



**RANGER**  
**BASE ENGINEERING INC.**

INDUSTRIAL WIRELESS CONTROLS

## INSTALLATION AND OPERATION PROCEDURES

**RANGER HANDHELD**

1 TO 12 FUNCTION RADIO REMOTE CONTROL

Revision 2.5

**THIS MANUAL SHOULD BE KEPT IN THE TRUCK ALL THE TIME**

Thank you for purchasing this product.

**BASE Engineering Inc.** strives to continuously improve its products and services. Customer feedback is an important part of this process. If you have suggestions for the improvement of this product, this document or the services we provide, we would like to hear from you. Please contact us at the numbers listed below:

Steve A. Belyea - President

1-800-924-1010

1-506-635-2280

1-506-635-2281 fax

sales@baseng.com

**WARNING: The receiver/relay enclosure unit is NOT approved for use in hazardous locations. Installation must be carried out by a qualified electrician in a non-hazardous zone well removed from any explosive or dangerous gas supply, piping, hoses or valve fittings.**

#### **FCC Rules and Compliance.**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- i. This device may not cause harmful interference, and
- ii. This device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15.231

## **TECHNICAL SUPPORT**

Product technical support is available by contacting BASE Engineering Inc. at 1.800.924.1010 or 506-635-2280 between 7:00am and 5:00pm Eastern Standard Time (USA). After hours technical support can be reached at this same phone number.

**BASE ENGINEERING INC.**

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## WARRANTY AND RETURN PROCEDURES

### Limited Warranty Policy

This **BASE Engineering Inc.** radio remote control system is sold with a limited warranty to be free from defects in material and workmanship for a period of **four (4) years from the date of manufacture**. This warranty covers only repair or replacement parts/components. Labor to diagnose, remove, or replace failed components is not covered under this warranty. Lithium batteries and leather cases have a warranty of one (1) year.

Replacement parts will be shipped within 24 hours when possible. All defective components must be returned to the factory clearly marked with a RGA (Returned Goods Authorization) number for identification purposes. Returning an item without an authorized RGA number will result in substantial processing delays.

### Warranty Claims

**BASE Engineering Inc.** will make a good faith effort for prompt correction or other adjustment with respect to any product which proves to be defective within the warranty period. Before any warranty repairs are attempted or before returning any product to the factory **BASE Engineering** must be contacted. **BASE Engineering** staff will require the model number and the serial number of the system.

**BASE Engineering** is not liable for material, labor or contingent liabilities arising out of the improper use or function of any product. Warranty shall become void if the product is improperly installed, modified, damaged, abused, or used for applications other than intended use.

As indicated in *Maintenance* section (page 15), the black gasket on the Ranger handheld is an integral part of the handheld enclosure and must be kept in good condition to prevent moisture and dirt from entering the enclosure and damaging the electronic circuit board inside. Should the gasket become worn or damaged, it must be replaced promptly to ensure continued reliable operation of the handheld. This must be done to maintain warranty coverage on the handheld. New gaskets can be installed by your **BASE Engineering** dealer, usually for a nominal charge.

## PRODUCT WARNINGS

### PLEASE READ BEFORE OPERATING OR INSTALLING ANY BASE SYSTEM

Air solenoids used to control the tank internal valves should be connected to the same air supply for the DOT required MANUAL Emergency Stop switch(es). Following activation of the radio remote Emergency Stop feature, the operator **MUST** first close the manual internal valve switch prior to resetting the **BASE** system. Failure to do this may result in the internal valve(s) automatically and unintentionally reopening with system reset.

Systems wired 'hot' to power when the vehicle is in motion have ALL remote functions still operable. A driver (or passenger) may accidentally activate the remote control, unintentionally causing the Emergency Stop feature to activate and the truck's engine to stop instantly. Systems must be properly interlocked to prevent unintended use.

