



# WIRELESS ANTI-TWO-BLOCK INDICATOR

## Installation and Operation Manual

Crane Warning Systems Atlanta  
U.S. Distributor for Rayco / Wylie Systems  
6175 Hickory Flat Hwy Suite #110-376  
Canton, GA 30115  
866-672-2951 Toll Free 678-261-1438 fax  
[www.craneindicators.com](http://www.craneindicators.com) website  
[sales@craneindicators.com](mailto:sales@craneindicators.com) email











The purpose of this manual is to provide the customer with the operating procedures essential for proper machine operation (its intended purpose). Emphasis must be put on proper usage. All information in this manual should be read and understood before any attempt is made to operate the machine.

Since the manufacturer has no direct control over machine application and operation, conformity with good safety practice in this area is the responsibility of the user.

All procedures herein are based on the use of the system under proper operating conditions, with no deviations from the original design. The alteration and/or modification of the equipment is strictly forbidden without written approval from RaycoWylie Systems.

The R147 Anti-two block indicator is to be regarded only as an aid to the operator.

This system must never be used as a substitute for the good judgment of a crane operator when carrying out approved crane-operating procedures. The crane operator is responsible for the safe operation of the crane. If not set properly, the indicator equipment will not necessarily prevent crane damage due to overloading and related causes.

The operator must carefully read the information in both this manual and the crane manufacturer operator's manual before he operates a crane equipped with a RaycoWylie system indicator. He must also have read and understood all federal, state and local regulations applicable to his job. The correct functioning of the system depends upon daily inspection.

Any suspected faults or apparent damage should be immediately reported to the responsible authority before using the crane.



Since safety of workers and proper use of the machine is of primary concern, different symbols are used throughout this manual to emphasize certain points. The following definitions indicate the level of hazard related to these symbols.

The safety of the workers is compromised whenever these symbols appear in this manual. Please take the time to read and understand these definitions!



**DANGER:** INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.



**CAUTION:** INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY. IT MAY ALSO BE USED TO WARN THE OPERATOR AGAINST UNSAFE PRACTICES



**IMPORTANT:** INDICATES A SITUATION THAT MAY CAUSE MACHINE DAMAGE IF NOT CORRECTLY FOLLOWED.



**NOTE:** PROVIDES INFORMATION THAT MAY BE OF SPECIAL INTEREST.





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## GENERAL DESCRIPTION OF THE SYSTEM

### 1.1 Introduction

The R147 WIRELESS ANTI-TWO-BLOCK SYSTEM is a device which aim is to warn the operator and shut off crane motion controls upon an impending two-block situation. It has been conveniently designed to fit on telescopic cranes, boom trucks, derrick trucks and conventional lattice cranes.

There are two basic elements in the system.

- 1) A display/receiver unit in the cab able to manage two radio switches generating an electrical signal output used to activate lockout function. The display/receiver comes standard for 12V or 24V negative body machines. For machines requiring non-standard electrical systems, adapting relays or different installation procedures might be needed as further detailed.
- 2) A radio switch to be installed at the tip of the boom and/or jib. It detects the « two-block » condition and send the information to the Display unit by radio link.

This system will easily adapt to all crane types and it requires only a minimum of installation time.

### 1.2 Warning



When using R147 system, always observe the safety rules and regulations applicable in the country of operation to reduce the risk of injury or damage to the equipment. Each safety instruction throughout this manual must be taken into consideration when using the R147 system. The information contained in this manual will help qualified workers to properly operate and efficiently perform maintenance.

## 1.3 Description of Components

### 1.3.1 Display Unit

The display is mounted in a convenient position in front of the operator's working area. It's microprocessor based, meaning that there is a computer inside the box with the operating software.

This software has 2 operating modes allowing different functions:

- 1) Normal Mode
- 2) Calibration Mode

These modes will be described in detail in the operating section of this manual.

