

CATTRON™

GROUP INTERNATIONAL

REMTRON® BRAND

COMMAND PRO®

Patriot

USER'S MANUAL

25 Series

142130-H April 2009

WARNING!

Read all safety rules and warnings before installing and operating this system.



AVERTISSEMENT!

Lire toutes les consignes de sécurité et tous les avertissements avant de faire fonctionner ce système.

<http://www.remtron.com>

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ADDENDUM – ADDITIONAL WARNINGS

IMPORTANT SAFETY NOTICE



WARNING:

THE USE OF UNAPPROVED COMPONENTS OR ACCESSORIES IN THE SYSTEMS SOLD BY CATTRON GROUP INTERNATIONAL AND ITS SUBSIDIARIES IS STRICTLY PROHIBITED. UNAPPROVED COMPONENTS ARE DEFINED AS ANY COMPONENT NOT INSPECTED AND SOLD BY CATTRON. THIS ALSO INCLUDES ANY COMPONENT MODIFIED FROM ITS INTENDED USE AND/OR ANY COMPONENT EXHIBITING OBSERVABLE DAMAGE OR DEFECT. USE OF NON-CONFORMING PARTS, ASSEMBLIES AND ACCESSORIES MAY LEAD TO INJURY OR DEATH.



WARNING:

THE REMOTE CONTROL SYSTEM YOU HAVE PURCHASED IS DESIGNED TO STOP IN A SAFE MODE UNDER A VARIETY OF CONDITIONS. SOME EXAMPLES OF THESE CONDITIONS ARE: EXCESSIVE RADIO SIGNAL INTERFERENCE, LOSS OF BATTERY OR ELECTRICAL POWER, FAILURE OF CERTAIN COMPONENTS AND OPERATION BEYOND SIGNAL RANGE AND OTHERS. ALTHOUGH CATTRON GROUP INTERNATIONAL AND ITS SUBSIDIARIES DOES NOT SPECIFY THE POSITION OF THE OPERATOR WHEN CONTROLLING THE EQUIPMENT WE ARE AWARE THAT SOME USERS ARE INSTRUCTED AND TRAINED BY THEIR EMPLOYER TO RIDE THE EQUIPMENT IN A SAFE MANNER. IT IS IMPERATIVE THAT YOU ARE PREPARED FOR AN UNPLANNED STOP OF THE EQUIPMENT AT ANY TIME AND DO NOT PLACE YOURSELF OR OTHERS IN A POSITION WHERE THIS SITUATION MAY CAUSE YOU TO FALL FROM THE EQUIPMENT. FAILURE TO USE CAUTION MAY LEAD TO INJURY OR DEATH.

END

REMTRON, INC.

COMMAND PRO® RECEIVERS

FCC COMPLIANCE STATEMENT

COMMAND PRO® series receivers have been tested and found to comply with in 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, uses, and can radiate radio-frequency energy, and if not installed and used in accordance with the user manual, may cause harmful interference to radio communications. However, there is no guarantee that harmful 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 switching this equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna that is connected to the device that is receiving the interference.
- Increase the separation between our equipment and the equipment that is receiving the interference.
- Consult our factory or one of our Service Representatives for additional help.

Responsible Party:

Remtron Inc.
1916 W. Mission Rd.
Escondido, CA 92029

*Ph: 800 328-5570
760 737-7800*

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Table of Contents

SECTION 1 — INTRODUCTION.....	1
Purpose	1
Scope	1
Important Safety Rules	1
SECTION 2 — OPERATIONS	4
How the System Works	4
Frequency	4
Range and Antenna Coverage	4
License-Free Channels	5
Command Format	5
Safety.....	6
Transmitter Operation and Features	7
Operation	7
Commands.....	8
Command Switches	8
Status Indicators.....	9
Transmitter Status Chart.....	9
Function Select LEDs	9
SECTION 3 — INSTALLATION	10
General.....	10
Locating the equipment.....	10
Antenna Location	10
Receiver Location	12
Installation Wiring	12
Output Snubbers.....	13
Power/Control Wiring.....	13
Installation Testing.....	14
SECTION 4 — MAINTENANCE & TROUBLESHOOTING.....	18
Monthly Inspection	18
Installation Troubleshooting.....	18
Installation Troubleshooting Chart	18
General Troubleshooting	19
Transmitter Troubleshooting.....	19
Normal Operation.....	19
Transmitter Troubleshooting Chart	19
Replacing the Transmitter Batteries.....	20
Changing the Transmitter ID Code	21
Transmitter Spare Parts List	22
Receiver Troubleshooting	24
General.....	24
Receiver Testing	24
Receiver Repairs	25
Fuse Replacement	25
Receiver Spare Parts List.....	26

SECTION 5 — WARRANTY STATEMENT FOR **PATRIOT REMOTE CONTROL SYSTEMS29**
Transmitters 29
Receivers and Accessories 29
General Terms of Warranty 29
Service 30

APPENDIX A: TRANSMITTER SPECIFICATIONS31
Certifications 31

APPENDIX B: RECEIVER SPECIFICATIONS32

List of Illustrations

FIGURE 1. REMTRON **PATRIOT TRANSMITTERS2**

FIGURE 2. REMTRON **PATRIOT RECEIVERS2**

FIGURE 3. TRANSMITTER/RECEIVER COMMUNICATION11

FIGURE 4. ANTENNA CLEARANCE11

FIGURE 5. **PATRIOT RECEIVER (25R15A)15**

FIGURE 6. CONNECTIONS AND LABELS FOR **PATRIOT RECEIVERS16**

FIGURE 7. HANDHELD TRANSMITTERS WITH BACK REMOVED23

FIGURE 8. FUSE LOCATIONS26

SAFETY RULES

WARNING!

READ ALL INSTRUCTIONS

Failure to follow these rules can result in serious personal injury.

INSTALLATION

- **GROUND THE RECEIVER CASE.** In order to ensure safety of the system, the receiver case must be firmly connected to earth ground.
- **PROVIDE A SAFETY CUTOFF SWITCH.** If maintenance is required, the radio must be disconnected from power to prevent accidental activation.
- **USE PROPER WIRING.** Loose or frayed wires can cause accidental activation of machinery.
- **DO NOT INSTALL IN HOT AREAS.** This apparatus can be damaged by heat in excess of 160° F.
- **DO NOT INSTALL IN HIGH VIBRATION AREAS.** The life of this apparatus might be shortened through long exposure to intense shaking or vibration.

