

TORO Count on it.

TMR-1 Toro Maintenance Remote

• **User's Guide**

- **Installation**
- **Setup**
- **Operation**
- **Service**
- **Troubleshooting**



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TMR-1 Remote Control System Overview

The Toro Maintenance Remote is designed for convenience and usability. This powerful tool enables a single operator to perform most manual controller operations remotely from the field. With the capacity to handle commercial and municipal applications, the TMR-1 is also right at home in residential systems as well.

The TMR-1 kit includes a long-range, handheld transmitter complete with NiMH batteries and compatible charger. A pre-wired, quick-release receiver mount enables the TMR-1 system to be quickly installed and ready for operation; then easily moved from site to site as needed.

The TMR-1 system is designed for simple “plug and play” operation with all Toro and Irritrol remote-ready controllers, such as, TMC-212, TMC-424, and Rain Dial® Plus.

For additional controller model compatibility information, refer to “Specifications” on page 20.

Features and Benefits

- ♦ Programmable handheld transmitter retains up to 999 unique receiver address codes.
- ♦ Handles high station-count controllers — provides remote control of up to 512 individual stations.
- ♦ Quick-release receiver mounting system — enables receiver to be moved easily from site to site.
- ♦ Rechargeable NiMH batteries and dual-rate charger — keeps batteries at peak efficiency.
- ♦ Remote operations include: start, pause/resume, skip, restart and stop functions of selected stations and fully automatic ASC (All Station Cycle) for quick-check system operation.

! **IMPORTANT: Before installing and operating this equipment, read all product use and safety information provided on pages 21 and 22 of this manual. Failure to comply may result in injury and/or equipment damage.**

Handheld Transmitter Components

- 1 - **Antenna** - Screw-mount, flexible whip.
- 2 - **LCD Display Symbols:**
 - A - **Transmit** - Indicates signal transmission
 - B - **Pause** - Indicates watering on hold
 - C - **Water On** - Indicates station watering on
 - D - **Time** - Indicates run time is displayed
 - E - **Station** - Indicates station number is displayed
 - F - **Numeric Display Characters**
 - G - **Address** - Indicates address function is displayed
 - H - **Battery Status**- Indicates battery charge status
- 3 - **Address Key** - Accesses receiver address code function
- 4 - **Cursor Keys** - Up/Down arrow keys select station number. Left/Right arrow keys step through station sequence during operation.
- 5 - **Function Keys** - Accesses On, Pause and Off functions
- 6 - **Battery Charger Receptacle**
- 7 - **Belt Clip Attachment Points** (belt clip not shown)
- 8 - **NiMH Battery Stack**
- 9 - **115 VAC/7.5 VDC Battery Charger**



Receiver Components

- 1 - Antenna**
- 2 - Receiver Lock** - Sliding latch secures the receiver to the plug assembly.
- 3 - Activity Monitor LED** - Flashes Green while power is applied; Red when receiving a valid signal from the transmitter.
- 4 - Receiver Plug Receptacle**
- 5 - Receiver Plug Mounting Bracket** - Enables simple wall-mount installation. Easily removed enabling receiver plug installation in threaded ½" PVC.
- 6 - Receiver Plug Assembly**
- 7 - Modular RJ-11 Plug and Cable Assembly** - Connects the receiver to a compatible, remote-ready controller.
- 8 - Receiver Power Wires** - Connects the receiver to the controller's 24 VAC power terminals.
- 9 - Receiver Plug Cover** - Covers and protects the plug assembly when the receiver is not installed. Prevents damage due to prolonged exposure to moisture, sun and dust.




Receiver Installation

Before using your TMR-1 remote control system for the first time, the following procedures must be completed:

- ♦ Charge the transmitter batteries for a minimum of 8 hours.
- ♦ Install and connect the receiver plug assembly and receiver unit per the instructions provided.
- ♦ Test the installation to confirm proper signal reception and remote operation.

For maximum remote control performance and operating range, select an installation site for the receiver using the following guidelines:

- ♦ The mounting location wall is constructed primarily of wood or other non-metallic materials.
- ♦ Stuccoed walls, metal buildings and large metal objects are avoided.
- ♦ The receiver is located as high above the controller as possible.
- ♦ The antenna is free of contact and aligned perpendicular to the horizon.