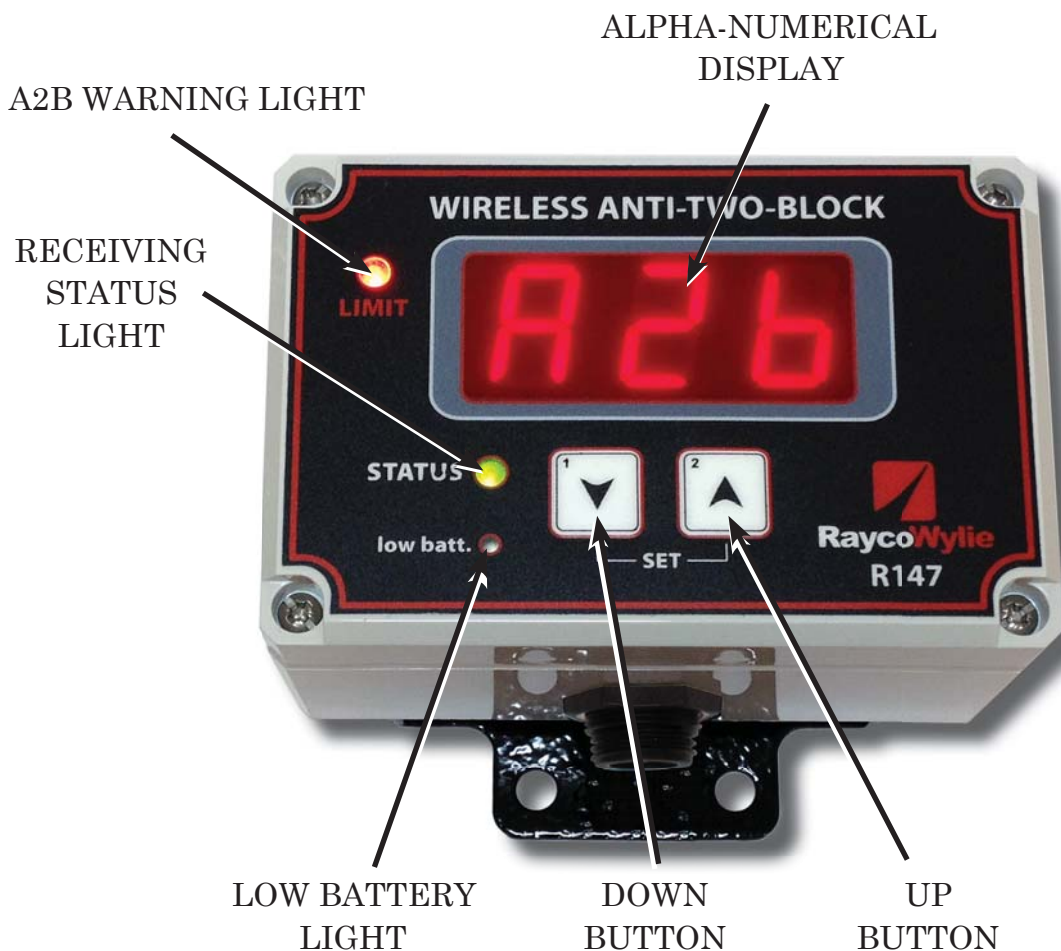


Fig. 1: R147 Display box

### 1.3.2 Wireless ATB Switch

The Wireless ATB switch is delivered with a chain and block. A bracket supplied with the kit must be welded on the tip of the boom to anchor the ATB switch. The switch contains 4 x AA standard lithium or alkaline batteries and is personalized by a serial number called «ID Number». The ID number is composed of 4 alphanumeric numbers. The two first digits identified by « H » stand for High part of the ID number and the two last ones identified by « L » stands for Low part of the ID number. This number is programmed in the Display unit at the factory. Therefore, if the Wireless ATB Switch delivered with your system must be replaced for some reasons, your Display unit will have to be re-programmed with the ID number of the new switch.

The ATB Switch contains different parts described as follows:

