer to the Light Legend below for diagram details.

NOTE: The calibration settings can be reset to factory default in steps 4 and 5 by holding the calibration switch UP or DOWN for 5 seconds.

* All switches, except the Calibration switch, remain active in Calibration Mode. A switch can be activated during calibration to help determine the desired levels.

Light Legend

Solid | Slow Flash | Fast Flash

R160 Lights: Red Light | Green Light
**Diagnostics**

**T150 Transmitter**

- **Tether connection detected**
- **Low battery. Unit will run approximately 10 hours after (Battery) light starts flashing.**
- **Flashing rapidly for 10 seconds indicates a Transmitter failure.**

**Normal Operation**

- The (Active) light will flash 2 times per second, indicating that the Transmitter is sending signals to the Receiver. The (Active) light will remain on momentarily whenever a switch is pressed or released.

**On Power Up**

- Release the [E-Stop] button within 10 seconds to power up the Transmitter, or the unit will power down.

**On Power Down**

- Unit is still powered. Check for stuck switches, as the Transmitter will not power down when a switch is ON.

**R160 Receiver**

- The E-Stop relay in the Receiver is closed and operating properly.
- The E-Stop relay in the Receiver is open due to an abnormal condition. The reason may be the Transmitter not communicating with the Receiver.
- An internal fault with the E-Stop has been detected.
- A function is ON. This indicator logically orders all outputs.
- A blown fuse or faulty wiring has been detected. It is most likely caused by a wiring short to Ground.
- A wiring short to the battery has been detected.
- The Receiver has a radio Link with a valid Transmitter. This light will flash in sync with the Transmitter’s (Active) light.
- The Receiver does not have a radio Link with a valid Transmitter.

**FCC Rules and Compliance**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15.247
ISC RSS 210