PERSONAL SAFETY

- **MAKE SURE MACHINERY IS CLEAR BEFORE OPERATING.** Do not activate the remote system unless it is safe to do so.
- **SWITCH OFF THE RECEIVER POWER BEFORE WORKING ON MACHINERY.** Always disconnect the remote system power before doing any maintenance to prevent accidental operation of the machine.

CARE

- **KEEP DRY.** If water or other liquids get inside, immediately dry the unit.
- **KEEP ANTENNA(S) CLEAN.** Keep antenna connections clean and free of corrosion.

IMPORTANT NOTE: Throughout this manual, other safety rules appear under the following heading.

WARNING!

Failure to follow these rules can result in serious personal injury.

CONSIGNES DE SÉCURITÉ

AVERTISSEMENT!

Le non respect des consignes peut causer des blessures sérieuses.

INSTALLATION

- **RACCORDER LE BOÎTIER À LA MASSE.** Pour que le système fonctionne en toute sécurité, le boîtier du récepteur doit être solidement raccordé à la masse.
- **FOURNIR UN INTERRUPTEUR DE SÉCURITÉ.** Lors de travaux d'entretien du dispositif, déconnecter le poste radio afin d'éviter une mise en marche accidentelle.
- **UTILISER LES FILS APPROPRIÉS.** Des fils découverts ou usés peuvent provoquer un démarrage accidentel de la machinerie.
- **NE PAS INSTALLER DANS DES ENDROITS CHAUDS.** Des températures supérieures à 160° F (71° C) peuvent endommager l'appareil.
- **NE PAS INSTALLER DANS LES ENDROITS SOUMIS À DE FORTES VIBRATIONS.** L'exposition prolongée de cet appareil à des vibrations ou des secousses intenses peut en réduire la durée de vie.

SÉCURITÉ

- **S'ASSURER QUE LA MACHINERIE EST DÉGAGÉE AVANT DE LA FAIRE FONCTIONNER.** Ne pas faire fonctionner le système de téléguidage à moins que cela puisse être fait en toute sécurité.
- **METTRE LE RÉCEPTEUR HORS TENSION AVANT D'EFFECTUER DES TRAVAUX SUR LA MACHINERIE.** Afin de prévenir la mise en marche accidentelle de la machinerie, toujours débrancher le système de téléguidage avant de d'effectuer des travaux d'entretien.

ENTRETIEN

- **GARDER AU SEC.** Sécher immédiatement l'appareil, s'il est exposé à de l'eau ou tout autre liquide.
- **GARDER LES ANTENNES PROPRES.** Garder les raccordements d'antenne propres et exempts de corrosion. Le non respect des consignes peut causer des blessures sérieuses.

Le non respect des consignes peut causer des blessures sérieuses.

Section 1 — Introduction

Purpose

This manual provides information on the safe installation and operation of the Remtron **Patriot** wireless control systems. Information is also included on the maintenance and repair of the **Patriot** systems.

Scope

Information is included on all Remtron **Patriot** transmitters and receivers. See the detailed information contained in each section of this manual for your particular equipment.

The transmitters covered in this manual contain enhanced features that expand the types of applications for the systems.

Many new features have been added, but most changes are transparent to the user. If you are already familiar with Remtron transmitters, you are encouraged to read the section on operating the transmitters, where you will find information about the latest changes in operation.

To help you identify your system, Figures 1 and 2 on page 2 provide a reference for the transmitters and the receivers covered in this manual.

Important Safety Rules

Using wireless control systems with heavy industrial equipment can improve the safety of the equipment.

It is important to adhere to the safety rules presented throughout this manual, especially during installation, in order to achieve the safest operating system possible.



Figure 1. Remtron Patriot Transmitters



Figure 2. Remtron Patriot Receivers

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Section 2 — Operations

Remtron **Patriot** Wireless Control Systems are designed for control of industrial machinery. These rugged controls are built to survive the wear and tear of life in factories, mills, and foundries.

These systems comply with requirements for operation under Part 15 of the FCC Rules and Regulations. This means that neither the operator nor the company need apply or register for a license to operate this equipment.

The basic system consists of a transmitter and a receiver. The transmitter sends commands to the receiver by means of radio waves in the 900 MHz band. Receivers operate at 120 VAC 50/60 Hz power.

How the System Works

Frequency

Remtron **Patriot** equipment operates in the 902 to 928 Megahertz (MHz) frequency band. A wavelength at our frequency is 12.9 inches.

Like light, 900 MHz radio signals will pass through glass and plastics, and will reflect off of walls, buildings, and metal structures. Unlike light, 900 MHz radio signals will penetrate all plastics, including those that you cannot see through, thin-gauge steel, dry wood, dry concrete, plasterboard, fog, and rain.

However, trees, earth, water, people, aluminum, copper, and some window tints will not readily pass our signals.

Range and Antenna Coverage

Antennas convert radio signals into radio waves and convert radio waves back into radio signals. They can send and receive in all directions or in a single direction, depending on their design.

An omni-directional antenna is like a light bulb, and a directional antenna is like a flashlight. Metal objects reflect radio waves, just as a mirror next to a light bulb will reflect light. Metal objects near an antenna alter the intended pattern of an antenna by either shading or reflecting signals.

Our standard antennas are omni-directional; they 'see' equally well in all directions. We have other antennas that will 'see' further in one direction for special applications.

License-Free Channels

The 902 to 928 MHz spectrum is set aside by the FCC as an ISM Band (Industrial, Scientific, and Medical), and this spectrum accommodates many license-free users. We have the ability to change frequencies in this band, and we have 81 different channels that we can assign to our transmitters and receivers. The actual frequency is coded into the receiver and transmitter at the factory, but it can be changed to one of the other 80 channels in the field.

Other devices in this band include wireless phones, computer data links, and inventory equipment. As a condition of using this band, we must accept and handle interference from other users.

The 900 MHz band has worked well for most users, and not being burdened with licensing regulations is desirable. The FCC has allowed 50,000 microvolts per meter field strength on this band, which is 250 times higher than other unlicensed frequencies below this band. This allows our systems to operate very reliably in the presence of other signals.

Command Format

We use *packet-mode, Frequency Modulation (FM)* to carry commands in a packet form from our transmitter to our receiver.

To reduce battery drain, our transmitter transmits for a hundredth of a second, which is long enough to send one packet to our receiver at a repetition rate of 16 or four times per second.

The rate varies: 16 times per second for three times when sending a command and four times per second when there is no change in commands and the transmitter is still on. Any time a lever or switch is activated, we send all control settings three times at the 16-per-second rate and then return to the slower rate of four times per second.