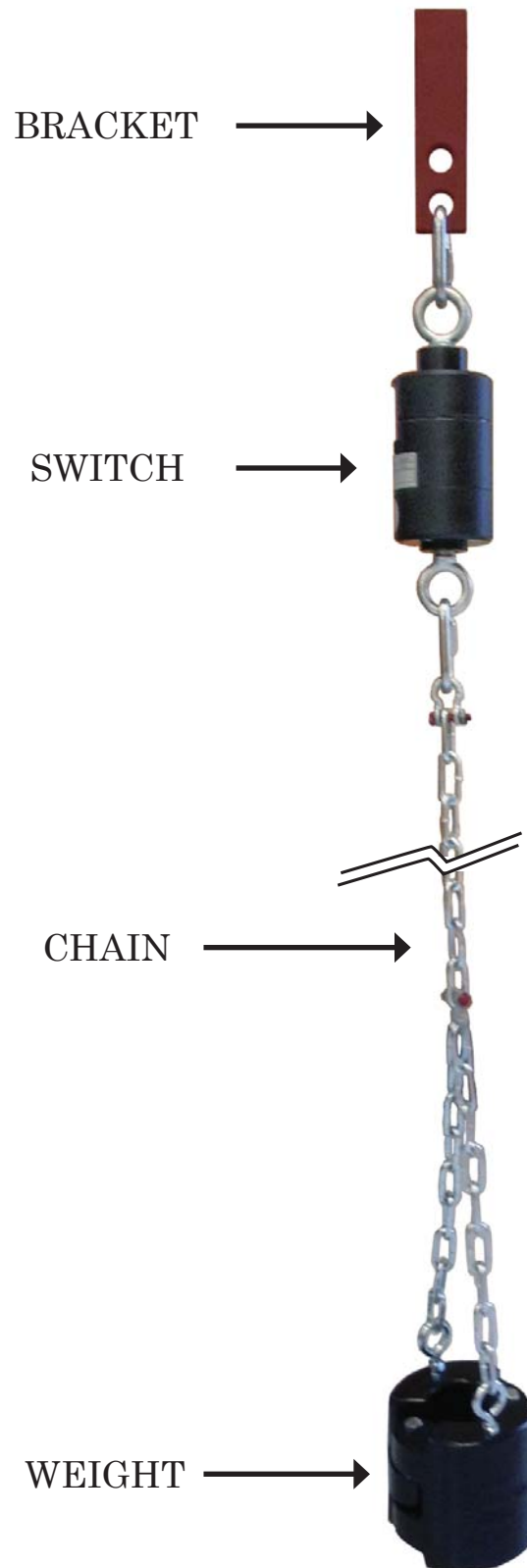


Fig. 2: ATB Switch Assembly

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## OPERATING PROCEDURE

### 2.1 Power On

The system is automatically engaged at the crane startup or on PTO engagement. The normal operation of the crane then starts. When the display is turned on, it begins a sequence by illuminating all lights and displays on screen «8.8.8.», then it shows the High part followed by the Low part of the ID number of the switch #1. It is then followed by the High part and the Low part of the ID number of the switch #2 (if installed).

Following this sequence, the display enters in a «Listening» mode, waiting for a valid radio transmission from the Wireless ATB Switch, which is matched with the ID number programmed inside the display unit. During that time, the display will flash a « 1 » on the screen and the green status light meaning that it is waiting for a valid radio transmission from the ATB switch. If your system has been programmed to manage 2 switches, the display will flash a « 1 » and a « 2 » and the green status light meaning that it's waiting for a valid transmission from both switches. The operator must force the Wireless ATB Switch to transmit by causing a two-block condition; this will allow the verification of the good functionality of the switch.



Fig. 3: R147 Waiting for transmission from the ATB switch

## 2.2 Normal Mode

Once a reliable radio communication link is established with the Wireless ATB Switch, the «1» will disappear off the screen and the green status light will remain on without flashing, meaning that the system has been able to match the ID number received from the switch and has entered in the Normal mode (ready to operate).



Fig. 4: R147 Normal Mode of operation (no two-block)

If a two-block condition occurs during the Normal operation, the red «A2B WARNING» indicator light will turn on, «A2B» will appear on the screen and the buzzer will sound continuously until the situation is rectified. If a lockout system has been installed, motions for telescoping out and hoisting up will be stopped. If the hoist is separated from the boom, then motion for booming down will also be stopped. To sum up, the operator must either hoist down or telescope in.



Fig. 5: R147 in a Two-Block condition



## 2.3 Override/Bypass

It is possible to bypass the lockout system when it's activated by pressing the « UP » and «Down » buttons simultaneously. The bypass will be activated for 5 seconds.



Press both buttons simultaneously to bypass motion cut for 5 seconds

Fig. 6: Bypassing the R147 system

## 2.4 Low Battery

The LOW BATTERY indicator light will warn the operator of energy shortage of the Wireless ATB Switch batteries at least two weeks in advance.



Fig. 7: R147 Low battery indicator

INSTALLATION AND SETUP

3.1 Display Mounting & Wiring

Determine the mounting location inside the cab to make it easy to see by the operator. The display can be mounted on the dash or on a sidewall. Use one of the three holes available at the top of the bracket and another one at the bottom of the bracket. Install the display using ¼ bolts (Bolts, Nuts and Washer not included). The display has an IP67 rating, so it is possible to install it outside. If it’s installed outside of the cab, RaycoWylie Systems recommends placing it so it’s well protected against any impacts that could cause damages resulting in the lost of the IP67 rating.