 **The TMR-1 receiver plug assembly is specifically designed for this system. The Toro EZ-Remote and Irritrol KwikStart receiver plugs are not compatible.**

The receiver plug mounting bracket should be secured to an inside wall within 4' of the controller (the connecting cable is approximately 6' in length). Alternately, when an outdoor installation is preferred, the receiver plug can be removed from the mounting bracket and installed into a threaded ½" PVC pipe fitting.

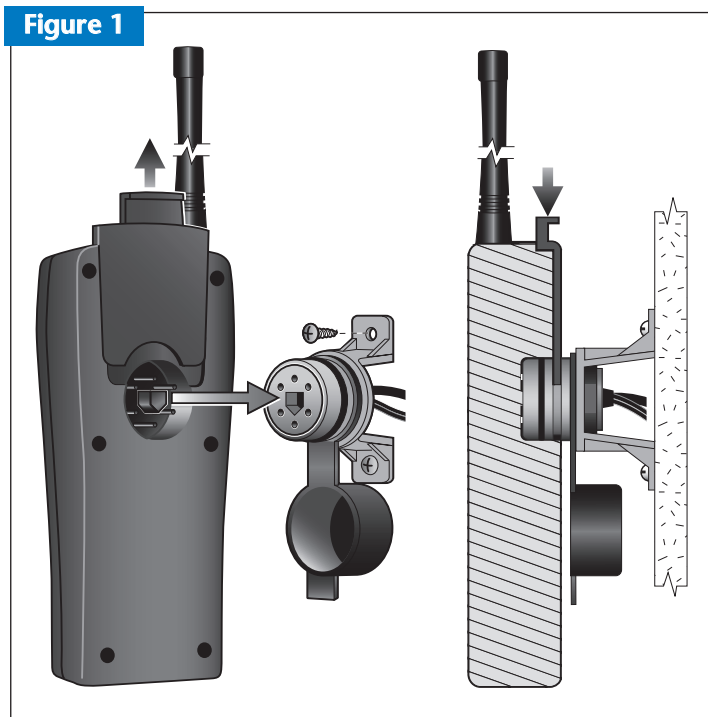
Indoor Installation

- 1 – Position the receiver plug assembly on the wall within 4' of the controller, as high as practical. **The alignment hole in the center of the plug must be pointing down.**

- 2 – Using the provided wood screws (or other appropriate fasteners), secure the bracket to the wall as high as possible. **If installing the plug assembly bracket onto drywall or masonry, screw anchors must be used.**
- 3 – With the receiver lock pulled up, align and install the receiver onto the plug assembly. Push the lock down to engage the groove in the plug assembly. See Figure 1.

⚠ Caution: Never connect the remote control power wires to any voltage source greater than 24 VAC. Failure to comply will result in severe equipment damage.

- 4 – Disconnect power to the controller.
- 5 – Route the receiver plug wiring through the base of the controller cabinet.



- 6 – Locate the controller's remote RJ-11 jack and insert the modular connector. See Figure 2.

 **The controller illustrated in Figure 2 is shown for reference only. Refer to the controller user's guide for specific installation information.**

- 7 – Locate the controller's 24 VAC connection terminals and attach the receiver power wires. **Connect either wire to either terminal.**
- 8 – Apply power to the controller. The receiver Activity monitor should begin flashing Green. If the Activity monitor does not illuminate, confirm the receiver is properly installed and plug assembly is wired correctly.

Outdoor Installation

⚠ CAUTION: The receiver plug is weather resistant only when installed in PVC conduit and the plug cover is in place. The receiver unit is not weather resistant and should only be installed outdoors for temporary use. Do not allow irrigation spray to contact the receiver during sprinkler operation.





- 1 – At the selected installation site, bore a $\frac{3}{4}$ " hole through the wall for $\frac{1}{2}$ " PVC pipe access.
- 2 – Install a length of PVC pipe through the wall, leaving about 1" of pipe on both sides.
- 3 – Inside, install a 90° elbow and a 3" section of pipe. Use a conduit clamp to secure the pipe assembly to the wall. See Figure 3.
- 4 – Remove the mounting bracket from the plug assembly.
- 5 – Insert the receiver plug wiring through the threaded end of a $\frac{1}{2}$ " thread/slip PVC fitting. Thread the receiver plug into the PVC fitting and tighten by hand.
- 6 – Route the wiring through the conduit. Install the plug/fitting assembly to the pipe, orienting the plug alignment hole pointing straight down.
- 7 – Connect the receiver plug wiring as described above.

