

MACRO

RADIO REMOTE CONTROL SYSTEM

INSTALLATION AND OPERATION MANUAL

BJ
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TRINITY

MACRO REMOTE

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MACRO REMOTE

DESCRIPTION

The MACRO REMOTE is a state of the art microprocessor based Radio Frequency (RF) control system. It will provide the operator the ability to wirelessly operate equipment. The operator is required to follow all OSHA www.osha.gov safety standards when operating the equipment.

The remote control system consists of several modules: the radio transmitter, receiver modules, and associated optional equipment such as wiring harnesses and Gate™ interface tools.

The transmitter is equipped with pushbuttons for the various functions. This unit runs on a 3.7V rechargeable battery.

The system's radio receiver has ON/OFF and PWM outputs to accommodate the functions available on the transmitter. All outputs are current-sourcing. It also includes a port for RS-232 communication for system diagnostics.

OPERATION

Power must be applied to the receiver module for the system to work.

Pressing the POWER button until the red and green LEDs appear will turn on the transmitter. Pressing and holding the POWER button until the LEDs stop toggling will turn off the transmitter. Pressing the STOP button will turn off all outputs as a safety feature. If the transmitter goes out of range for

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more than 2 seconds, all outputs will keep their previous status.

BELT

To start the BELT from an off state: Hold BELT FAST for 3s or more, after 3s LOWER DOOR UP output turns ON for 0.75s, then BELT will turn ON at 10%. Upon activation, the output will stay on for 20 minutes and then it will shut down.

Pressing the BELT FAST will increase the output for 10% at a time. This percentage is adjustable using the Gate. If the button is hold for more than 3 seconds, the output goes to 100%.

Pressing BELT SLOW will decreased the output 10%. Holding the button for more than 10 seconds will turn the output

off.

Pressing the STOP, BELT STOP, LOWER DOOR DOWN or both BELT FAST and SLOW at the same time will turn the output off.

Upper Door Open

Pressing this button activates LOWER DOOR UP output for 0.75 seconds and then AIR LATCH OPEN activates for 3 seconds. At the end the UPPER DOOR OPEN output comes on for 6 seconds.

Upper Door Close

Pressing this button activates UPPER DOOR CLOSE and AIR LATCH OPEN outputs for 9 seconds and then AIR LATCH CLOSE activates for 6 seconds. At the end the LOWER DOOR

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DOWN output comes on for 0.25 seconds.

Lower Door

Lower door up and down are momentary outputs and will be active when the button is pressed.

Aux

AUX is a latched output. To disable AUX OFF must be pressed.

STOP

Pressing the STOP button will turn off all the active outputs

To save battery life, the transmitter will turn off after 15 if no buttons are pressed. The user must press POWER at this point to restore transmitter operation. The transmitter will not turn off if the receiver is on.

To change the sleep time, use the following procedure:

Note: The transmitter will not shut down as long as the receiver has power applied to it.

1. With the transmitter off, press and hold UPPER DOOR CLOSE, LOWER DOOR CLOSE, BELT SLOW and POWER
2. Wait for a few seconds, then release the buttons
3. The green and red LEDs will start blinking together slowly
4. Press one of the following buttons for desired sleep time:
 - a. UPPER DOOR OPEN - 15 minutes
 - b. UPPER DOOR CLOSE - 30 minutes
 - c. LOWER DOOR OPEN - 60 minutes

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- d. LOWER DOOR CLOSE -
120 minutes
- e. STOP -sleep time
disabled

INDICATOR LEDs

The transmitter has two indicators, a red BATTERY indicator and a green TRANSMIT indicator.

The green TRANSMIT indicator flashes rapidly whenever there is communication between the transmitter and the receiver.

The red BATTERY indicator starts blinking once every second when the battery voltage is low and the batteries need charging.

Also the red LED will be steady red when charging and will turn off when the charge is complete.