Our receiver uses the slower rate for maintaining transmitter timing and provides for a maintained link where one is used. The only exception to this is the 'STOP' switch, which transmits at 16 times per second as long as it is depressed. In addition to lever and switch positions, each packet contains a unique address and CRC check sum (described in the next paragraph).

Safety

Safety and preventing loss of control are very important issues at Remtron. We use a unique identification (ID) code for each user. There are provisions in our system for 65,535 individual codes.

Each transmission includes a CRC check sum, which is a polynomial created by factoring all of the previous bits transmitted. Once our receiver receives a valid start command from our transmitter, our receiver tracks the time of the transmitter and ignores all other transmissions that do not fall within the expected time frame of our transmitter.

Maintained link systems must receive at least one valid transmission each second in order to allow the remote-controlled equipment to function. Our receiver provides a loss-of-signal control output that safely shuts down the equipment if a loss of signal occurs.

Our receiver will not allow restart of equipment under its control after a loss of signal until a valid system start command is received from our transmitter. This prevents an unintended start-up from occurring if the transmitter returns within range of our receiver and is still operating.

Our transmitters also check the position of all controls upon start-up. Our transmitter will not issue a start command if any of the controls are pressed at the time the start command is invoked.

Transmitter Operation and Features

WARNING!

Do not operate the system until you are familiar with radio-controlled operation. If you are not familiar with radio-controlled operation, contact your supervisor before attempting to use the radio control system.

AVERTISSEMENT!

Ne pas faire fonctionner le système avant de bien connaître le fonctionnement d'une grue par téléguidage. Contacter le superviseur avant de faire toute tentative de mise en marche par téléguidage, si le fonctionnement n'est pas connu.

IMPORTANT!

To stop the system in an emergency, press and hold the OFF/STOP button. Pressing and holding this button down stops all functions.

IMPORTANT!

Le bouton d'arrêt d'urgence (STOP) pour ce système est le bouton **OFF/STOP**. Appuyer et maintenir le bouton pour arrêter toutes les fonctions.

Operation

1. Press and release the **ON/ALARM** button. Verify that the status LED starts flashing at a low rate. If equipped, the Alarm function should sound.
2. Press the required switches to operate the desired function. Note that more than one function can be controlled at any time.
3. To stop sending any command, release the switch.
4. To switch the transmitter off, press the **OFF/STOP** button. (Note that the transmitter will switch itself off if no commands are sent for a predetermined time if Auto Off is enabled).

Commands

Command Switches

The command switches are labeled according to their function.

- If opposing commands are attempted, that is, two commands that conflict with each other, in most cases no function will result. In the case of **ON/OFF** functions, **OFF** will predominate.
- If more than one speed command is sent for the same function, the lower speed will predominate.

ON / ALARM

Turns on the transmitter and puts the system in the active mode. Sends an ALARM command to the receiver while the switch is depressed. The transmitter will remain active until the **OFF/STOP** button is pressed or the transmitter switches itself off (see Auto Off).

OFF / STOP

While depressed, sends a STOP command to the receiver. The transmitter does not need to be switched 'ON' to send this command. When this switch is released, the transmitter will be switched off.

A-B SWITCH

(25T15A only) A Selector switch is provided to control more than one similar function with the same controls (that is, controlling hoist/trolley A, hoist/trolley B, or both A and B simultaneously). A single button will cycle between A, B, BOTH, and OFF each time the button is pressed. LED indicators show the control status.

AUTO OFF

The transmitter will switch itself off if no commands have been sent for a predetermined time. This time is normally set to 15 minutes but can be re-set to 0-60 minutes (or disabled) using a RAC16A series Programmer (01 to 60 = minutes, 00 = disabled).

Status Indicators

Status LED

The status LED provides an indication of the transmitter operation. When the transmitter is operating normally, the LED indicator will emit short flashes at a low rate when no commands are activated and at a higher rate when a command is activated. Some transmitters use a red LED only. Others use a multicolored LED that flashes GREEN when no problems are present and changes to RED under low battery conditions or when other problems are encountered. See Status Chart below.

Transmitter Status Chart

LED Indication	Possible Cause
LED is off	Transmitter is off – switch transmitter ON. Batteries are dead – replace batteries. Transmitter failure – call for service.
LED flashes at low rate	Transmitter is operating in a normal mode.
LED flashes at high rate	Command Switch is pressed.
LED flashes Red/Green ('A' series only)	Batteries getting low. Batteries should be changed at the next convenient opportunity.
LED flashes on-off at a slow rate (½ second on and ½ second off)	Batteries getting low. Batteries should be changed at the next convenient opportunity.
LED remains on continuously (LED might flicker slightly)	Either a switch was activated at the time the transmitter was switched on or a general failure occurred that requires factory service. Ensure no other switches are pressed while attempting to switch the transmitter on.
LED will not light when ON/OFF button is pushed	Replace batteries. If this does not correct the problem, the transmitter must be repaired.

Function Select LEDs

Two LEDs are used on 25T15A transmitters to indicate which control functions are active (such as hoist/trolley A, hoist/trolley B) and are intended to be used with pilot relays. When both are lit, both controls are active. When both LEDs are unlit, neither control is active.

Section 3 — Installation

General

Check all of the components to confirm that they are the components you ordered for your system and that they are in good condition. If any components are missing, or if any are not in good condition, contact Remtron.

WARNING!

READ ALL INSTRUCTIONS! Failure to follow the SAFETY RULES can result in serious personal injury. Before starting this installation, ensure that the crane power has been disconnected and that all applicable safety precautions are followed.

AVERTISSEMENT!

Le non respect des CONSIGNES DE SÉCURITÉ peut causer des blessures sérieuses. Avant de procéder à l'installation, s'assurer que le bras élévateur ou la grue est hors tension et que toutes les consignes de sécurité ont été respectées.

Figure 5 on page 14 shows a typical **Patriot** receiver. See this figure for mounting dimensions and antenna connector location.

Locating the equipment

Antenna Location

The antenna is one of the most important components of a radio receiving system. Proper placement of the receiver antenna will ensure reliable operation under the most severe conditions. A direct 'line-of-sight' path between the transmitter and receiver antenna provides the best performance (see Figure 3 on page 10).

