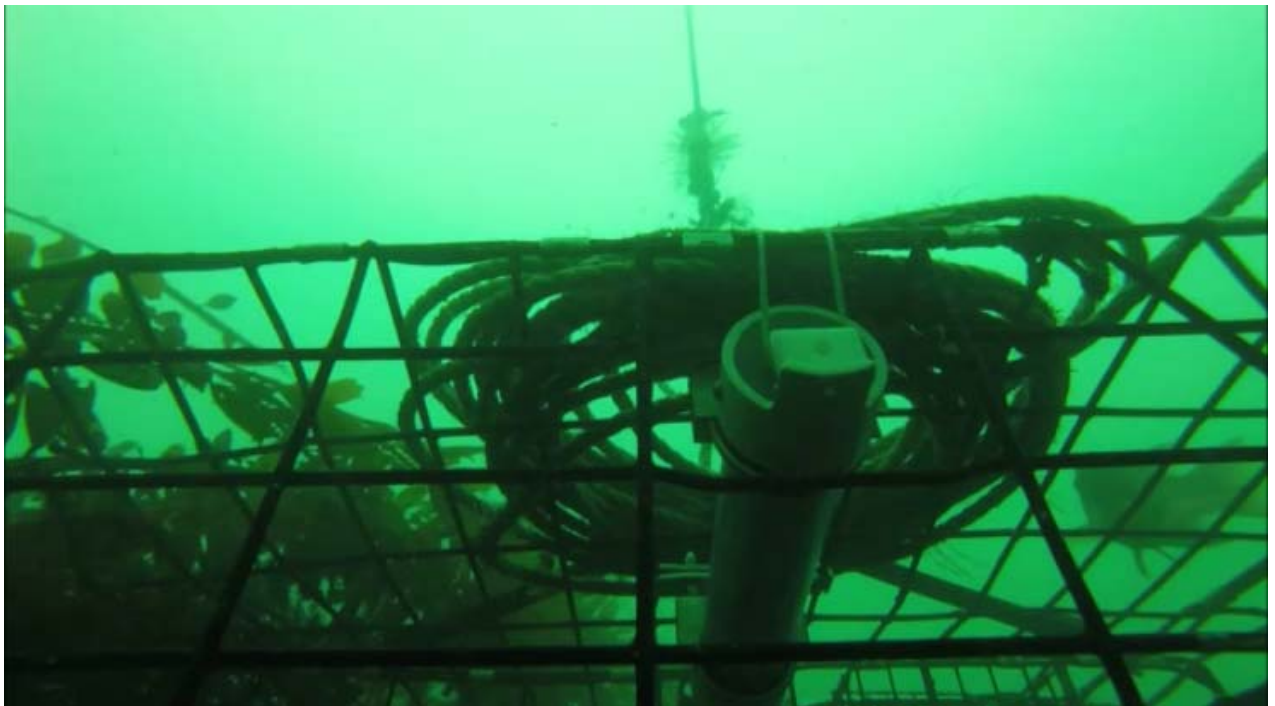


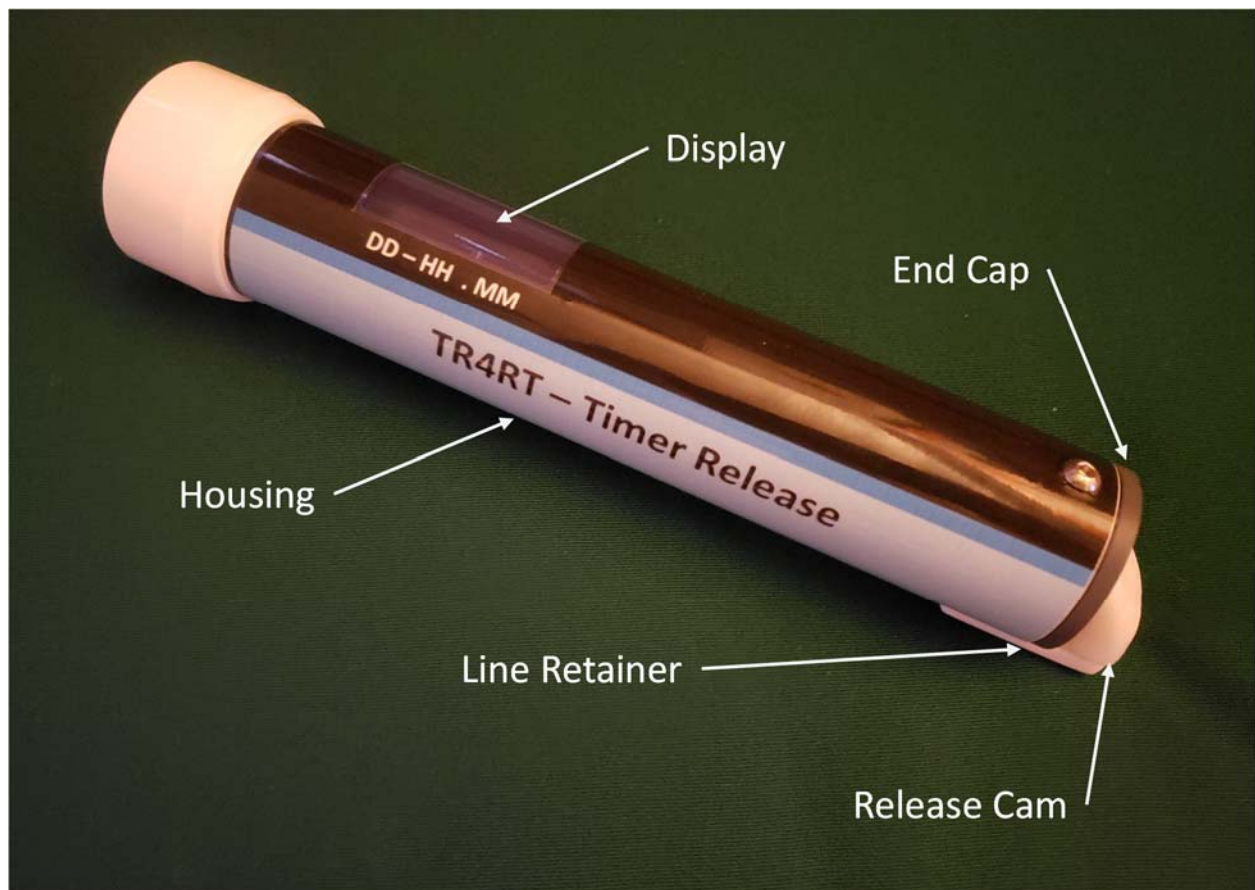
TIMER RELEASE FOR ROPELESS TRAPS  
(TR4RT)  
INSTRUCTION MANUAL





## GENERAL DESCRIPTION

The TR4RT is an underwater timer release for recovery of underwater equipment. The system was developed primarily for use with fishing traps but can be used in any suitable application. The system consists of an underwater housing, a rotating release and programming cam, and a release line retainer. The system works on the principal of "Time Until Release" (TUR). Using the cam, the user programs the unit with a specified TUR. The user then arms the system and deploys the equipment. After the specified TUR duration has elapsed, the cam rotates 180 degrees and to activate the release. For most systems, this releases a coil of line and float that are secured to the trap, and the float comes to the surface and the equipment can then be retrieved.



## SYSTEM SETUP

System setup generally requires:

- Activation or installation of batteries.
- Installation/Removal of the line retainer.
- Selecting the display orientation.
- Attachment of the system to the trap.
- Setup of the rigging that will release the line coil and float.
- Testing of the system for proper operation.

## ACTIVATION/INSTALLATION OF BATTERIES

**IMPORANT! The TR4RT is designed to use only the Titanium Innovations CR14505 lithium AA batteries. Use of other AA batteries may result in insufficient torque to overcome the release line load and a failure of the system to release.**

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### ACTIVATION

If batteries are already installed, but not activated, use the following steps.

