



Powering Business Worldwide™

TD110 RCU

Installation / Configuration Manual

TD110 RCU

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CRITICAL: These instructions are intended only for installing and operating the remote control equipment described here.

This is not a complete Operator's Manual.

For complete operating instructions, please read the Operator's Manual supplied by your equipment manufacturer.

READ ALL INSTRUCTIONS



CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Failure to follow the SAFETY PRECAUTIONS may result in radio equipment failure and serious personal injury.

Installation

PROVIDE A SAFETY CUTOFF SWITCH. If maintenance is required, the radio must be disconnected from power
USE PROPER WIRING. Loose or frayed wires can cause system failure, intermittent operation, machine damage, etc.
DO NOT INSTALL IN HOT AREAS. This apparatus can be damaged by heat in excess of 158° F (70° C)

Personal Safety

MAKE SURE MACHINERY AND SURROUNDING AREA IS CLEAR BEFORE OPERATING. Do not activate the remote system unless it is safe to do so.

TURN OFF THE BASE STATION POWER BEFORE WORKING ON MACHINERY. Always disconnect the remote system before doing any maintenance to prevent accidental operation of the machine

Care

KEEP DRY. Do not clean the RCU / base station under high pressure. If water or other liquids get inside the RCU battery or base station compartment, immediately dry the unit. Remove the case and let the unit air dry

CLEAN THE UNIT AFTER OPERATION. Remove any mud, dirt, concrete, etc. from the unit to prevent clogging of buttons, switches, etc. by using a damp cloth.

Maintenance / Welding

DISCONNECT THE RADIO BASE STATION BEFORE WELDING on the machine the base station is connected to. Failure to disconnect will result in the destruction of the radio base station.



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Failure to follow the SAFETY PRECAUTIONS may result in radio equipment failure and serious personal injury.

READ ALL INSTRUCTIONS

Lithium Battery Handling Precautions, Transportation, Disposal

- Do not disassemble, crush, or puncture a battery.
- Do not short the external contacts on a battery.
- Do not dispose of a battery in fire or water.
- Do not expose a battery to temperatures above 65 °C (149 °F).
- Keep the battery away from children.
- Avoid exposing the battery to excessive shock or vibration.
- Do not use a damaged battery.
- Always check all applicable local, national, and international regulations before transporting a Lithium-Ion battery.
- Transporting an end-of-life, damaged, or recalled battery may, in certain cases, be specifically limited or prohibited.
- Lithium-Ion batteries are subject to disposal and recycling regulations that vary by country and region. Always check and follow your applicable regulations before disposing of any battery. Contact the *Rechargeable Battery Recycling Corporation* (www.rbrc.org) for U.S.A. and Canada, or your local battery recycling organization.
- Many countries prohibit the disposal of waste electronic equipment in standard waste receptacles.
- Place only discharged batteries in a battery collection container. Use electrical tape or other approved covering over the battery connection points to prevent short circuits.

In the increasingly interconnected world, it is recommended that this mobile wireless application be installed in a manner to prevent any unauthorized access or use. Though the possibility of intentional wireless interference or hijacking is low, the potential to physical tampering with a system poses the greater threat.

The following steps are suggested to ensure the most secure installation possible.

1. Mount the base station within a metal box with a securable door or hatch.
2. Secure the box using a key, preferably of a type that is not widely circulated nor easily duplicated.
3. Run all cable through industry standard conduit. Ensure that fittings make a secure and difficult to breach connection between the metal box and the conduit.
4. Whenever possible, operate the RCU as close to the vehicle as possible. This results in a stronger signal that is harder to override or jam.
5. When not in use store the RCU in such a way as to limit access.
6. All system operators should be made aware that individuals with questionable intentions do exist and to always check their system prior to operation.
7. In the event of a system malfunction, always depress the E-Stop button to safely shut the equipment down.