The receiver module can identify problems with the system in the form of an error code. Check the red indicator or display window on the receiver to diagnose system problems. Then, refer to the ERROR CODE CHART in this manual for explanation of the error codes. The green LED indicator will blink on the receiver during active operation.

BATTERY CHARGING

Place the transmitter onto the charging pad button side up. A solid red LED indicates battery is charging. Once the internal battery is fully charged, the LED will change from red to green. A fully discharged unit will take up to 10 hours to charge.

Use only approved chargers

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Note: The transmitter will take longer to charge if it is on during charging, and may not complete the charge before timing out.

IMPORTANT BATTERY INFO

When the battery is new, the run-time of the transmitter will be shorter until it has gone through the drain/charge cycle several times. After this point, the unit's current drain should allow at least 20 hours of run-time before a recharge is needed.

The temperature that the transmitter battery is exposed to affects performance and useful life. It is strongly recommended you keep within the following limits:

- A. Charging: -4 to +86°F
- B. Operating: -20 to +122°F
- C. Storing: -4 to +86°F (lower is better)

TRANSMITTER AND RECEIVER SYNCHRONIZATION

Each radio remote system is designed to operate with a unique radio ID code and RF channel sequence. Each receiver is programmed to respond *only* to the transmitter with the correct ID code/RF channel sequence for which it is set. This feature allows multiple systems to work in close proximity to one another without interference.

In the event that a transmitter becomes damaged and a new one is needed, the receiver can be reprogrammed to respond to the new transmitter. To teach the ID code to the receiver, use the following procedure. ***Please note that if this procedure is interrupted before it has completed, the system may have intermittent operation:**

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1. Press and hold the POWER button for more than 10 seconds. LEDs should blink at this point
2. Apply power to the receiver and press any switch. Green LED stays on when teaching is in progress and it turns off when teaching is complete
3. Teach complete

OUTPUTS

Each of the outputs from the receiver module is designed with built-in short circuit and overload protection. The outputs can also detect a no-load or broken wire condition.

These error conditions are evident by the red LED indicator or alphanumeric display on the receiver module *or* the HISTOGRAM page on the optional Gate.

The ON/OFF outputs will indicate an error under no load or broken wire status if NOT activated, and current regulated outputs will detect a short IF activated.

INSTALLATION

Refer to the WIRING CHART in this manual for hookup of the harness.

To install the receiver module, use the two mounting holes provided on the enclosure to attach it in a vertical manner with the connectors facing down. Please take extra caution not to damage internal components while installing. For high vibration applications, use shock absorbing mounts. It is advised to mount the radio receiver as high as possible, keeping clear of metal obstructions around the antenna which might affect RF

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performance. Antenna extension cables are available from Kar-Tech to aid in this, if needed.

The main power to the receiver should be connected through a switched, fused line capable of a minimum of 20 amps. For best results, connect power (+) to the receiver via an auxiliary terminal of the ignition switch, PTO switch, or ignition relay. Be sure that the ground (-) is connected securely to the battery ground with a star washer which digs into the base metal to insure good contact. Connect CAN HIGH of radio receiver to CAN HIGH of can receiver and connect CAN LOW of radio receiver to CAN LOW of can receiver for proper operation.

All connections must be properly insulated to protect against

shorts.

Seal all connections with a non-conductive silicone grease to prevent corrosion.

BEFORE APPLYING POWER!

- Check power and ground for proper polarity.
- Check the wiring harness for possible shorts before connecting to output devices (i.e., valves and relays) by checking each mating pin terminal.
- Verify that the transmitter battery is fully charged.
- Read the rest of this manual

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SYSTEM TROUBLESHOOTING USING OPTIONAL GATE:

The Kar-Tech GATE connects to the receiver/controller thru the RS232 diagnostic port.

Note: To prevent electrical shorts and damage turn Receiver power off. Plug gate to the receiver then turn power on to the receiver.

The GATE creates a Wi-Fi access point which allows you to connect to any device with Wi-Fi and web browser such as smart phones, pads or personal computers. It supports Google Chrome, Internet Explorer, Firefox and IOS Safari and allows user to configure, diagnose and troubleshoot the system.