1. Remove the two stainless steel screws that hold the endcap in place.
2. Remove the line retainer.
3. Place the unit in a vice, with the vice holding the cam.
4. Carefully pull on the housing directly away from the endcap until the housing slides off the endcap and reveals the electronics and batteries.
5. Verify that new Titanium Innovations CR14505 lithium AA batteries are in the battery holder.
6. Find the small tab inserted between the battery terminals and remove it.
7. Check that the unit powers up when this is removed by looking at the display.
8. Check that the O-ring and seal areas are clean, and if necessary clean and re-grease with silicone grease.
9. Reinstall the housing making sure that the display aligns with the window in the housing and that the holes in the housing align with the holes in the end cap.
10. Reinstall the line retainer and the screws.

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### INSTALLATION

If batteries need to be installed, use the following steps.

1. Remove the two stainless steel screws that hold the endcap in place.
2. Remove the line retainer.
3. Place the unit in a vice, with the vice holding the cam.
4. Carefully pull on the housing directly away from the endcap until the housing slides off the endcap and reveals the electronics and batteries.
5. Install new Titanium Innovations CR14505 lithium AA batteries into the battery holder.
6. Check that the unit powers up when this is removed by looking at the display.
7. Check that the O-ring and seal areas are clean, and if necessary clean and re-grease with silicone grease.
8. Reinstall the housing making sure that the display aligns with the window in the housing and that the holes in the housing align with the holes in the end cap.

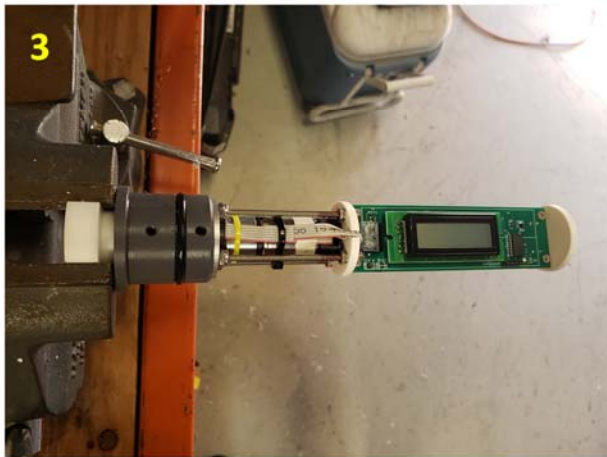
9. Reinstall the line retainer and the screws.



Remove the two stainless steel screws that hold the endcap in place and remove the line retainer.



Place the unit in a vice, with the vice holding the cam.



Carefully pull on the housing directly away from the endcap until the housing slides off the endcap and reveals the electronics and batteries.



If activating existing new batteries, find the small tab inserted between the battery terminals and remove it. Verify display turns on.



If installing new batteries, remove old batteries and dispose of properly.



Install new Titanium Innovations CR14505 lithium AA batteries into the battery holder. Verify display turns on and close up the unit

## INSTALLATION/REMOVAL OF THE LINE RETAINER

**IMPORANT! The TR4RT can be used with or without the line retainer. In general, the system is easier to use without the line retainer. The line retainer should only be installed if it is found that the release line has a tendency to jump off the cam during deployment of the trap.**

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### INSTALLATION

If the retainer is not already installed, use the following steps to install it.

1. Remove the endcap screw on the side of the unit where you want to install the retainer.
2. The retainer should be installed on the side opposite the direction of tension for the release line.
3. Install the retainer using the screw and supplied flat washer.

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### REMOVAL

If the retainer is already installed, use the following steps to remove it.

1. Remove the endcap screw on the side of the unit where the retainer is installed.
2. Remove the retainer and flat washer.
3. Replace the screw.

## SELECTING THE DISPLAY ORIENTATION

**IMPORANT! The TR4RT display can be oriented in any direction required by the mounting arrangement. The motions of the cam are all relative and thus are not fixed to a specific orientation of the unit or the display. However, if the line retainer is installed, then the display can only be oriented on the same side as the retainer, or on the opposite side to the retainer due to the location of the retainer mounting holes relative to the display.**

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### ORIENT THE DISPLAY – LINE RETAINER NOT INSTALLED

If the line retainer is not installed, use the following steps to orient the display.

1. Locate the unit at the desired mounting location on the trap.
2. Rotate the unit until the display is facing the best direction for viewing.
3. Follow the steps in the subsequent section of the manual to mount the unit in this orientation.