System Overview

Eaton's **OMNEX Trusted Wireless™** remote control system is portable, long range, programmable and designed as a compact and easy-to-use product. This **Trusted Wireless™** system puts complete control of your equipment where it's needed most, with the operator. It's robust, easy to install and has complete self-diagnostics. The system can be a simple cable replacement or add intelligence to make it a total control package. It's a radio and a CAN bridge all in one.

The **OMNEX Trusted Wireless™ TD110** RCU uses Frequency Hopping Spread Spectrum (FHSS) technology. FHSS devices concentrate their full power into a very narrow signal that randomly hops from frequency to frequency within a designated band. This transmission pattern, along with sophisticated error-checking techniques, enables our industrially hardened **FHSS** signals to overcome interference that commonly affects licensed radios.

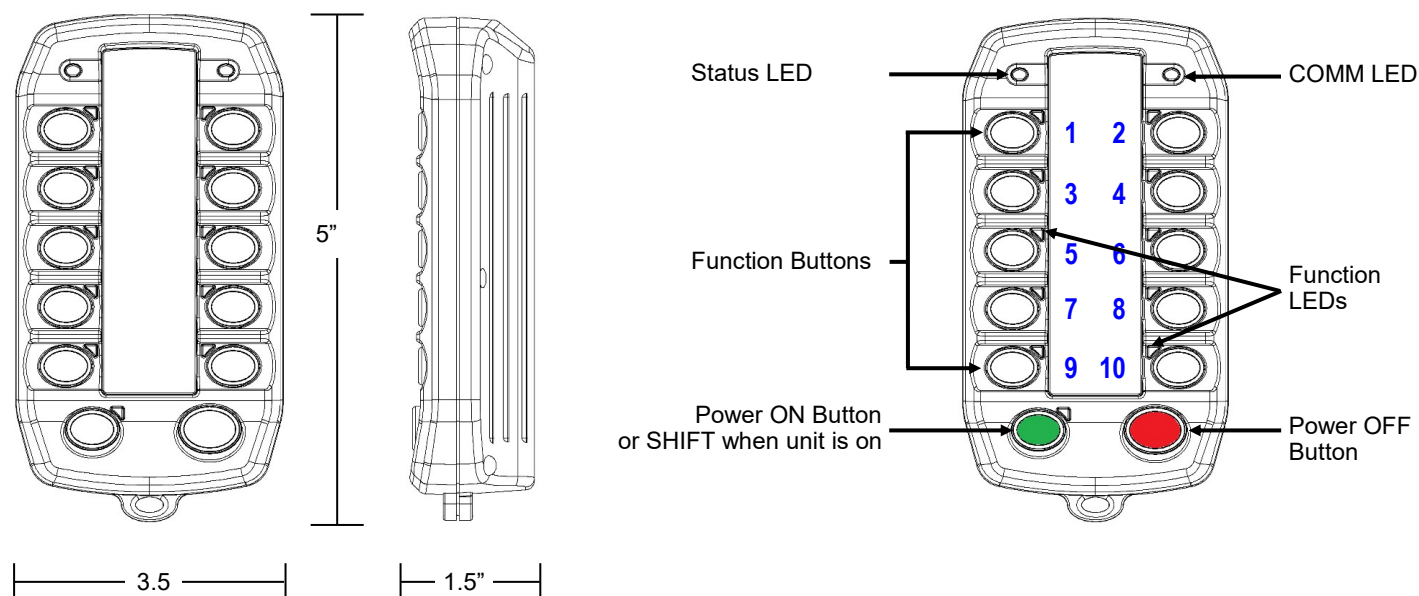
The **TD110** comes with 12 buttons to provide the user flexibility to control the functions they need. The RCU uses built in rechargeable Lithium battery pack. When used with the battery charger, the TD110 can use and recharge batteries. Each **TD110** RCU uses a unique ID code to ensure that no two systems will conflict at a job site.

