

An Oshkosh Truck Corporation Company

ORIGA T150 / R160 User Manual Wireless Control System for the IMT Telescopic Crane



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.





R160 Receiver

T150 Transmitter

Specifications

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

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

IMT # 99903628



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					Connector Diagram	
	Pins	I/O	Wire Colors		Functions	Connectors as seen from under Receiver
R160 Receiver Internal Wiring	B7 B8			\rightarrow	Factory Configurable Only Factory Configurable Only	Input/Output 1 Connector A
	B12 B11 B10	19 18 17	Black/Red White/Black Blue/White	\rightarrow	A2B Installed Input	Input/Output 3 Input/Output 5
	A1 A2	16 15	Blue/Black Black/White	$\stackrel{\checkmark}{\rightarrow}$	Dominator Selected Input	O O O O O O O O O O
	A4	14	Green/Black	Ś	Proportional Control	
	 B9 B6 B5 B4 B3 B2 B1 A12 A10 A11 A9 A8 A7 	13 12 11 10 9 8 7 6 5 4 3 2 1	Red/White Orange White Green/Black/White Green Red/Black/White White/Red/Black Orange/Red Orange/Black Blue/Red White/Red Red/Green Orange/Green	<u> </u>	Compressor Output (Latching) Engine Stop Output Engine Start Output Extension Out Output Extension In Output Winch Up Output Winch Down Output Lower Up Output Lower Up Output Rotate CW Output Speed High Output (Latching) Speed Relay Output	Input/Output 16 Ground Proportional Control E-Stop Output Power / E-Stop In Input/Output 7 Connector B Input/Output 7 Input/Output 9 Input/Output 10 Input/Output 10 Input/Output 11 Input/Output 12 Input/Output 12 I
	A5 A6		Black/White/Red	→	E-Stop Out (Switches to Power with Link) Power Input (+9V to 30VDC) Cround	Input/Output 13 Input/Output 17 Input/Output 18
<u>''</u> i	A3		Black	>	Ground	

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 $\frac{1}{4}$ " 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.

under Download ID Code below.

The ORIGA system is now ready for use.

T150 Battery Housing

3: Release [E-Stop]

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.



Refer to Opening the R160 Case

Light Legend

** If left idle in Setup Mode for over 30 seconds, the Receiver will time out. The (Link) light and (Status) light will flash red rapidly. To return to Setup Mode, repeat step 4.

Calibrating Proportional Controls

Solid

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.

Slow Flash



Fast Flash

R160 Lights:

Red Light

Green Light

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



If the Receiver's (Link) light does not flash green, follow the steps

Diagnostics T150 Transmitter

R160 Receiver

	Tether connection detected	FUNCTION / LINK STATUS FUNCTION / LINK STATUS Receiver is closed and operating properly.	STOP FAULT STATUS		
	Low battery. Unit will run approximately 10 hours after (Battery) light starts flashing.	FUNCTION/ FAULT LINK STATUS FAULT LINK STATUS The E-Stop relay in the Receiver is open due to an abnormal condition	The Receiver has detected an internal		
± v v v v v v t	Flashing rapidly for 10 seconds indicates a Transmitter failure.	The reason may be the Transmitter not communicating with the Receiver.	ESTOP FAULT LINK STATUS A low battery condition		
Normal Operation	The (Active) light will flash 2 times per second, indicating that the Transmitter is sending sig- nals to the Receiver. The (Active) light will remain on momentarily whenever a switch is pressed or released.	An internal fault with the E-Stop has been detected.	has been detected. In order to detect intermittent conditions caused by poor or corroded ground or power circuits, the GREEN light will continue to flash for 30		
© ● ★	Release the [E-Stop] button within 10 seconds to power up the Transmitter, or the unit will	A function is ON. This indicator logically orders all outputs.	seconds after the condition has been re- moved.		
On Power Up	The Transmitter is in Download Mode.	A blown fuse or faulty wiring has been de- tected. It is most likely caused by a wiring short to Ground.	for replacing the fuse are found on the second page of this manual.		
on Power Up	Press and release the [E-Stop] button within 10 seconds to power up the Transmitter, or the unit will power down.	A wiring short to the battery has been detected.	Output powered from an external source higher than power		
Alternating flash m	Stuck switch detected. Ensure that all switches are in a centered position. The Transmitter will not power up when a switch is ON. eans that the Transmitter is in Calibration Mode.	The Receiver has a radio Link with a valid Transmitter. This light will flash in sync with the Transmitter's (Active) light.	A Setup Failure has occurred. Either hold the [Setup] button for 5 seconds to return to Setup mode or cycle		
On Power Down	Unit is still powered. Check for stuck switches, as the Transmitter will not power down when a switch is ON.	The Receiver does not have a radio Link with a valid Transmitter.	power to return to the normal operating mode.		
Light Legend O _{Solid} Slow Flash Fast Flash R160 Lights: O _{Red Light} O _{Green Light}					

Replaceable Parts & Accessories

Part	Part Number	Description
Batteries	B0010	4 x AA alkaline
R160 Output Cables	ACAB-2493-01	Generic Output Cable- see illustration
	ACAB-2493-03	Output Cable with Tether connection
T150 Tether Cable (8 m. / 25 ft.)	ACAB-2455-02	see illustration
Toggle Switch	AKIT-1504-04	Honeywell 1TL1-7
E-Stop Button	AKIT-1821-02	RAFIX16, 25mm, C&K 1.30074.2810300 See illustration
Magnet Back	AKIT-2498-02	see illustration
Bipolar Diode Kit	AKIT-2492-01	36V, Bi-directional, Motorola P6KE36CA
Fuse	F0039	Bussman ATC-15
Socket Connectors	J0418	Grey, 12-pin, Deutsch DTM06-12SA
	J0419	Black, 12-pin, Deutsch DTM06-12SB
Wedge	J0420	12 pos., Deutsch WM12S
Pin	J0417	Female, Size 20, Deutsch 0462-201-20141
Sealing Plug	J0421	Size 20, Deutsch 0413-204-2005
R160 Connector Kit	AKIT-2337-01	Includes Deutsch socket connectors, wedges, pins and sealing plugs.





Tether Cable

R160 Output Cable



Magnet Back

E-Stop

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 harm-ful interference, and (2) this device must accept any interference conjudicity in the forence any interference received, including interference that may cause undesired operation.

FCC Part 15.247 ISC RSS 210