**AN UNINTENTIONAL ENGINE SHUT DOWN WHILE THE VEHICLE IS IN MOTION MAY RESULT IN SERIOUS INJURY OR DEATH.**

**Never attempt to perform PTO repairs from under chassis while engine is running or while wearing radio remote control device.**

All open valves must be closed prior to system reset to prevent the valve from automatically and unintentionally reopening with Emergency Stop reset.

DO NOT CONNECT CHASSIS GROUND TO EITHER OF THE HOSE REEL MOTOR ELECTRICAL LEADS WHEN USING A REMOTE CONTROL POLARITY REVERSE CIRCUIT. BOTH LEADS MUST BE CONNECTED DIRECTLY TO THE CONTROLLER AS SHOWN IN THE SUPPLIED SYSTEM DRAWINGS.

## PRODUCT WARNINGS CONT'D

NEVER GO UNDER A TRUCK WITH THE ENGINE RUNNING AND NEVER USE THE REMOTE CONTROL DEVICE TO ACTIVATE THE PTO WHEN WORKING ON OR SERVICING THE PTO FROM UNDER THE TRUCK. THE REMOTE CONTROL DEVICE IS INTENDED TO BE USED ONLY WHEN THE OPERATOR IS NOT AT RISK OF BEING INJURED BY THE MACHINE.

**AN UNINTENTIONAL USE OF REMOTE WHILE WORKING ON THE TRUCK MAY RESULT IN SERIOUS INJURY OR DEATH.**

Do not mix different brands of batteries or used and new batteries.

Unauthorized modifications to any **BASE** system or any unintended uses of **BASE** systems may void the manufacturer's warranty for the product. This may include, but is not limited to, drilling holes in **BASE** product enclosures, adding auxiliary or bypass switches, changes to installation procedures, modifications to antennae configurations, or changes to the electronic or mechanical workings of the system.

## TROUBLESHOOTING

### System will not operate when button pressed

- Check that the **ON** button, if included, was pressed and the LED is blinking.
- If the LED is not blinking when a button is pressed, the battery might be beyond its maximum time and require charging. Plug it in to its appropriate charger and ensure the blue LED starts blinking.

### When plugging the handheld in to charge with the car charger, there is no activity on the blue LED.

- Make sure there is power to the charger socket.
- Make sure the correct charger is being used, i.e. the Li-ION battery charger from **BASE Engineering Inc.** (12/24 volts).
- Make sure the red LED on the outside of the charger lights up when plugged in. If not, replace the charger fuse.
- If above are correct, open the handheld and inspect the battery. Look for loose/broken connections from the wire to the connector, and make sure the connector is connected snugly to the PCB connector.

### When plugging the handheld in to charge with the car charger, the blue LED lights up solid but does not flash.

- This is normal if the battery is still fully charged. Allow the battery to run down through normal operation and attempt to charge again.

**WARNING**

**Do not charge the batteries unless the LOW BATTERY indicator is active. This will shorten the useful life of the batteries. The handheld is designed to provide a long operation with each charge, therefore continuous recharging is not needed.**

**Do not charge the handheld unit with any device other than the supplied BASE charger or damage to the unit may occur.**

**SYSTEM MAINTENANCE**

1. Check the transmitter battery condition by verifying that the blue LED flashes properly when pressing a function button or the **ON** button.
2. The Ranger is provided with a leather case to help protect the life of the product by protecting the black gasket from damage. The black gasket is an integral part of the handheld enclosure and must be maintained in good condition to prevent moisture and dirt from entering the enclosure and damaging the electronic circuit board inside. Inspect the gasket and case on a regular basis and if either becomes worn or damaged, replace them promptly to ensure continued reliable operation of the handheld. **This must be done to maintain warranty coverage on the handheld.**

Replacement gaskets and cases can be purchased for a nominal charge from your **BASE Engineering** dealer.