Features

FCC, IC approved
License free in USA and Canada
Upto 4000 foot range @ 900 MHz
Hand held / weatherproof (IP67,IP65) / ergonomic
Simple "wire-and-use" installation

Resilient to impact and shock
Available in both 900 MHz and 2.4 GHz
Factory configurable for all custom applications.

TD110 Dimensions and Controls

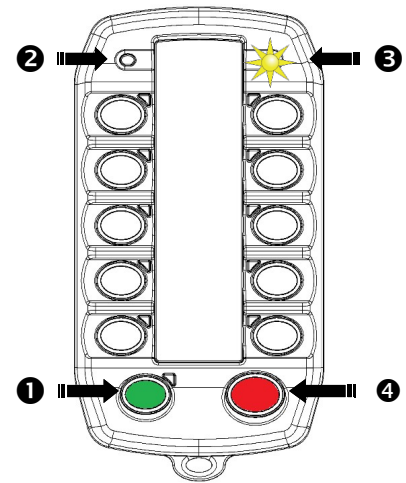


Power the RCU

Before using an RCU, make sure that it has been fully charged



NOTE: Low temperatures reduce battery performance for batteries. Refer to the battery manufacturer's specifications for detailed information on low temperature performance.



Turn ON RCU

1. Turn on the RCU

Press Power [ON] ②. Refer to the **Light Legend** below for LED states.

Depending on the presence of a powered and paired base station the COMM LED may blink YELLOW ③.

2. Turn off the RCU

Press the Power [OFF] ④ .button.

Light Legend

Solid		Slow Flash		Fast Flash		Red Solid		Green Solid		Yellow Solid		Red & Green Alternating	
-------	--	------------	--	------------	--	-----------	--	-------------	--	--------------	--	-------------------------	--

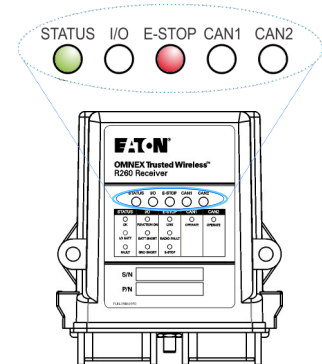
Test the RCU / Base Station Link

Follow these steps to ensure that there is a radio link between the RCU and Base Station. Refer to the Light Legend below for LED states on the Base Station.

1. Base Station

Apply power to the base station and confirm the light pattern as shown in the diagram on the right.

If the base station does not power confirm it was wired correctly. Reference the Wiring Diagram in the *Pin Assignments* section of the base station manual.

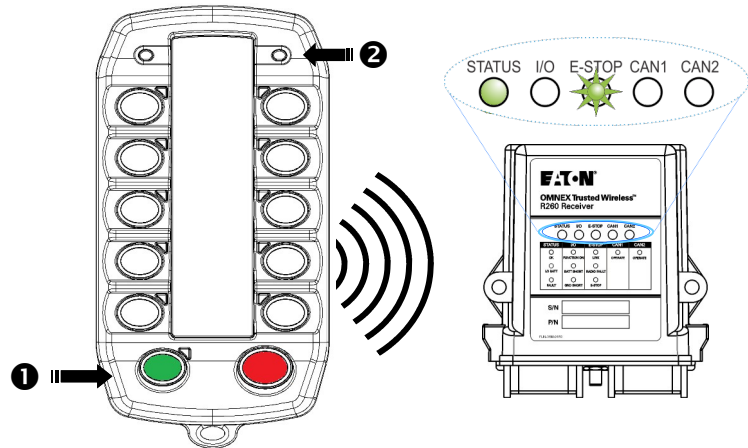


2. Power TD110

Press Power ON ❶ button

The RCU can take from 2-7 seconds to link with the base station.

If the RCU does not power refer to the previous section *Power the RCU*.



The System is now ready for use.

If the base station's (E-STOP) light flashes GREEN the system is ready to use.