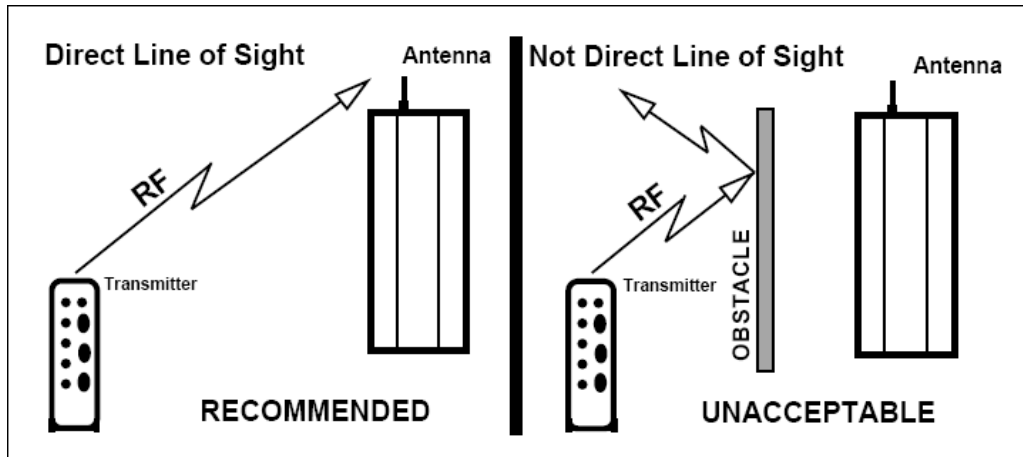


Figure 3. Transmitter/Receiver Communication

In most cases, the antenna can be mounted directly on the receiver enclosure. In determining the mounting location, the following items should be considered:

- The antenna should be mounted vertically.
- For optimum performance, the antenna itself should have a minimum of eight (8) inches of clearance in all directions, excluding the wall or plate to which the receiver enclosure is mounted (see Figure 4). If the receiver enclosure location cannot provide this clearance and the antenna must be mounted at a remote location, the Remtron Remote Antenna Mounting Kit should be used. Call your Remtron dealer for information.

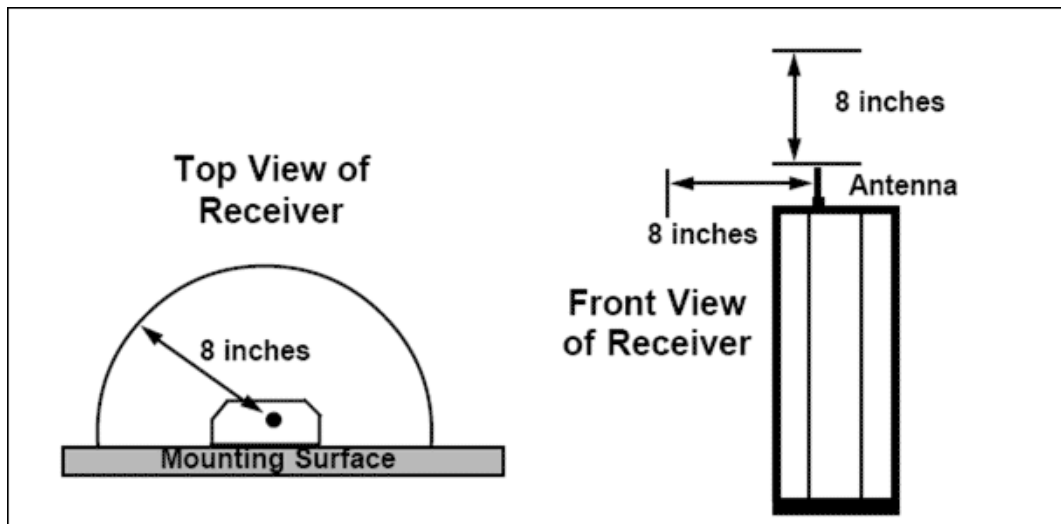


Figure 4. Antenna Clearance

Receiver Location

To ensure safe and reliable system operation, the following items must be considered when selecting a location for mounting the receiver:

- Install the receiver in an environment where the ambient temperature during operation does not drop below -20° F (-28° C) or rise above +160° F (+71° C).
- To ensure that the receiver enclosure is electrically at earth ground, connect the green wire in the interface cable to earth ground.
- Mount the receiver enclosure securely using appropriate locking-type hardware.

Installation Wiring

WARNING!

Before starting this installation, ensure that the crane power has been disconnected and that all applicable safety precautions are followed.

MISE EN GARDE!

Avant de procéder à l'installation, s'assurer que le bras élévateur ou la grue est hors tension et que toutes les consignes de sécurité ont été respectées.

CAUTION!

Connection to equipment or contactors with higher voltage or current requirements requires intermediate relays.

AVERTISSEMENT!

La connexion à des équipements ou à des contacts soumis à des tensions électriques élevées ou à de fortes intensités de courant nécessite l'installation d'interface à relais.

Output Snubbers

Snubbers are recommended for the suppression of noise generated from arcing relay contacts. When a contactor opens, the contactor coil produces a large voltage potential, much like automotive ignition systems. When the points open on automotive ignition systems, the coil sends a large voltage to the distributor. This voltage jumps across the spark plug (called *arcing*). The result is a large amount of noise being generated in the system.

A snubber is a device designed to reduce arcing (noise). To increase relay life, it is recommended that all contactors have snubbers installed directly across the coils. Snubbers can be purchased directly from Remtron, Inc. Call Remtron's Service Department at 800-328-5570.

Power/Control Wiring

See Figure 6 on page 15 for **Patriot** receiver wiring diagrams.

Patriot receivers are pre-wired according to the wiring label on the face of the receiver. Limit the load current applied to the output relay bank 'common' to 5 amps maximum.

Use the following steps to install the wiring to the receiver.

1. Connect the 'hot' input wire for the bridge (X1A) to the black wire of the interface cable. This provides power for the bridge and alarm functions as well as power for the receiver.
2. Connect the neutral (X2) wire for the bridge to the white wire of the interface cable. This provides power return for the receiver.
3. Connect the 'hot' input wire for the trolley and hoist (X1B) to the black/white wire of the interface cable. If only one power source (phase) is used, this will be the same as Step 1 above.
4. Connect the red wire to the coil of the main line (ML) contactor. This wire will provide a continuous voltage to the ML Coil when the transmitter is active. If a pendant is also connected to the controls, we recommend the addition of a transfer switch to select either pendant or radio control.
5. Connect the remainder of the wires to the control relays as required.

NOTE

The standard **Patriot** receiver can interface to either 3- or 4-wire hoist controls. When installing the **Patriot** on standard 3-wire hoist controls, the two wires for hoist second speed (GRN/WHT and RED/WHT) need to be joined together and wired into the appropriate location for hoist second speed.

Review the steps above to ensure the accuracy of the wiring before applying power to the installation.