Gate Diagnostic Tool

Accessing the control panel

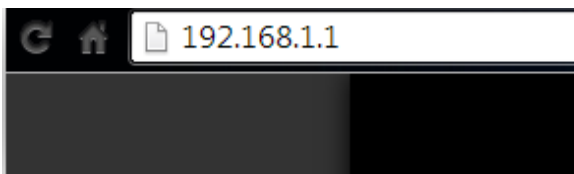
1. Turn off power to the receiver.
2. Plug in the GATE to the receiver.
3. Turn on the power to the receiver. The power LED on the GATE will turn on at this point
4. Use your device and look for the available WiFi networks. A network under the name of

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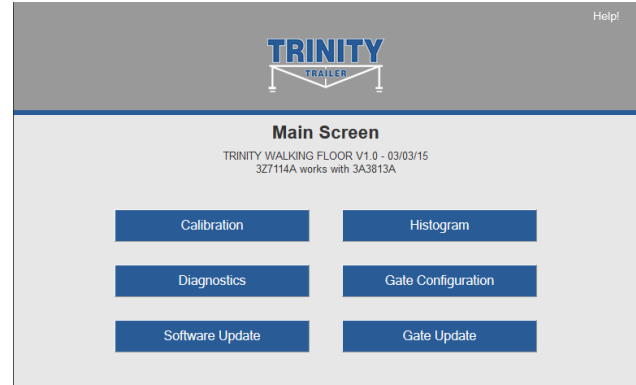
“TRINITY3A381” should be available at this point. Connect to the network, no password is required.

5. Once the connection is established, open a web browser on your device. Kar-Tech recommends using the Firefox browser.
6. Enter the address `http://192.168.1.1` in the address bar

Address Bar



7. The following options are available from the main screen.



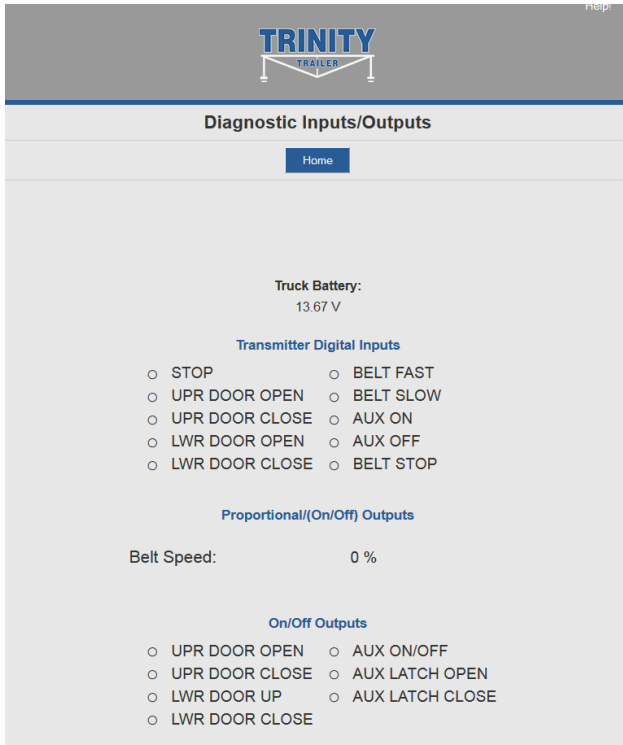
Main Screen

DIAGNOSTICS

Tap the Diagnostic button to see the diagnostic screens, which shows the present state of remote communications, and system I/O.

When the round circle next to a label is dark, the corresponding ON/OFF input or output is sensed to be active or ON.