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### ORIENT THE DISPLAY – LINE RETAINER INSTALLED

If the retainer is installed, use the following steps to orient the display.

1. Locate the unit at the desired mounting location on the trap.
2. Orient the unit so the line retainer is facing way from the direction of tension for the release line.
3. Determine if the display is facing the best direction, or if it needs to be rotated 180 degrees.
4. It necessary, mount the line retainer on the opposite end cap screw to rotate the display orientation 180 degrees.
5. Follow the steps in the subsequent section of the manual to mount the unit in this orientation.

## ATTACHMENT OF THE RELEASE TO THE TRAP

The TR4RT has been used on a wide range of fishing traps, and each system requires some adjustment to the attachment to accommodate the different trap designs. Some key considerations for mounting are summarized below. Please feel free to contact us with any questions regarding your specific application.

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### ATTACHMENT HARDWARE

The housing of the TR4RT is constructed from clear schedule 40 PVC pipe. So, a standard sized pipe mounting bracket can be used to attach to the housing. While there are many varieties, we recommend using two plastic clamps, one at each end of the unit (1-1/2" Pipe Clamp Body Polypropylene Light Series; The Clamp Co.; see Appendix A for parts list). This can then generally be attached to a secondary plate that can in turn be secured to the wire mesh or the structural frame of the trap with cable clamps. The TR4RT unit must be secured sufficiently that the housing is not able to rotate when activated, otherwise the housing will turn, and the cam will not, and no release will occur. For this reason, we recommend against using zip ties or other methods that are prone to slippage for securing the housing.

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### ATTACHMENT LOCATION AND ORIENTATION

There are two basic attachment locations that have generally been used successfully. These are either horizontal or vertical. In the vertical configuration, the TR4RT is generally secured to a vertical wall of the trap. This can be on the inside of the wall or the outside. Inside is preferred for protecting the unit from impact during handling and may allow better stacking of traps. Outside provides easier access to the unit.

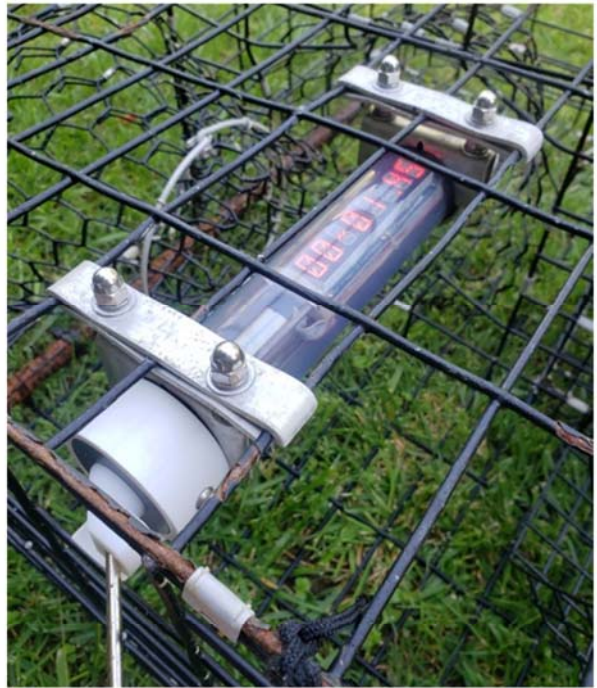
In the horizontal configuration, the TR4RT is generally secured to the top of the trap with the cam end aligned with one of the vertical walls. Again, mounting inside is preferred for protecting the unit from impact during handling, and may allow better stacking of traps. Outside is generally not recommended for this orientation but may be possible in some cases.

**IMPORTANT! In either of these orientations, it is critical that the unit be mounted such that the release line leads with the proper angle to the cam. The angle to the cam must be oriented above the perpendicular, otherwise the release loop may not slip off the cam. This is one of the most common causes of release failure. Make sure that the attachment location and orientation are such that the release line pulls at a slight vertical angle from the perpendicular to the cam.**





Vertical installation on a lobster trap with the TR4RT outside the trap and no line retainer.