Remote Control Operations

 For the best results, please note the following TMR-1 remote system operating characteristics:

- ♦ The transmitter batteries must be fully charged prior to operation. Refer to “Charging the Batteries” on page 16.
- ♦ For maximum signal range, hold the transmitter vertically, at shoulder level, facing toward the receiver when sending a command. Operating the transmitter in a horizontal plane and/or contacting the antenna during transmission can significantly reduce signal range.
- ♦ The highest station number that can be selected is 24 (by default), but is easily adjusted from 1 to 512 as preferred. To adjust the station number range, refer to “Adjust Station Number Range” on page 15.

Basic Station Operation

- 1 – Press and hold the  ON button until the transmitter powers up. The last station number operated will be displayed on the initial start up screen. The valve symbol indicates a station number is shown.
- 2 – Press the  up or  down arrow button to select a station number. Press and hold the button for rapid scrolling.
- 3 – Press the  ON button. The receiver Activity monitor will flash Red when a valid signal is received. The selected station will turn on and the 10-minute timer will begin counting down in one-second increments. The water droplet and the hour glass are shown to indicate watering in progress. Every 15 seconds the display will switch to the operating station number.

 The station run time is fixed at 10 minutes and cannot be adjusted.





Operating Controls

After selecting and starting a station, the following operating controls become available:

♦ Stop operation:


Press the  OFF button.


♦ Select a different station number:

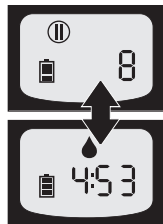
Press the  left or  right arrow button to select the station number. The previous station will turn off as the selected station starts.



♦ Pause operation:


Press the  pause button. The pause symbol will be displayed with the station number. Every 15 seconds the display will alternate to show the run time remaining when operation resumes.

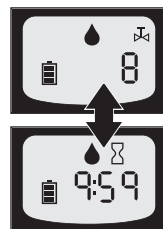
Press the  pause button again to resume operation.



If the pause function is not released within 10 minutes, station operation will be terminated.

♦ Reset the countdown timer:

Press the  ON button. The run time for the operating station will be reset to 10 minutes. *This control function does not apply to ASC operation.*



♦ Turn off transmitter:

Press and hold the  OFF button until the display is blank.







The transmitter will shut off automatically after 30 minutes of inactivity.

ASC Operation

The ASC (All Station Cycle) feature enables all stations to be automatically operated in numeric sequence for a two-minute run time.

When ASC operation is initiated, a start command is sent to station number 1. The station runs for two minutes and shuts off. All subsequent stations (up to and including the highest station number accessible on the transmitter) will run automatically in numeric sequence. **You may prefer to adjust the station number range for this procedure. Refer to “Adjust Station Number Range” on page 15.**

 **The station run time used during ASC operation is fixed at two minutes and cannot be adjusted.**

- 1 – Press and hold the  ON button until the transmitter powers up. **The last station number operated will be displayed.**
- 2 – To select the ASC function, press the  up arrow button one step past the highest station number, or press the  down arrow button one step past the lowest station number. **Press and hold the button for rapid scrolling.**
- 3 – Press the  ON button. **Station 1 will turn on and the timer will begin counting down from two minutes, in one-second intervals. Every 15 seconds, the display will alternate to indicate that an ASC operation is currently running.**











TMR-1 Setup Features

About Communication Address Codes

The handheld transmitter and receiver provided in the TMR-1 kit are programmed by default with the same three-digit communication address code ranging from 001 to 999 and requires no additional adjustments for initial remote control operation.

Due to the long-range capability of the TMR-1 transmitter, cross talk to more than one receiver is possible if the receivers are located within the transmitter's broadcast radius. So, it is generally good practice to assign a unique address to each receiver when operating multiple remote control irrigation systems with a single TMR-1 handheld transmitter. [The transmitter and receiver address codes are accessed and set through the transmitter keypad.](#)




Set Transmitter to the Receiver's Address Code

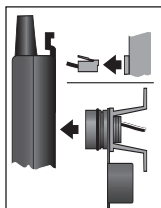
- 1 – Press and hold the  ON button until the transmitter powers up.
- 2 – Press and the  Address button to access the address setup mode. The current transmitter address code will be displayed.
- 3 – Press and hold the  Address button until the word ADDRESS and the third digit of the address code begin flashing, then release. [The display will automatically revert to the initial power-up screen after 30 seconds of inactivity.](#)
- 4 – To adjust the digit, press the  up or  down arrow button. To select another digit, press the  left or  right arrow button. [In this example, the transmitter is being set to access a receiver address code of 007.](#)
- 5 – Press the  Address button to exit the setup mode.