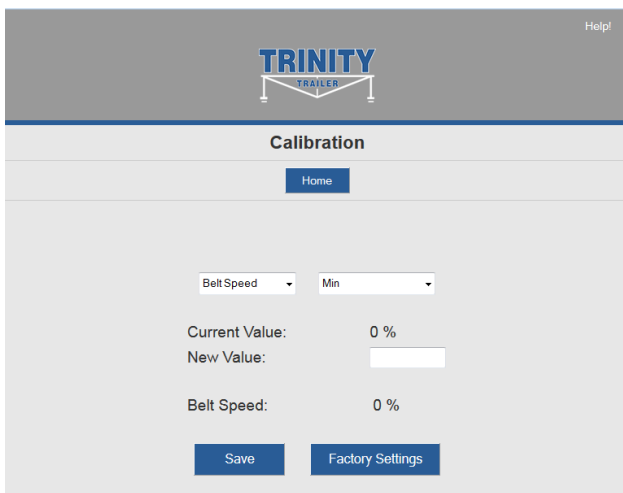
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Diagnostics

CALIBRATION

To change the configuration of the unit, tap the Calibration icon.



Calibration

The password to gain access to the calibration screens is 1262.

To adjust a proportional output's configuration, use the following procedure:

1. Select the output to change from the first drop-down menu
2. Select the parameter of the output to change from the second drop-down menu
 - a. Min - Minimum amount of output valve
 - b. Max - Maximum amount of valve in percentage of PWM
 - c. Ramp Up - Time in seconds for the Belt output to come on
 - d. Ramp Down - Time in seconds for the Belt

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output to turn off

- e. `Frequency` - Dither frequency to valves in Hz (Change affects all outputs)
- f. `Step` - Percentage of total PWM width to increase as function is held (default is 10% steps)

3. Enter the new value in the new value box
4. Tap the `Save` button to send the setting to memory

The lines to the right of the parameter indicate the present value of the output (if active), and joystick voltage on the transmitter.

Tap the `Factory Settings` button to return all outputs to standard values. Tap `HOME` to quit calibration and return to the main menu.

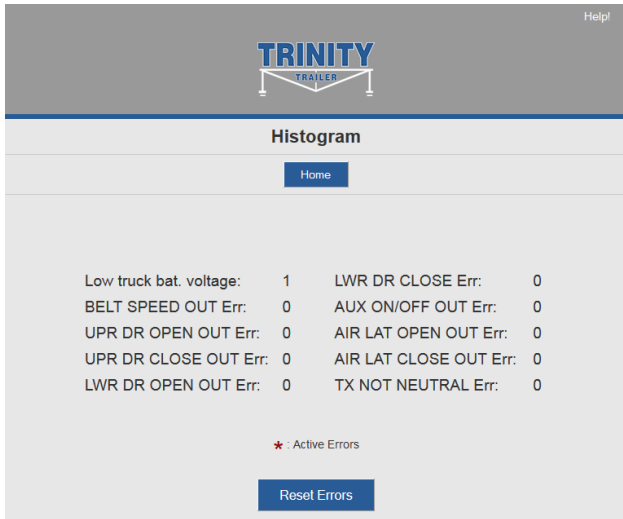
HISTOGRAM

Tap the `Histogram` icon to see a set of screens that show which error codes are active and how many times the specific error code has been active.

This feature can be used to troubleshoot machine wiring and other problems. Tapping the `Reset` button resets the error code counts. The password to reset error codes is 1262. Tapping `Next` and `Back` allows access to all the histogram pages. Tap the `Done` button to return to the main menu.

Note: the `GATE` is not a precision measurement instrument. There may be delays.

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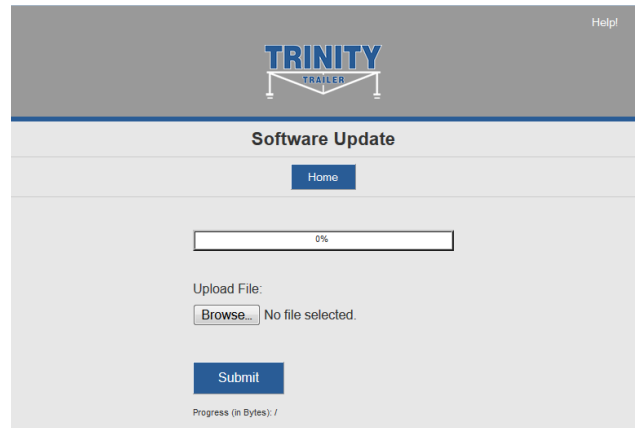
Histogram Page

SOFTWARE UPDATE

Use the Choose File button to select new software on your device with which to program the receiver. Kar-Tech will have provide software in the .kar format. Once the file is selected, press the SUBMIT button to upload the file.