Horizontal installation on a lobster trap with the TR4RT inside the trap.



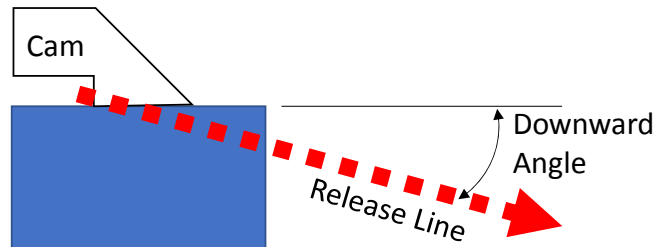
Vertical installation on a crab trap with the TR4RT inside the trap with line retainer.

## Correct Configuration



Correct configuration of the release line lead relative to the cam

## Incorrect Configuration



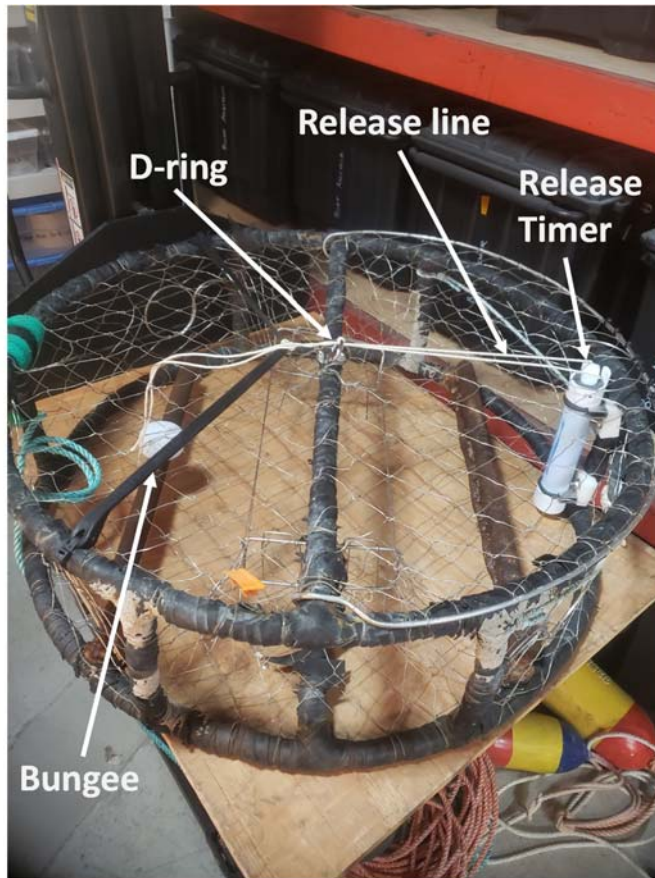
Incorrect configuration of the release line lead relative to the cam

## RIGGING

Rigging of the release system is critical to the successful operation of the system. While many different configurations are possible, the system has been tested with configurations that are known to perform reliably, and these should serve as at least a starting point for the rigging configuration for any trap.

The recommended rigging arrangement works with a coiled trap line and float. The trap line must be coiled cleanly to minimize the possibility of tangles after release. The float should have a small line loop at its base for securing to the release rigging. The system can use a single float, or main float with trailer. If a main float and trailer are used, the loop should be with the main float.

The release rigging consists of a bungee cord, the release line, and a degradable link. The release line is made into a loop and secured to the middle of the bungee using a degradable cotton cord linkage. The release line should be made of a small diameter, slippery material such as 1/8" diameter dyneema line. The bungee cord should be a smooth rubber (polyurethane or EPDM) that will hold up in saltwater (e.g., McMaster Carr <https://www.mcmaster.com/3097T53-3097T531/>). The bungee cord is secured to the top of the trap at its ends using either the supplied hooks (bent over to keep them from coming off), or large zip ties. The release line is then led through the float loop, under a central hold down point (either an installed D-ring or just a wire section of the trap), and on to the release cam. The release line and the bungee together thus form a three-point tie-down system for the trap line coil. In this way, when the cam releases the release line loop, the buoyancy of the float pulls the release line through the central hold down point, and the bungee snaps back out of the way, releasing both the float and the coil.