Installation Testing

Before putting the system into service, the following testing procedure must be performed:

1. *Apply power* to the receiver.
2. Verify that **PWR** indicator turns on. See Figure 5 on page 14.
3. *Turn on* the transmitter.
4. Verify that the **SIGNAL** indicator flashes.
5. Verify that *voltage is present* at the receiver output to the Main Line Contactor (MLC).
6. Verify that *no voltage is present* at any of the relay output terminals that are used for your application.
7. Recheck the system wiring if voltage is present at any output terminal that is used.

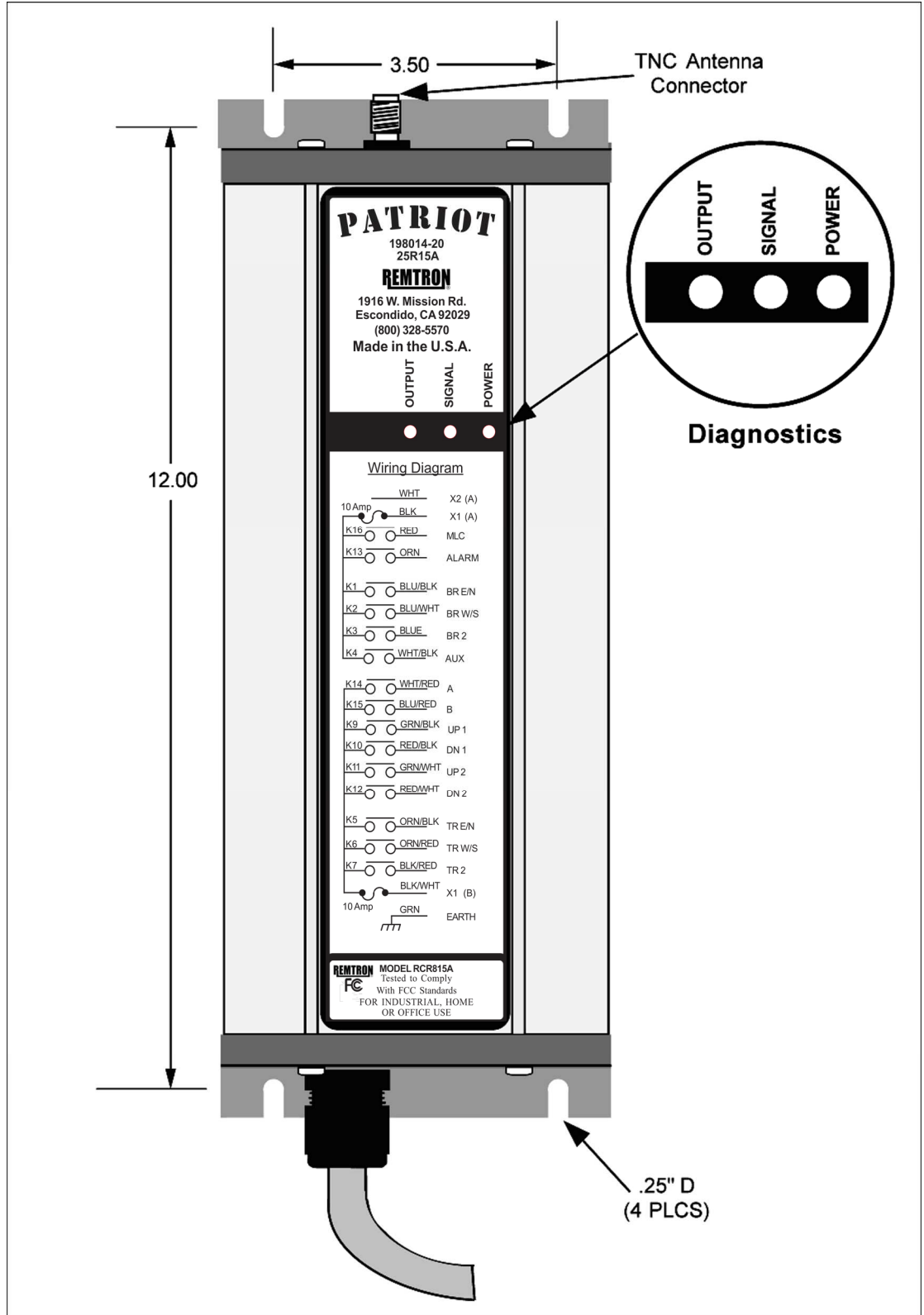
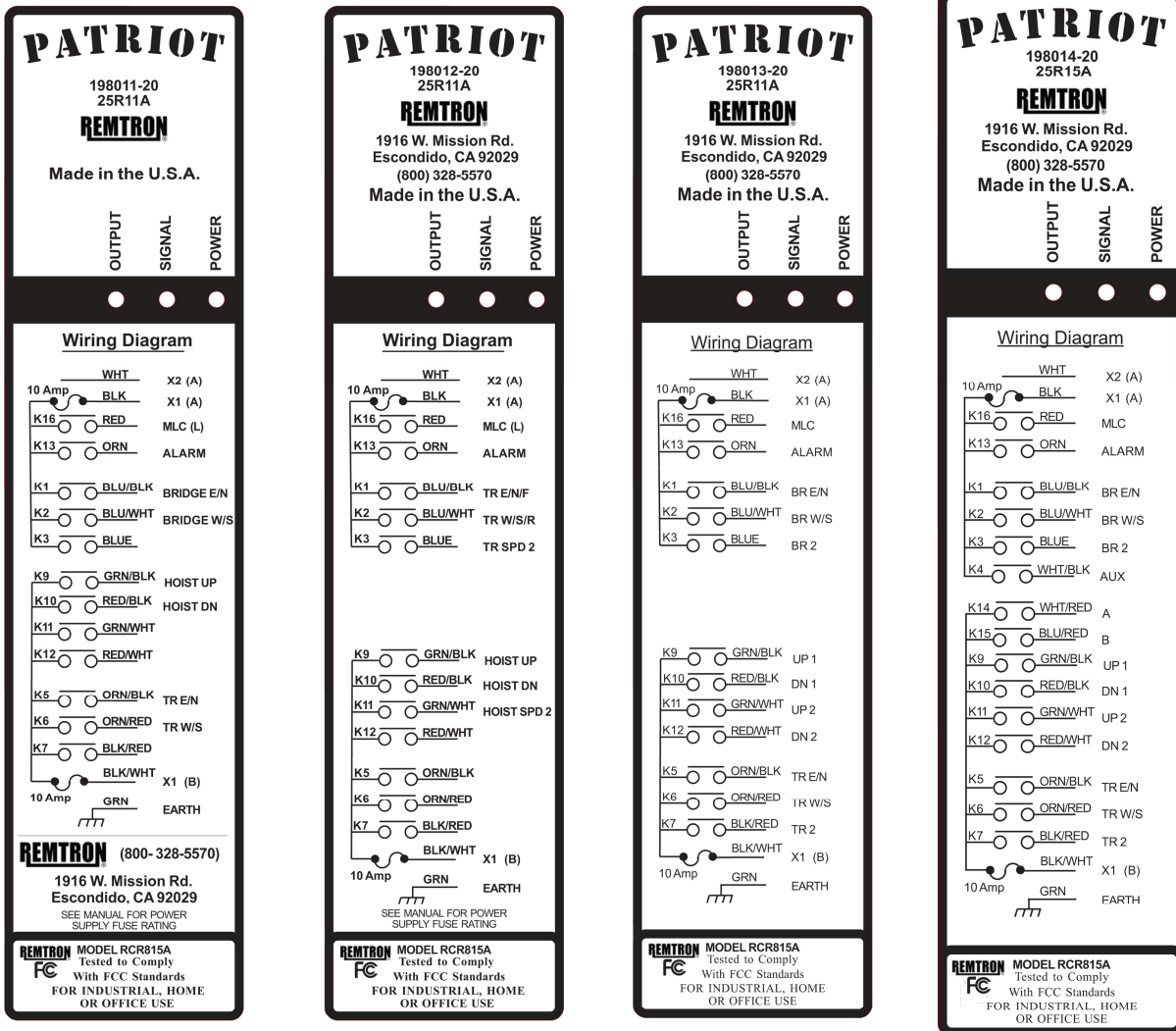