**WARNING**

**NEVER GO UNDER A TRUCK WITH THE ENGINE RUNNING AND NEVER USE THE REMOTE CONTROL DEVICE TO ACTIVATE THE PTO WHEN WORKING ON OR SERVICING THE PTO FROM UNDER THE TRUCK. THE REMOTE CONTROL DEVICE IS INTENDED TO BE USED ONLY WHEN THE OPERATOR IS NOT AT RISK OF BEING INJURED BY THE MACHINE.**

**AN UNINTENTIONAL USE OF REMOTE WHILE WORKING ON THE TRUCK MAY RESULT IN SERIOUS INJURY OR DEATH.**

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## RANGER HANDHELD COMPONENTS

Please check that your package includes the following:

- Custom Ranger transmitter
- 12/24V Car Charger—CHA1006
- Leather Case—CAS3000

Optional Components

- 12/24V Wall Charger—CHA1007

before the unit shuts down. The actual amount of operational time will depend upon the actual usage of the handheld.

## SAFELINK OPERATION

During the SafeLink operation, the handheld will attempt to communicate continuously with the receiver.

If the operator experiences a shut down triggered by the SafeLink, he can resume operation by moving back within range and pressing the **ON** button again. The system will return to normal operation. This safety feature prevents unintended 'latched-function' equipment operation following signal loss.

## HANDHELD BATTERY CHARGING

If the red LED and beeper indicate that the handheld system charge is getting low, the unit should be recharged as soon as possible.

To charge the battery, pull back the sealing plug on the bottom of the handheld and insert the small plug of the supplied charger (stock no. CHA1006) into the receptacle. Next, plug the other end of the charger into the power receptacle of the truck. Ensure that 12/24VDC power is available to this receptacle at all times. Be aware that in some vehicles the power to the receptacle is cut off when the ignition is off.

While the handheld is charging, the blue LED will flash at a slow rate. When the unit is fully charged, the blue LED will remain lit continuously. It will take up to four hours to charge the batteries from a fully depleted state.

The handheld will remain operational while charging, allowing the operator to continue operations while the unit is charging.

**NOTE: It is not recommended to charge the handheld in a cold environment such as overnight in the vehicle. This will severely limit the lifespan of the batteries.**

## SYSTEM OPERATION

**It is required that any radio control system be powered only when the equipment is parked and ready to work. A park-brake interlock switch for all air-brake truck applications is available from BASE Engineering at the time of order.**

**AN UNINTENTIONAL ENGINE SHUT DOWN WHILE THE VEHICLE IS IN MOTION MAY RESULT IN SERIOUS INJURY OR DEATH.**

### SYSTEMS WITH ON/OFF FEATURE

Press the **ON** button to activate the handheld. Once the handheld device is powered on, pressing any button will make the blue indicator on the handheld flash rapidly. When the button is released, the blue indicator flashes approximately once per second. This is to show that the handheld is awake and is sending signals to the receiver unit. Under normal operations, the red indicator will not light.

If the battery in the handheld become drained to a preset point, the red indicator will flash during button presses instead of the blue. An audible alarm will also sound at this point.

This is to warn the operator that the handheld will need recharging soon. The user has approximately one hour of continuous operation time left before the unit shuts down. The actual amount of operational time will depend upon the actual usage of the handheld.

### SYSTEMS WITHOUT ON/OFF FEATURE

Pressing any button in the handheld will cause the unit to wake up and send a command. The blue LED should blink rapidly while the button is pressed. Once the button is released, the LED will turn off.

If the battery in the handheld becomes drained to a preset point, the red indicator will flash during button presses instead of the blue indicator. An audible alarm will also sound at this point. This is to warn the operator that the handheld will need recharging soon.

The user has approximately one hour of continuous operation time left

## RANGER HANDHELD OVERVIEW

The Wireless Control System is comprised of two major components; the handheld device (Ranger) and the receiver unit. The handheld device is the portable unit which the operator keeps by his side and uses to send wireless commands back to the receiver to make the desired operational changes.