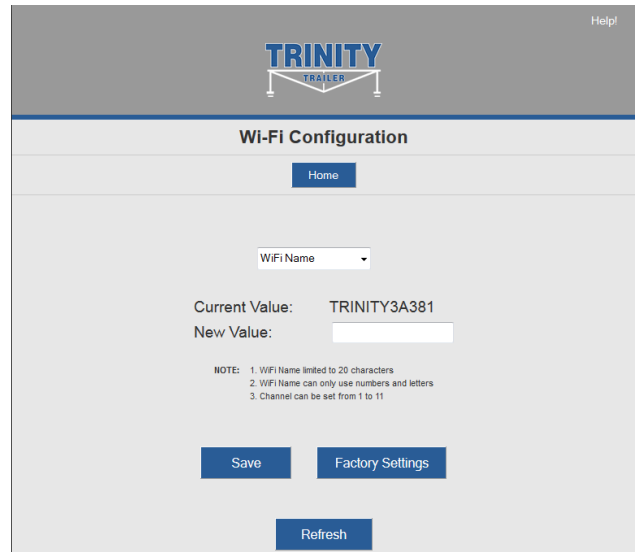
Note: This feature does not work on Apple mobile or tablet products.

Note: Do not turn the receiver or the GATE off during the upload process.



Software Update

Page



Gate Configuration Page

Gate Configuration

This page allows you to change the name (SSID) of the WiFi network you are connecting to. Factory settings will rename the Wi-Fi to its original name.

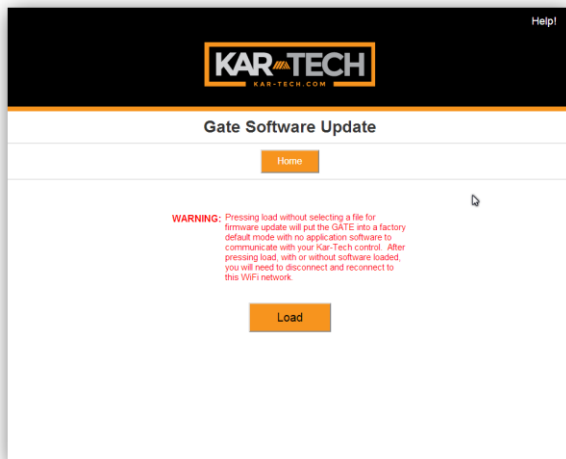
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Note: After changing the name, the user needs to disconnect and reconnect to the new WiFi network.

Gate Update

This page was designed to upload software that changes the product that the GATE interface works with.

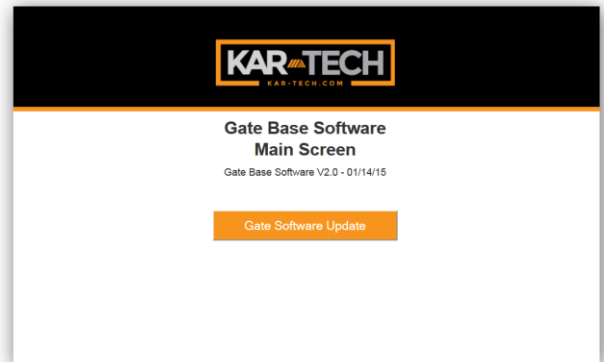
Once the LOAD button is pressed the application on the GATE will be **deleted**.