Figure 5. Patriot Receiver (25R15A)



25S08A

25S10A

25S11A

25S15A

Figure 6. Connections and labels for Patriot Receivers

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Section 4 — Maintenance & Troubleshooting

Monthly Inspection

It is recommended that the following tasks are performed once a month:

- Inspect the transmitter for damage to the keypad and case.
- Inspect all electrical and antenna connections to ensure they are clean and tight.

Installation Troubleshooting

If the system fails to operate at the time of installation, or after a system component has been repaired, try to remedy the problem by using the following troubleshooting chart. If this does not solve the problem, proceed to the transmitter and receiver troubleshooting charts or call Remtron Service.

Installation Troubleshooting Chart

Problem	Possible Cause	Remedy
Receiver will not respond to the transmitter.	Wrong transmitter code.	Make sure transmitter is the correct one for the receiver. Re-program the transmitter.
	Transmitter problem.	See the Transmitter Troubleshooting Chart on page 19.
	Receiver problem.	See Receiver Troubleshooting on page 24.
System has short range.	Antenna placement.	Move the antenna (see Antenna Location on page 10).
	Antenna cable shorted or open.	Check cable and connections to the antenna.
Some functions are incorrect.	Programming error.	Check the configuration sheet against system requirements. Call Remtron Service.

General Troubleshooting

Most problems are likely to occur in the transmitter, due to the rough treatment it can be subjected to. The transmitter should therefore be thoroughly diagnosed before proceeding to the receiver.

Transmitter Troubleshooting

WARNING!

When testing the transmitter, the receiver can become active and cause system operation. Always assume the system is working and will respond when testing a transmitter.

AVERTISSEMENT!

Lors d'essais de fonctionnement du transmetteur, le récepteur peut être activé et provoquer la mise en marche du système. Toujours considérer que le système fonctionne et qu'il répondra aux essais du transmetteur.

Normal Operation

When the transmitter is operating normally, the LED indicator will emit short flashes at a low rate when no commands are activated and at a higher rate when a command is activated.

Some transmitters use a red LED only. Others use a multicolored LED that flashes GREEN when no problems are present and changes to RED under low battery conditions or when other problems are encountered.

Transmitter Troubleshooting Chart

LED Indication	Possible Cause
LED is off	Transmitter is off – switch transmitter ON. Batteries are dead – replace batteries. Transmitter failure – call for service.
LED flashes at low rate	Transmitter is operating in a normal mode.
LED flashes at high rate	Command Switch is pressed.
LED flashes Red/Green ('A' series only)	Batteries getting low. Batteries should be changed at the next convenient opportunity.
LED flashes on-off at a slow rate (½ second on and ½ second off)	Batteries getting low. Batteries should be changed at the next convenient opportunity.

LED Indication	Possible Cause
LED remains on continuously (LED might flicker slightly)	Either a switch was activated at the time the transmitter was switched on or a general failure occurred that requires factory service. Ensure no other switches are pressed while attempting to switch the transmitter on.
LED will not light when ON/OFF button is pushed	Replace batteries. If this does not correct the problem, the transmitter must be repaired.

Replacing the Transmitter Batteries

WARNING!

The transmitter's electronic components are exposed when the back of the case is removed. Take care to prevent dirt or other contaminants from entering the case. Do not allow the circuit to be scraped or damaged in any way.

AVERTISSEMENT!

Lorsque l'endos du boîtier est enlevé, les composants électroniques sont à découvert. Prendre soin d'éviter de laisser la saleté ou tout autre contaminant entrer dans le boîtier. Éviter d'érafler ou d'endommager le circuit de quelque façon que ce soit.

Handheld transmitters

See Figure 7 on page 23 for your particular transmitter.

1. For Standard transmitters, fully release the two captive screws and remove the battery door.
2. Remove and replace the AA Alkaline batteries. **Be sure to observe the correct polarity.**
3. For Standard transmitters, fully replace the battery door and secure using the two captive screws. 'A' Series Battery door screws should be tightened until snug, plus half a turn.

Changing the Transmitter ID Code

Changing the ID Code requires use of a Remtron RAC16A series programmer. See Figure 7 on page 23.

- 1.** Confirm that the batteries are in good condition (refer to the Transmitter Troubleshooting Chart on page 18).
- 2.** Remove the battery door and batteries before removing the back of the transmitter.
- 3.** Attach the programming plug to the 4-pin connector on the circuit board. Verify that the ID Code is displayed.
- 4.** Enter the new ID Code and press the PRG key. The RAC16A display should read 'SUCCESS'.
- 5.** Replace the battery door and batteries after replacing the back panel. 'A' Series captive screws should be tightened until snug, plus half a turn.

See the RAC16A series User's Manual for more detailed instructions.