The handheld unit is a robust, custom designed ergonomic unit. It uses large buttons which provide positive tactile feedback when operated. The handheld is powered by a rechargeable lithium battery. A 12/24 volt system charger is included in the system to allow charging while in the vehicle. Two (2) LED indicators are used to give the operator confirmation of signal transmission during button presses and also to warn of low batteries. An audible 'beep' alarm will also indicate a low battery condition.



The Ranger handheld can be equipped with different radio technologies depending on your application requirements. Currently three (3) radio technologies are available: Direct Sequence (DSS), Frequency-Hopping Spread-Spectrum (FHS), and Amplitude Shift Keying (ASK).

The operating frequency along with other characteristics of each radio technologies are outlined in the table on the following page.

Radio	Frequency	Advantages
ASK	433Mhz	Simple, low cost, excellent battery life, reliable solution. Has built-in ID codes to ensure the receiver only operates with the programmed transmitters (up to two).
DSS	2.4Ghz	Good range, good performance, accepted outside of US.
FHS	900Mhz—US	Good range, best performance in presence of radio interference.
FHS (EUR)	869Mhz—EUR	OK range, good performance in presence of radio interference. Approved for use in Europe.

The handheld and receiver are pre-programmed to operate as a paired system unless otherwise requested. Replacement handhelds can be quickly field programmed by following the instructions in the section of this manual entitled **System Pairing/Dedication**, under **Installation Procedures** (page 10).

The handheld also has optional SafeLink and Auto Shutoff features incorporated into the design and can be included with any order at the request of the customer (not used in all the configurations).

## SAFELINK TECHNOLOGY

The SafeLink function acts as a safety measure for the system. As long as the handheld unit is functioning and the receiver is within range of the handheld, any currently active functions (latched channels) will remain active. However, if the handheld goes out of range, is turned off by the operator, or fails for some reason, the receiver will shut down any active functions.

This feature is only implemented in systems that include **ON** and **OFF** buttons on the handheld. If your system does not have these buttons, then this feature is not available.

## HANDHELD AUTO SHUTOFF

## FHS/DSS HANDHELDS WITH TEACH

Please verify that your FHS/DSS system has a **yellow , white or green band** on its serial tag. If not, please review radio identification under “System Pairing/Dedication” on page 10.

1. Press the **SETUP** button on the receiver five (5) times rapidly. Wait for five (5) blinks on the blue LED. If the LED does not blink, repeat this step.
2. Press the **TEACH** button on handheld five (5) times rapidly.
  - If your receiver has no **SETUP** button, turn off the receiver by unplugging the power connector (grey for B & C, round black for E).
3. Verify the red **BATT** light blinks and the handheld beeper sounds five (5) times followed by one (1) long indication.
  - \* If your receiver has no **SETUP** button, turn on the receiver by reconnecting the power connector.
4. Press the **SETUP** button on the receiver once. Wait for the LED to blink once. If the LED does not blink, return to step two (2).
5. The process will happen automatically and may take up to one (1) minute. The blue LED on the receiver will flash continuously during the process.
6. If the red **BATT** light blinks six (6) times, the process was successful. If the light flashes two (2) times, the process failed. Return to step one (1).



3. Press the **ON** button on the handheld rapidly five (5) times.
4. Verify the red **BATT** LED blinks and the handheld beeper sounds five (5) times, followed by one (1) long indication.
5. Press the **SETUP** button on the receiver once. Wait for the LED to blink once. If the LED does not blink, return to step 3.
6. The process will happen automatically and may take up to one (1) minute. The blue LED on the receiver will flash continuously during the process.
7. If the red **BATT** LED blinks six (6) times, the process was successful. If the light flashes two (2) times, the process failed and you must return to step one (1).
8. When the process is complete, the handheld will shutdown automatically. To begin operation, press the handheld **ON** button.