Gate Update Page

1. Select LOAD
2. Disconnect then reconnect

- to "3A381" network
3. Press HOME button
4. Screen below should be shown:



5. Press Gate Software Update
6. Using Browse select proper .gat file
7. Press Submit
8. File will upload and say Success! When complete
9. Disconnect then reconnect to "3A381" network
10. Press HOME button
11. Update complete

Note: the GATE is not a precision measurement instrument. There may be some delays.

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WIRING

PIN	COLOR	DESCRIPTION DTM04-12PA GREY
1		NC
2		NC
3	VIOLET	AIR LATCH CLOSE OUTPUT
4	YELLOW	LOWER DOOR CLOSE OUTPUT
5	BLUE	BELT SPEED PWM OUTPUT
6	WHITE	LOWER DOOR OPEN OUTPUT
7	GRAY	AIR LATCH OPEN OUTPUT
8	ORANGE	UPPER DOOR OPEN OUTPUT
9	GREEN	UPPER DOOR CLOSE OUTPUT
10	RED	POWER (9-30VDC)
11	BLACK	GROUND
12	BROWN	AUX ON/OFF OUTPUT

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ROUTINE MAINTENANCE

Clean transmitter regularly with a damp cloth and mild detergent.

Inspect electrical wiring for wear points or other damage. Repair as required.

Inspect all connections for looseness or corrosion. Tighten and/or "seal" as necessary.

MAINTENANCE PRECAUTIONS

When performing any inspection or maintenance work on the remote system, always exercise care to prevent injury to yourself and others or damage to the equipment. The following are general precautions, which should be closely followed in carrying out any maintenance work.

Do not have hydraulic power available to the valves when performing electrical tests.

Never operate or test any function if any person is in an area where they could be hurt by being hit or squeezed by the hydraulic equipment.

Turn power off before connecting or disconnecting valve coils or other electrical loads.

TROUBLESHOOTING

This next section provides basic operator level troubleshooting for the MACRO REMOTE system. If, after following these instructions, the system still does not function, contact your KAR-TECH representative for further instructions or servicing.

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TROUBLESHOOTING CHART

<i>PROBLEM</i>	<i>SOLUTION</i>
No functions work	<ol style="list-style-type: none">1. Verify transmitter power source – battery, CAN cable, external supply, etc2. Verify that receiver or control module power source is present at its input connector3. Check for proper system ground4. Check the receiver or control module LED status display for functionality or errors5. Check the hydraulic system
Certain functions do not work	<ol style="list-style-type: none">1. Check the wiring and connections from the receiver or control module to the valve coil for the particular function that does not work2. Check the receiver or control module LED status display for possible fault or error indication3. Check the hydraulic system4. Check the electrical system
Functions operate intermittently	<ol style="list-style-type: none">1. Check for loose connections at the valve coil2. Check the receiver or control module LED status display for functionality or errors3. Check the receiver antenna for damage and possible obstructions4. Check the hydraulic system

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ERROR CODES

EC	POSSIBLE CAUSE	
1	RF COMMUNICATION	
2	LOW VOLTAGE	
3	BELT SPEED OUTPUT ERR	
4	UPPERR DOOR OPEN ERR	
5	UPPERR DOOR CLOSE ERR	
6	LOWER DOOR OPEN ERR	
7	LOWER DOOR CLOSE ERR	
8	AUX OUTPUT ERR	
9	AIR LATCH OPEN OUT ERR	
10	AIR LATCH CLOSE OUT ERR	
11	TX NOT IN NEUTRAL	

Error code explanations:

- 1** Transmitter is off
Transmitter went to sleep mode
Interference in RF communication link
- 2** System voltage is below 10.5V (12V system) or 21V (24V system)
- 3-10** Short or open load/coil on output
- 11** Transmitter did not start in neutral mode

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PARTS LIST

PART NUMBER	DESCRIPTION
3A3812A	RADIO TRANSMITTER
3A3813A	RADIO RECEIVER
3B2379A	GATE DIAGNOSTIC TOOL
B20202a	MACRO USB CAR CHARGER
B20203a	MACRO USB WALL CHARGER

There are no user-serviceable parts inside the transmitter or the receiver. Return the units for service.