Transmitter Spare Parts List

Item	Part #
Spare Transmitter (complete)	Use Model No./Serial Number
Shoulder Strap	600008-02
Case screws, 6-32 5/8 Phillips, stainless steel	500047
Case and battery door screws, captive, 'A' series transmitters	500132
Replacement Transmitter Label	Use Model No./Serial Number

Model	Leather Holster	Clear Protective Pouch
25T08A	620022	620024
25T10A	620022	620024
25T11A	620023	620025
25T15A	620023	620025

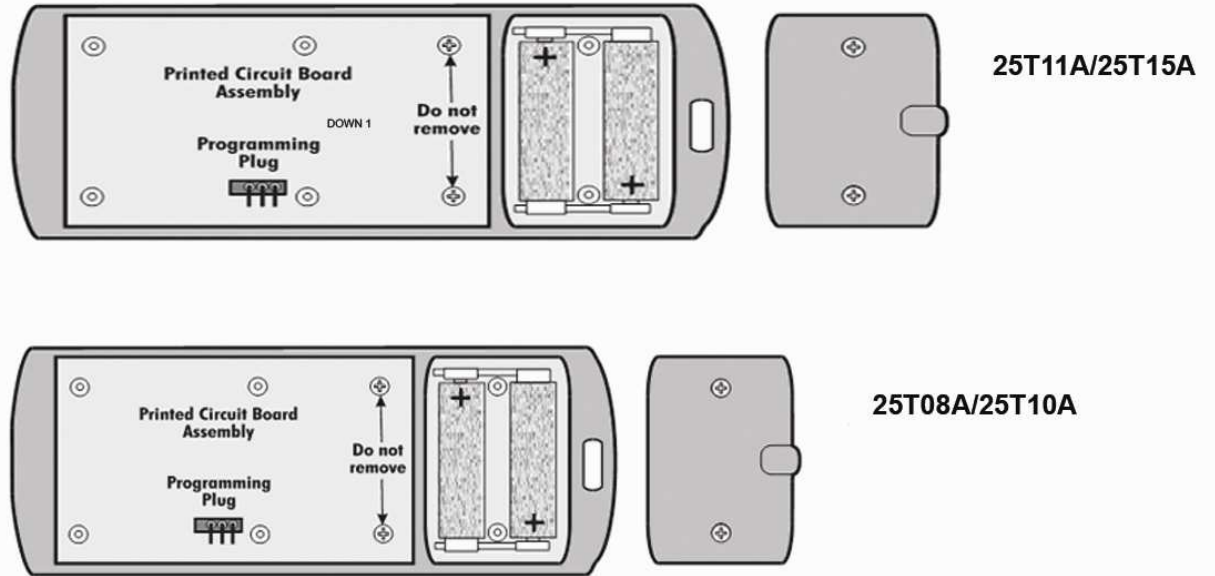


Figure 7. Handheld transmitters - access to Batteries and Programming Plug

Receiver Troubleshooting

General

See Figure 5 on page 15 for location of the diagnostic LEDs. The **Patriot** receivers have diagnostic LEDs that aid in identifying a problem if one occurs. The following table describes the diagnostic LEDs.

LED	Meaning
PWR	Receiver operating voltage is present when this LED is lit.
SIGNAL	A signal is being received that matches the decoder's address when this LED flashes. (MLC should be active).
OUTPUT	One or more command outputs are energized when this LED is lit, not including MLC relay.

Receiver Testing

The following steps should be followed when troubleshooting the **Patriot** receivers.

1. Check the **POWER** LED. If this LED is not lit:
 - Check that the power source to the receiver is present.
 - If 115VAC is present between the WHT and BLK wires on the interface cable, replace fuse F3 if present on the receiver circuit board (See Fuse Replacement on page 25).
2. Switch the transmitter to ON. The **SIGNAL** LED should start to flash. If it does not:
 - Test the transmitter.
 - Verify that the ID Code is the same for the transmitter and the receiver.
3. If only some functions are operating:
 - Check the output voltage of the respective relays and the electrical circuits.
 - If only the bridge functions are not operating, replace fuse F1 on the receiver circuit board. (See Fuse Replacement on page 25).
 - Check the condition of the transmitter switches.

4. If you are experiencing intermittent operation:
 - Check all connections.
 - Check the antenna connections.
 - Install noise-suppression devices across the coils of all contactors.
5. If the operating range is short:
 - Check all antenna connections and transmitter operation.
 - On new installations, verify that the receiver antenna is placed properly. If necessary, use an antenna mounting kit to relocate the antenna to a more favorable location.

Receiver Repairs

Patriot receivers have been designed for the utmost reliability. Other than two fuses to protect the basic power circuits, there are no serviceable items in the receiver.

Fuse Replacement

See Figure 8 on page 25.

1. Ensure power is switched OFF to all receiver power inputs.
2. Remove the mounting bolts from the end of the receiver by the interface cable.
3. Remove the four screws on the end of the receiver near the interface cable.
4. Gently pull the end cap and receiver board out of the case about 1 inch so that the fuses on the bottom edge of the circuit board are exposed.
5. Using a voltmeter, verify that no power is present on either of the fuses.
6. Replace the appropriate fuse with a GMC 125V 10A M/D or equivalent fuse 125VAC for F1 or F2. For F3 use 250v/250mA
7. Reposition the end cap and insert and tighten the four screws snugly.
8. Replace the mounting bolts to the end of the receiver by the interface cable.