Reset Receiver Address Code

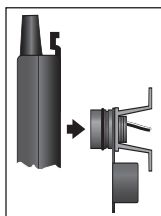
When the receiver is initially powered up, its address code can be accessed and adjusted for period of 30 seconds through the handheld transmitter keypad. To perform this procedure, you must have access to the receiver, the plug assembly and the controller's modular cable connection.

- 1 – Unlock and remove the receiver from the plug assembly.
- 2 – Remove the modular cable connection from the controller's remote control jack.
- 3 – Press and hold the  ON button until the transmitter powers up.
- 4 – Press the  Address button to access the address code function. The current address code in the transmitter will be displayed.
- 5 – Press and hold the  Address button until the word ADDRESS and the third digit of the address code begin flashing, then release the button.



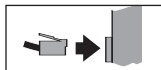
 **During this procedure the address code will be entered into the receiver and the handheld transmitter at the same time.**

- 6 – To adjust the digit, press the  up or  down arrow button. To select another digit, press the  left or  right arrow button. **In this example, the receiver address code is set to 008.**
- 7 – With the receiver address code displayed correctly, reinstall the receiver. The Activity monitor should begin flashing Green.
- 8 – Press and hold the  Address button. When the receiver Activity monitor momentarily flashes Red, release the button.



! Important: The Activity monitor will momentarily flash Red when the receiver acquires a valid signal from the handheld transmitter. Repeat this procedure as necessary until the signal reception is confirmed.








- 9 – Connect the receiver modular cable to the controller.



- 10 – Run a basic station operation using the handheld transmitter to confirm established communications and proper controller operation.

Adjust Station Number Range

When shipped from the factory, the highest station number that can be selected is 24. To adapt the handheld transmitter for various controller configurations, the station number range can be easily adjusted from 1 to 512.

- 1 – Press and hold the  ON button until the transmitter powers up.
- 2 – Press and hold the  left and  right arrow buttons at the same time. The current station range value will be displayed (flashing).
- 3 – To adjust the value, press the  up or  down arrow button. **Press and hold the button for rapid scrolling. In this example the station range is reset to 36.**
- 4 – Press and hold the  left and  right arrow buttons at the same time to exit the adjustment mode.



Transmitter Battery Service

The NiMH batteries supplied with the handheld transmitter are capable of several hundred charge/discharge cycles and a long service life when properly maintained.

The transmitter batteries will have a slight charge when shipped from the factory. Before using the remote system for the first time, charge the batteries for at least 8 hours.

The battery charger provided in the TMR-1 kit supplies a dual-rate charge cycle that will initially bring the batteries to full capacity at a high rate, then switch automatically to a trickle charge to maintain the batteries at peak capacity. When using the TMR-1 charger, the batteries can be charged indefinitely without risk of overcharging.


The battery symbol on the transmitter display indicates the current charge state of the batteries.

The display symbol will change to indicate the following battery charge conditions:



Charging the Batteries

- 1 – Plug the battery charger into a 115 VAC outlet.
- 2 – Locate the rubber flap cover on the bottom of the transmitter. Pull the inner end of the flap outward to expose the charger receptacle. Insert the charger plug into the receptacle. See Figure 4.

 **The transmitter can be turned on or off while charging the batteries. When the transmitter is on, the battery symbol will blink continuously.**

- 3 – When the battery symbol indicates full charge, remove the charger plug and close the rubber flap cover.


 **The length of time required to charge the batteries to full capacity will vary depending on the battery condition and current state of discharge.**

Figure 4

To 115 VAC
Receptacle



Replacing the Batteries

When battery replacement is required, any conventional size AA rechargeable NiMH or non-rechargeable Alkaline batteries can be used.

⚠ Caution: Never, under any circumstances, connect the battery charger to the transmitter with Alkaline batteries are installed. Charging Alkaline batteries will result in battery failure and severe equipment damage.

- 1 – Confirm the transmitter is off and the battery charger is disconnected.
- 2 – Remove the optional belt clip accessory if installed.
- 3 – Remove the phillips head screw from the battery cover. Slide the cover downward to remove.
- 4 – Carefully remove and replace the batteries, maintaining the correct polarity as shown in Figure 5.
- 5 – Reinstall the battery cover and optional belt clip.