Note: For operation with negative ground systems only.

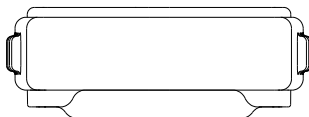
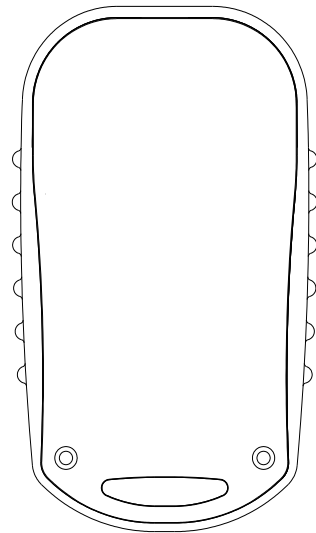
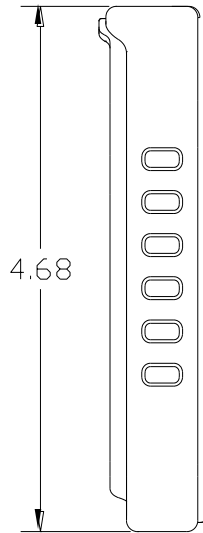
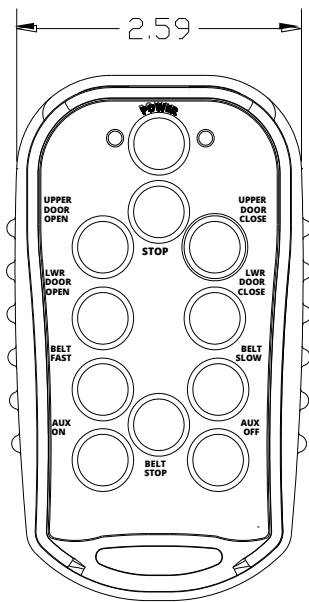
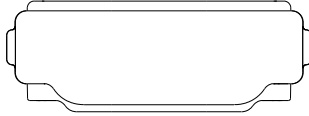
WARNING:

The MACRO REMOTE must be operated in compliance with all applicable safety regulations, rules, and practices. Failure to follow required safety practices may result in death or serious injury.

The information, specifications, and illustrations in this manual are those in effect at the time of printing. We reserve the right to change specifications or design at any time without notice.