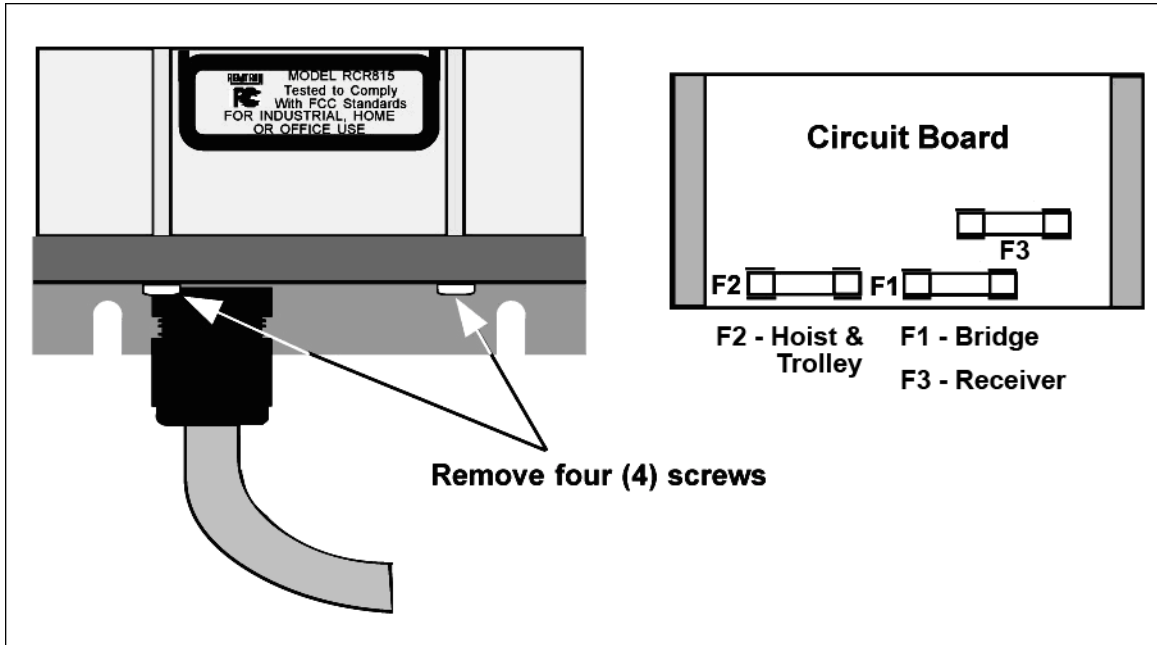


Figure 8. Fuse locations

Receiver Spare Parts List

Item	Part #
Receiver assembly (complete)	Use Model No.
Receiver Antenna	485026
Snubbers	
115/240 VAC	600052
Antenna cable Assembly w/SMB and panel mount TNC connectors	920040-01
Antenna Mounting Kit w/angle bracket, 9' coax cable and connectors	600038-01
Antenna Mounting Kit w/angle bracket, 18' coax cable and connectors	600038-02
250 mA 250V fuse	458030
10A 125V fuse	458028
Transfer Switch	452031

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Section 5 — Warranty Statement for *Patriot* Remote Control Systems

Transmitters

Transmitters are unconditionally warranted against malfunction or breakage for a period of one year and thirty days from the date of the original invoice except in the event of total destruction of the internal circuit board(s), immersion in water or fluid, or destruction by fire. Handheld transmitters used in corrosive environments must be protected by use of the Remtron clear plastic sealed pouch.

Receivers and Accessories

Receivers and accessories, in normal and customary use, are conditionally warranted against malfunction or breakage for a period of one year and thirty days from the date of the original invoice. The warranty does not cover: (a) defects or damage resulting from use of the product in other than its normal and customary manner; (b) defects or damage from misuse, accident, or neglect; (c) defects from improper testing, operation, maintenance, installation, alteration, modification, or adjustment; (d) damage from unauthorized repair or alterations; or (e) damage from water or corrosive materials beyond the specification of the case or enclosure.

General Terms of Warranty

Remtron will repair or replace the defective unit, solely at our option in the event of defect or failure to perform as specified, provided the product is returned in accordance with the terms of this warranty. Replacement parts are covered for the balance of the original warranty. All costs of shipping to Remtron shall be borne by the purchaser. The warranty covers the cost of return one-way shipping and handling of the product. The return shipment to the customer will be by the same method used for the original shipment of the product. This warranty does not cover the costs of outside repair service. This warranty sets forth the full extent of Remtron's responsibility regarding the product(s). Repair, replacement, or refund of the purchase price, at Remtron's option, are the exclusive remedies. This warranty is given in lieu of all other express warranties. All other warranties, expressed or implied, including without limitation implied warranties of merchantability or fitness for a particular purpose, are specifically excluded.

In no event shall Remtron be liable for damages in excess of the purchase price of the product(s), for any loss of use, loss of time, inconvenience, commercial loss, or lost profits or savings or other incidental, special, or consequential damages arising out of the installation, use, or inability to use the product(s), to the full extent that such may be disclaimed by law.

Service

Products returned for repair (warranty or non-warranty), must be assigned an RMA (Return Material Authorization) number by Remtron. To allow us to more effectively address the repair issues, the customer is to provide a detailed description of the specific problem.

Call 800-328-5570 for service or RMA assignment. To receive warranty service, deliver or send the product along with the assigned RMA number to our factory.

REMTRON, INC.
1916 W. Mission Rd.
Escondido, CA 92029

Appendix A: Transmitter Specifications

Item	Detail
Operating frequency band	902-928 MHz
Channel spacing	300 KHz
Modulation	Digital Frequency Modulation based on Manchester Code. Contains 16-bit address plus 16-bit CRC check.
Power, input	AA cell batteries (Alkaline recommended)
Output power	Meets FCC Part 15 requirements for license-free operation
Antenna	Circuit board, internal
Indicators	Self-test LED indicator
Ambient Operating Conditions	-20° F to +160° F (-28° C to +71° C)

Model	Weight⁽¹⁾	Dimensions	Commands	Batteries
25T08A	10.9 oz.	2.75" x 7.11" x 1.22"	8	2
25T10A	10.9 oz.	2.75" x 7.11" x 1.22"	10	2
25T11A	12.9 oz.	2.75" x 8.48" x 1.22"	11	2
25T15A	12.9 oz.	2.75" x 8.48" x 1.22"	15	2

Notes: (1) Weight includes Alkaline batteries

Certifications

Model	FCC ID#	Industry Canada Certification #
25T08A	EGT810TX	249 710 2624
25T10A	EGT810TX	249 710 2624
25T11A	EGT818TX	249 710 32099
25T15A	EGT818TX	249 710 32099

Appendix B: Receiver Specifications

Item	Detail
Operating frequency band	902 - 928 MHz
Channel spacing	300 KHz
Modulation	Digital Frequency Modulation based on Manchester Code. Contains 16-bit address plus 16 bit CRC check.
Receiver Type	Dual Conversion FM
Sensitivity	-104 dBm (typical)
IF Bandwidth	180 KHz
Antenna	3" tuned element
Decoder	Microprocessor-controlled
Command functions	
25R11	Up to 11
25R15	Up to 15
Response Time	60 Milliseconds
Safety Features	Address check ♦ CRC code check ♦ Format test ♦ Signal check ♦ Transmitter status checks ♦ Self test
Indicators	LEDs for easy troubleshooting
Output Contacts	8 Amp @ 230 VAC
Logic Base	Programmable for each application
Power Requirements	115 VAC 1 phase, 50 - 60Hz
Maximum Current Drain	0.12 Amp @ 115 VAC
Ambient Operating Temperature	-20° F to +160° F (-28° C to +71° C)
Receiver enclosure type and dimensions	NEMA 12, 4.85" x 13.13" x 2.67"
Industry Canada Certification #	249 710 2624A



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