Figure 5



💡 Dispose of all used batteries in accordance with the battery manufacturer's recommendations.

Troubleshooting

The following troubleshooting symptoms and solutions are provided to help resolve basic problems that may arise during setup and initial operation of the TMR-1 remote control system. If the problem cannot be resolved using this information, contact a Toro Customer Service representative at 1-800-664-4740 for assistance. Normal office hours are Monday–Friday, 7:30 a.m.– 4:00 p.m., PST.

The controller station does not turn on.

Solution

- ❖ Verify the handheld transmitter and receiver are set to the same address code. Confirm the receiver Activity monitor momentarily flashes Red when a command is sent from the transmitter. If the Activity monitor continues to flash only Green, communication is not established. Refer to pages 13–15 for address code setup information.

The controller station number is higher than can be selected on the transmitter.

Solution

- ❖ The transmitter station number range is adjusted too low for your controller application. Refer to page 15 for the adjustment procedure.

The communication range is very short.

Solution 1 of 2

- ❖ Change the receiver location slightly. Try increasing the installed height and/or moving the receiver slightly left or right. Sometimes small changes can result in a substantial increase in reception. Make sure the receiver is not located within 3' of any large metal object or metal stud. Metal objects below the receiver are generally not a problem, whereas metal objects above the receiver can often decrease reception and overall performance.

Solution 2 of 2

- ❖ Relocate the receiver beyond the constraints of the 6' connection cable and power wire supplied in the TMR-1 kit. Use a conventional RJ-11 extension cord and additional 18-gauge power wire to install and connect the receiver in an optimal reception location, within 30' of the controller.

The transmitter batteries discharge quickly.

Solution 1 of 3

- ❖ Protect the handheld transmitter keypad. Pressing the buttons on the hand-held cause it to transmit a signal which uses battery power. If carrying the transmitter in a toolbox, or any place where the buttons may be accidentally pressed, will cause the batteries to discharge. Storing the transmitter in its foam-lined carrying case is recommended.

Solution 2 of 3

- ❖ Bring the batteries up to full charge. Allow the batteries to charge continuously for at least 8 hours. The battery charger supplied in the TMR-1 kit can remain connected to the transmitter whenever the transmitter is not in use.

Solution 3 of 3

- ❖ Replace the batteries. NiMH batteries will generally last for hundreds of charge/discharge cycles, but will eventually need to be replaced when they can no longer hold a charge. See "Replacing the Batteries" on page 17.


Specifications

Handheld Transmitter – TMR-1-TX

- ◆ Dimensions: 3" W x 1.25" D x 6" H (12" with Antenna)
- ◆ Operating voltage: 4–6 VDC
- ◆ Maximum RF power output: 27 dBm
- ◆ Batteries: Four, Size AA, NiMH (included)
- ◆ Battery Charger: Input – 115 VAC 60 Hz, 4 W
Output – 7.5 VDC, 100 mA
- ◆ Operating temperature range: -10°C to +60°C
- ◆ Storage temperature range: -30° to +65°C
- ◆ FCC ID#: OXP – TMR-1-TX

Receiver – TMR-1-RX

- ◆ Dimensions: 3" W x 1.25" D x 6" H (12" with Antenna)
- ◆ Operating voltage: 22–26 VAC
- ◆ Maximum current draw: 75 mA VAC
- ◆ Operating temperature range: -10°C to +60°C
- ◆ Storage temperature range: -30° to +65°C
- ◆ MURS channel frequencies: 151.82 MHz, 151.88 MHz, 151.94 MHz, 154.57 MHz and 154.6 MHz
- ◆ Designed communication range: 1.5 miles (line-of-sight with typical obstructions)
- ◆ Controller model compatibility: Toro TMC-212, TMC-424, and Greenkeeper®212 – Irritrol Rain Dial® Plus and MCE

 **Controller model compatibility is subject to change without notice. Contact an authorized Toro or Irritrol dealer for current information.**

TMR-1 Remote Kit Components

- | | |
|---------------------------------|-----------|
| ◆ Handheld Transmitter Assembly | TMR-1-TX |
| ◆ Receiver Assembly | TMR-1-RX |
| ◆ Connector Plug Assembly | TMR-1-CC |
| ◆ Antenna | TMR-1-ANT |
| ◆ Battery Charger Assembly | TMR-1-CHG |

The Toro Promise – Limited Two-year Warranty

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrants, to the owner, each new piece of equipment (featured in the current catalog at date of installation) against defects in material and workmanship for for a period described below, provided they are used for irrigation purposes under manufacturer's recommended specifications. Product failures due to acts of God (i.e., lightning, flooding, etc.) are not covered by this warranty.