### **FHS/DSS SYSTEMS WITHOUT ON/OFF FEATURE**

Please verify that your FHS/DSS system has a **yellow , white or green band** on its serial tag. If not, please review radio identification under "System Pairing/Dedication" on page 10.

If your system does not have the **ON/OFF** feature or a **TEACH** button, you will require further instructions to perform this dedication.

Please call BASE Engineering Technical Support at 1-(800)-924-1010 or 1-(506)-635-2280, Monday to Friday 7AM to 5PM Eastern Standard Time for assistance.

**NOTE: The user should ensure that there are no other operational handheld units within range of the system as they could interfere with the dedication process.**

When using a system that includes **ON** and **OFF** buttons, the handheld unit has an auto shutoff feature which shuts down the power after a predefined period of time without button presses. This puts the unit into sleep mode conserving battery power. The handheld **ON** button must be pressed to turn the unit back on again. The amount of time that the handheld waits before shutdown is preset to the manufacturer's specifications at the factory. This feature is especially useful in operations where accidental button activation presents a safety concern (boom trucks, high pressure jettors, etc.)

In systems where there are no **ON** and **OFF** buttons, the handheld will wake up when any key is pressed and will go back to sleep mode as soon as the button is released.

## INSTALLATION PROCEDURES

The handheld unit is shipped from the factory configured and ready for operation. It is recommended that the handheld unit be charged before it is put into operation.

**NOTE: The user should ensure that there are no other operational handheld units within range of the system as they could interfere with the dedication process.**

### SYSTEM PAIRING/DEDICATION

The Wireless Control System is supplied from the factory fully programmed and ready for use, however, the following procedure can be used to re-program/dedicate a replacement handheld or receiver unit in the field.

To identify which radio is in your handheld, look at the serial tag. Tags with a **red band** indicate an ASK radio. Tags with a **yellow band** indicate a DSS radio. Tags with a **green band** indicate an older FHS radio, and a **white band** indicates a new FHS radio.

### ASK SYSTEMS

Please verify that your ASK system has a **red band** on its serial tag. If not, please review radio identification above.

If a transmitter is used that has not been paired with the receiver, the receiver will not function. To teach a receiver the ID code of a transmitter, complete the following steps:

1. Make sure the receiver is powered on.
2. Make sure the external antenna is connected, if applicable.
3. Press the green **SETUP** button on the receiver five (5) times rapidly. The blue power/activity LED should flash five (5) times.

4. Press the **SETUP** button once (1).

\* If your system supports the use of a 2<sup>nd</sup> handheld and you would like to dedicate it, press the **SETUP** button twice (2). *(If you are unsure if your product supports the use of a 2<sup>nd</sup> handheld please contact BASE Engineering Technical Support with your product information.)*

5. If the handheld has system **ON/OFF** buttons, press and hold the green **ON** button. If it does not have system **ON/OFF** functionality, press and hold any button on the transmitter.
6. If the receiver learns the transmitter ID correctly, the blue power activity LED on the receiver will blink eight (8) times. If it does not learn the ID correctly, the blue LED will blink two (2) times. If the two (2) blinks occur, go back to step three (3) and repeat instructions.
7. This completes the learning process. The ID of this transmitter is now stored in the receiver's memory and will not be lost when the receiver is powered off. These instructions can be repeated whenever a transmitter or receiver is replaced.

### FHS/DSS SYSTEMS WITH ON/OFF FEATURE

Please verify that your FHS/DSS system has a **yellow , white or green band** on its serial tag. If not, please review radio identification under "System Pairing/Dedication" on page 10.

1. Press the **OFF** button on the handheld.

\* If your receiver has no **SETUP** button, turn off the receiver by unplugging the power connector (grey for B & C, round black for E).
2. Press the **SETUP** button on the receiver five (5) times rapidly. Wait for five (5) blinks on the blue LED. If the LED does not blink, repeat this step.

\* If your receiver has NO **SETUP** button, turn on the receiver by reconnecting the power connector.