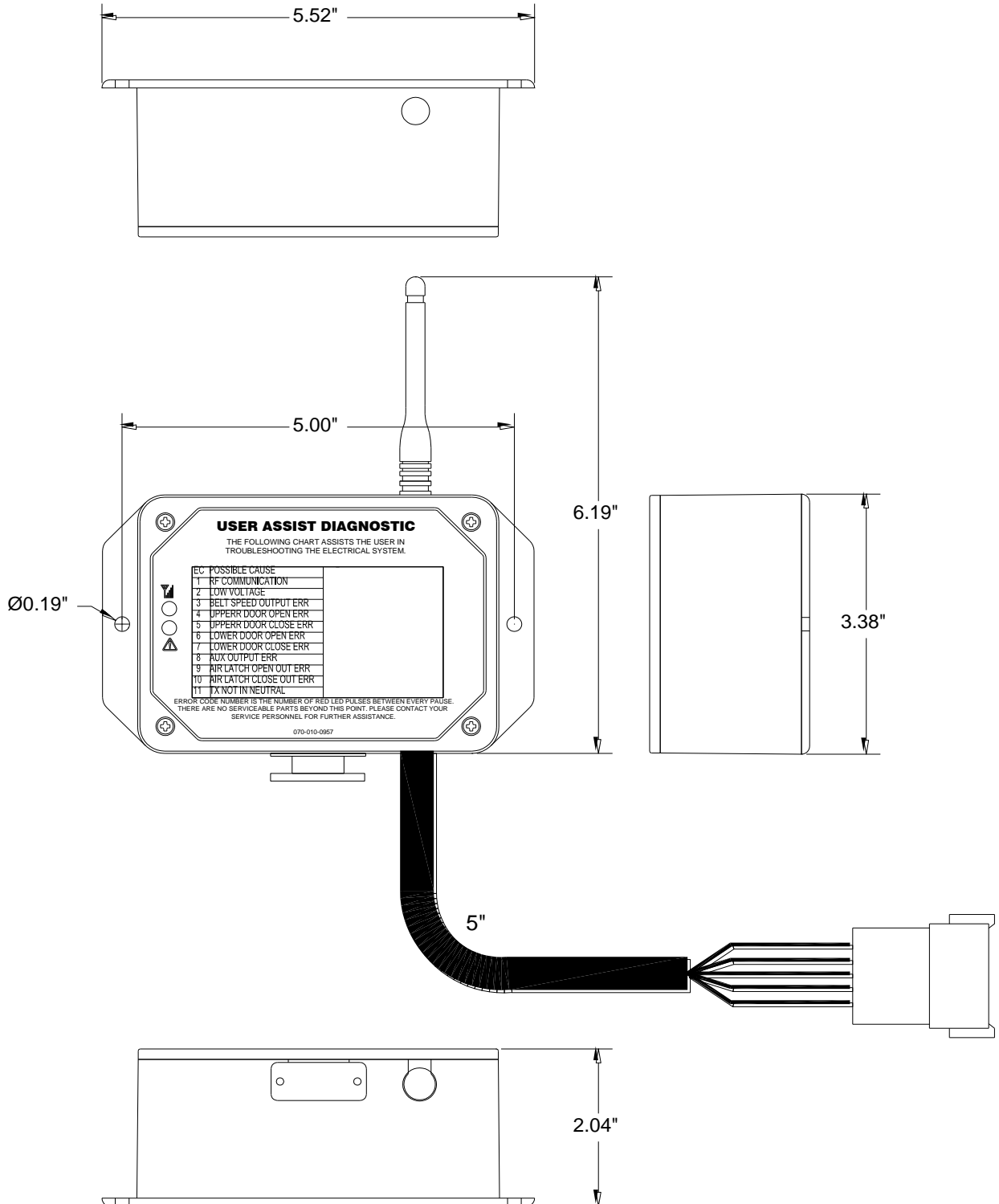
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TRANSMITTER PICTORIAL



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RADIO RECEIVER PICTORIAL



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SPECIFICATIONS

TRANSMITTER

Equipment Class.....	Part 15 Spread Spectrum Transmitter
FCC ID	P4U-VRTS
ICC (Industry Canada Certification) ID	4534A-VRTS
Power supply	3.7V LiPo Rechargeable Battery
Fast charger temperature range	+5°C to +60°C
Operating temperature - Radio	-40°C to +85°C
Storage temperature.....	-40°C to +100°C
RF Frequency	902-928 MHz
RF Transmit power (EIRP).....	10 mW
LCD display operating range (if equipped)	-20°C to +70°C
Vibration	3G to 200Hz
Shock.....	50G
NEMA	12

RECEIVER

Power supply voltage	9-30VDC
Operating temperature	-40°C to +85°C
Storage temperature.....	-40°C to +100°C
Outputs.....	5.0A max each, sourcing, 20A system max
Digital Inputs (when equipped)	supply voltage
Analog Inputs (when equipped)	0-5VDC/4-20mA
RF Frequency	902-928 MHz
Vibration	3G to 200Hz
Shock.....	100G
NEMA	4X

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INSTRUCTION TO THE USER

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- * Reorient or relocate the receiving antenna.
- * Increase the separation between the equipment and receiver.
- * Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- * Consult the dealer or an experienced radio/TV technician for help.
- * The machine operator must follow OSHA and other applicable standards when operating the equipment. Do not use high power radio devices in close proximity of this product.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.