Neither Toro nor Toro Warranty Company is liable for failure of products not manufactured by them even though such products may be sold or used in conjunction with Toro products.

During such warranty period, we will repair or replace, at our option, any part found to be defective. Your remedy is limited solely to the replacement or repair of defective parts.

Return the defective part to your local Toro distributor, who may be listed in your telephone directory Yellow Pages under "Irrigation Supplies" or "Sprinkler Systems," or contact The Toro Warranty Company P.O. Box 489, Riverside, California, 92502. Phone (800) 664-4740 for the location of your nearest Toro distributor or outside the U.S., call (951) 688-9221.

This warranty does not apply where equipment is used, or installation is performed in any manner contrary to Toro's specifications and instructions, nor where equipment is altered or modified.

Neither Toro nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of equipment, including but not limited to: vegetation loss, the cost of substitute equipment or services required during periods of malfunction or resulting non-use, property damage or personal injury resulting from installer's actions, whether negligent or otherwise.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

All implied warranties, including those of merchantability and fitness for use, are limited to the duration of this express warranty.

Some states do not allow limitations of how long an implied warranty lasts, so the above limitation may not apply to you.

This warranty gives you specific legal rights and you may have other rights which vary from state to state.

The TMR-1 is covered by this warranty for a period of two years from the date of installation.

Important Operating Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment. This product also complies with FCC Part 95 of the FCC rules and regulations.

RF Operational Characteristics

Your TMR-1 remote contains a transmitter and a receiver. When operating, they received and transmit radio frequency (RF) energy. They operate in the frequency range of 151-155MHz, with an rf output power level of 0.5 watts.

Electromagnetic Exposure and Operational Precautions

The TMR-1-TX handheld transmitter will transmit when the user presses certain button sequences on the front keypad. Use only the supplied and/or replacement antenna. Unauthorized antennas, accessories, or modifications to the unit may damage the unit, void the warranty, and/or violate FCC rules.

Do not hold the antenna when operating the remote control. Holding the antenna adversely affects the range of the unit. Hold the hand-held remote control upright, elevated to shoulder height or higher and antenna at least 12 inches away from the body when pressing buttons and operating the unit.

The Federal Communications Commission (FCC), with its action in ET Docket 93-62, has adopted a safety standard for human exposure to Radio Frequency (RF) electromagnetic energy emitted by FCC-certified equipment. This product meets the uncontrolled environmental limits as stated in OET-65C (01-01) when operated in accordance with the operation guidelines described in this manual. Proper operation of this radio device according to the instructions in this publication will result in user exposure substantially below the FCC recommended limits. This equipment generates, uses and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference. However, there is no guarantee that interference will not occur. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

Re-orient or relocate the receiving antenna.

Increase separation between the equipment and receiver.

Connect the equipment to a different circuit than than the receiver's.

Consult the dealer or an experienced radio/TV technician.

WARNING:

Do not operate your hand-held remote control where posted instruction notify you to turn off two-way radios. Such locations are construction sites with blasting taking place, hospitals, and aircraft.

The Advanced Medical Technology Association recommends a separation of 6" be maintained between hand-held wireless devices and a pacemaker.

Do not operate near blasting caps or potentially explosive atmospheres. These devices are not categorized as "Intrinsically Safe" and are not suitable for use inside refineries, chemical plants, grain elevators or any area requiring intrinsically safe products.

Caution:

- Do not use a hand-held remote control that has a damaged antenna.
- All batteries contain chemicals that may cause damage or bodily injury.
- Always exercise caution when handling charged batteries.
- Do not plug the charger into any voltage higher than 120 VAC.
- Do not attempt to charge non-rechargeable batteries such as alkaline batteries.
- Do not operate the charger if it has been dropped or damaged.
- Do not use any other charger with this product. The TMR-CHG is the only approved charger for use with this product.
- The receiver is powered by the controller's 24 VAC (nominal) transformer source. Never connect the receiver power wires to any power source higher than 24 VAC.