Fig. 8: R147 Mounting Bracket

A power and alarm cable is provided with the R147 display. The power supply can come from 10-30 volt DC.

Pin #	Color	Description	Details
1	RED	Power	10-30 VDC
2	BLACK	Ground	Battery (-)
3	WHITE	Relay NC contact	Normally Closed Contact
4	BLUE	Relay COM contact	Common Contact



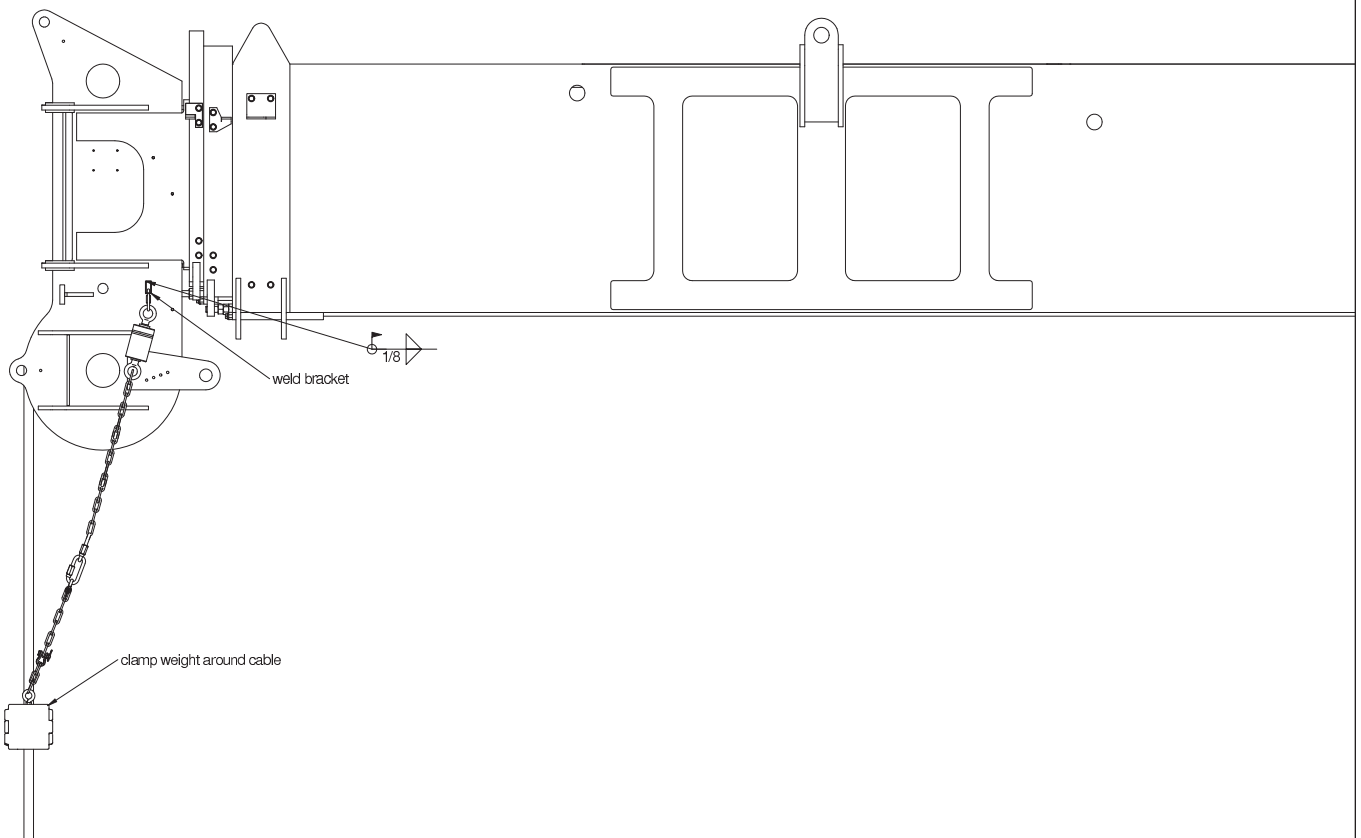
## 3.2 Wireless ATB Switch Installation

### 3.2.1 Power on the Wireless ATB Switch

When you receive your Wireless ATB Switch, the head of the switch is slightly unscrewed in order to remove the power to the transmitter. To power on the Wireless ATB Switch, use a 6 mm hex key to screw in the socket head screws.