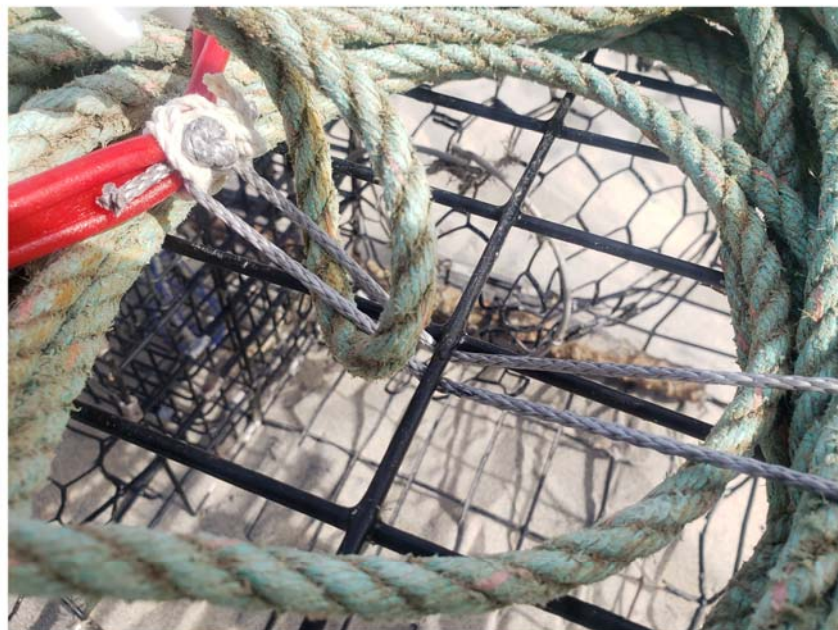
Rigging setup on a crab trap.



Rigging with line coil and float secured.



Rigging setup on a lobster trap.



Close up showing release line going under mesh for center point hold down, release line passing through float loop on bungee side of hold down, and cotton twine used as fail safe to connect release line to bungee.

## TESTING

When using the release for the first time or on a new type of trap, we strongly recommend the following testing steps:

1. Test on land.
2. Test in shallow water or pier-side.
3. Test under expected conditions with a safety line and float.

Following all of these steps and trying out the system multiple times during each step is critical to successful operation under real fishing conditions. Experience has shown that following these testing steps significantly reduced the probability of gear loss.

**IMPORANT! Failure to adequately test the system prior to actual use can increase the probability of lost gear.**

## OPERATION

Operation of the TR4RT is performed through rotation of the release cam, generally using a Philips screwdriver with 3/16" shaft inserted into the hole on the top of the cam. The available commands include:

- Turn on the display.
- Set the time.
- Arm the unit.
- Disarm the unit.

The system will also indicate when the battery is getting low. These are described below.

### TURN ON THE DISPLAY

To turn on the display, rotate the release cam either clockwise (CW) or counterclockwise (CCW) until the display shows "ARM/SET". The display will stay on for about 5 seconds and if there is not further activity, it will turn off again to save battery life.

#### Set the Time

To set the time, first turn on the display following the step above. When the display indicates "ARM/SET", turn the release cam CW until the display shows the current TUR setting in days, hours, and minutes (DD HH.MM). Now rotate the release cam CW to increase from the current setting, or CCW to decrease from the current setting. The TUR setting is progressive, so the further you rotate, the faster the time will increment. Once the desired time is displayed, wait about 3 seconds and the display will return to "ARM/SET", indicating that the new TUR has been accepted.

### ARM THE UNIT

To arm the unit, first turn on the display and set the desired TUR following the steps above. When the display indicates "ARM/SET", turn the release cam CCW until the display shows "ARM UNIT." Now loop the release line over the cam and set the cam position to the armed position. After there is no motion of the cam for about 10 seconds, the display will show "ARMED..." indicating that the unit is armed and will release after the TUR duration has completed.