### 3.2.2 Switch Installation

Weld the bracket to the head of the boom at the right angle. The bracket can be shortened slightly to bring the chain closer to the boom (optional). Make sure that the chain and the block move freely.



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## MAINTENANCE

### 4.1 Replacing the Batteries

You can use four standard Alkaline batteries size « AA ». For a longer duration, you can use Lithium batteries (recommanded).

1. Use a 6 mm hex key to unscrew the four socket head screws in order to remove the head of the Wireless ATB Switch.
2. Remove the batteries by hand.
3. Install the new batteries, pay attention to insert properly the right polarity, positive end and negative end.
4. Replace the head and screw in the socket head screws. Don't over tighten.



GOOD



BETTER

## 4.2 Programming the ID number

If you must change the ATB switch, you will have to change manually the ID number the R147 will respond to. You must change the ID number only if you change the ATB switch. The display must be set manually in order to respond to another ID number.

The ID number contains 4 digits, the first 2 digits are noted “High” by “H” and the last 2 digits are noted “Low” by “L”. Each digit of the ID number is coded in Hexadecimal (0-9, A-F).

Here’s how you change the ID number:

1. First, find the serial number a label directly on the switch.

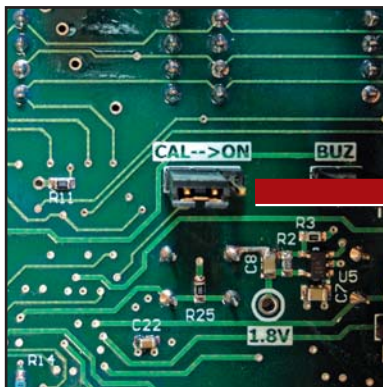
of the ATB switch. It is located on



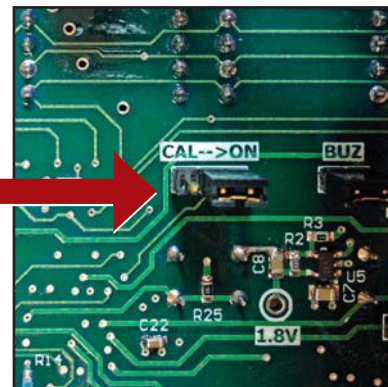
2. The first two digits of the serial number are the “HIGH” part of the ID number and the two digits following are the “LOW” part of the ID number. Remember these four digits.
3. Turn off the power supply of the R147 display. Use a Phillips screwdriver to open the display box of the R147.



4. Find on the printed circuit board inside the cover 3 metal pins with the word “CAL” and “ON” next to it. Move the jumper so that it covers the 2 pins of the “ON” side as pictured below.



Normal Mode



Calibration Mode

5. Put the R147 cover back on and turn on the power supply.

6. First, you need to edit the ID number of the first ATB switch. Remember: the R147 system can be used with one or two ATB switch(es). You should see this screen immediately after turning on the R147 display. The id1 is the ID of the first switch. Press both buttons simultaneously to go to the next step.

id1: ID number  
of the first ATB  
switch



7. Here, you need to edit the “HIGH” part of the ID number. Use the “down” button to change the first digit and the “up” button to change the second one.

H: high part of the  
ID number (first two  
digits of the switch  
serial number)



First digit of the  
ID high part

Second digit of  
the ID high part

8. When you finish editing the “HIGH” part of the ID number, press both buttons at the same time to edit the “LOW” part.

L: low part of the ID  
number (third and  
fourth digit of the  
switch serial number)



9. Change the digits by using the “up” and “down” buttons like you did with the “HIGH” part. Press both buttons simultaneously to confirm the ID number of the first ATB switch.
10. The screen should display “id2” for the ID of the second switch. Press both buttons simultaneously to go to the next step. Repeat steps 7 to 9 to program the ID of the second switch.



If your R147 system has only one switch, leave the ID of the second switch to 00 for both the high and low part of ID2. The system will assume you have two switches if you enter a value other than 0.



11. Put the jumper back to its normal mode position and switch off the power supply. It is important to note that the jumper must be put back before to switch off the power. Put the R147 cover back on and switch on the power supply again.