### DISARM THE UNIT

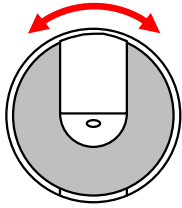
This instruction assumes that the unit has previously been armed following the steps above and you wish to disarm it. Rotate the cam CW until the display indicates "ARM/SET." The unit is now disarmed.

### LOW BATTERY INDICATOR

The TR4RT uses a set of four 3-volt lithium batteries, producing a nominal operating voltage of 12 volts. When the battery voltage drops below about 11 volts, the system will display a low battery warning when the display is turned on using the commands described above. It is strongly recommended that the system batteries be changed at this point to avoid a release failure.

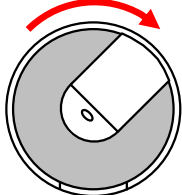
**IMPORTANT! Always change the batteries out for new Titanium Innovations CR14505 lithium AA batteries when the display indicates a low battery condition.**

## TR4RT Set Time Instructions



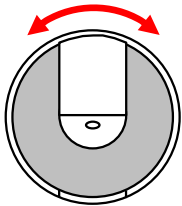
Rotate either direction until unit displays:

**ARM/SET**



Rotate CW to until time display comes up:

**01 10.30**

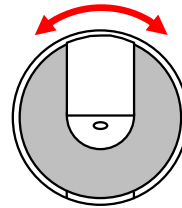


Rotate either direction to set time, then wait 3 seconds for time to store:

**03 12.00**

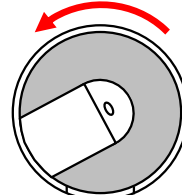
**ARM/SET**

## TR4RT Arming Instructions



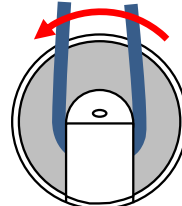
Rotate either direction until unit displays:

**ARM/SET**



Rotate CCW until arm display comes up, then stop just short of retainer:

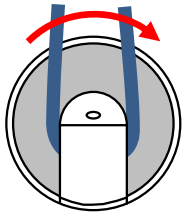
**ARM UNIT**



Install securing loop and complete CCW rotation to armed position, then wait 10 seconds and confirm unit is armed:

**ARMED. . .**

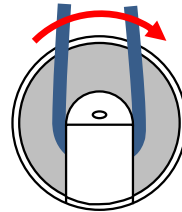
## TR4RT Disarming Instructions



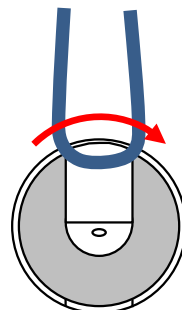
With unit already armed, rotate CW to disarm until unit displays:

**ARM/SET**

## TR4RT Release Sequence



With unit already armed, screen will be blank and cam will automatically rotate CCW 180 degrees when countdown time is reached:



Line will slip off cam and unit will display:

**Released**



APPENDIX A: PARTS LIST FOR MOUNTING SYSTEM

Material Items	Source	Part Number	Unit	Unit Cost	Number	Cost	Notes
1-1/2" Pipe Clamp Body (1.90" I.D.) Polypropylene Light Series x 10	The Clamp Co		each	\$ 3.08	2	\$ 6.16	
Multipurpose 6061 Aluminum, 3/32" Thick x 1" Wide X 2 ft long	McMaster Carr	8975K299	each	\$ 2.70	1	\$ 2.70	
Passivated 18-8 Stainless Steel Phillips Flat Head Screw, 82 Degree Countersink, 1/4"-20 Thread, 3" Long	McMaster Carr	91771A554	each	\$ 0.65	4	\$ 2.59	
18-8 Stainless Steel Hex Nut, 1/4"-20 Thread Size	McMaster Carr	91845A029	each	\$ 0.04	4	\$ 0.15	
18-8 Stainless Steel Cap Nut, 1/4"-20 Thread Size, 1/4" Thread Depth	McMaster Carr	91855A520	each	\$ 0.82	4	\$ 3.27	Not required but covers bolt end
18-8 Stainless Steel Cast Wire Rope Clamp for 1/8" Rope Diameter - Not for Lifting	McMaster Carr	31985T71	each	\$ 1.46	4	\$ 5.84	
Total per set						20.714	