Follow *Pair a RCU* in the *Service Mode* section if

1. The base station's (E-STOP) light is solid RED
2. The COMM LED ❷ is solid YELLOW



NOTE: As a battery saving feature the RCU may shut itself off (and the base station will transition all outputs to a safe state) after the configured RCU timeout inactivity period. The *RCU Timeout* feature is configurable within the RCUs *Service Mode* section.

Momentarily operating any button on the RCU, including the [Power] button will restart the timeout monitoring.

Light Legend		Solid	Slow Flash	Fast Flash	Red Solid	Green Solid	Yellow Solid	Red & Green Alternating

Service Mode

Service Mode is available on all TD110 configurations and allows the operator to pair to base station, adjust the RCUs timeout and run diagnostics.

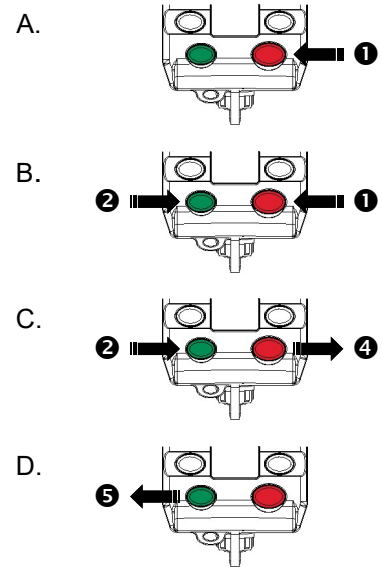
Once the RCU is put in to service mode, navigation and option selection/modification is controlled by four buttons as described by the *Enter Service Mode* and *Navigation*.

The following sections describe each option in detail and how to execute or modify it.

Enter Service Mode

- A. Press and Hold Power OFF ❶ [RED]
- B. Press and Hold Power ON ❷ [GREEN]
Wait for the COMM ❸ LED to be turned ON and immediately proceed to next step.
- C. Release Power OFF ❹ [RED]
- D. Release Power ON ❺ [GREEN]

The COMM LED ❸ will blink YELLOW when unit enters service mode.
If no buttons pressed within 5 minutes after entry to service mode, RCU will automatically turn OFF.

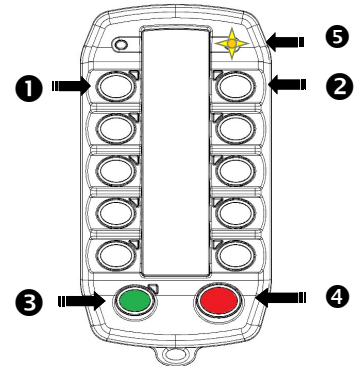


Navigation

Once you have entered service mode you can select the service mode options by using the top left ❶ and right buttons ❷.

The Power ON ❸ [GREEN] will allow you to execute or modify an option. Power OFF ❹ [RED] will allow you to move up from an entry and power off the unit. Only one option is allowed at a time in service mode.

- A. Button ❶ - Modify RCU timeout
- B. Button ❷ - Run Diagnostics
- C. Button ❸ [GREEN] - Pairing TD110



Service Mode: Pairing

Pairing

This function allows you to pair the TD110 with a base station.

Pairing is required to teach a RCU's unique configuration to a base station. Once complete the base station is capable of establishing a two-way radio link with a unique RCU.

Pairing is a three step process

1. Prepare the TD110
2. Prepare the base station
3. Start Pairing

The following sections describes the three step process to pair the TD110 with an base station. Refer to *Troubleshooting Chart #4* for Tips and Considerations.

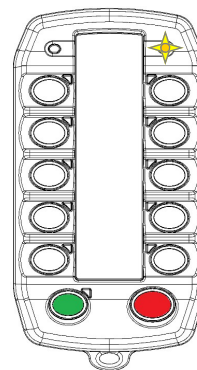


NOTE: It is necessary to associate the RCU to base station when replacing either the RCU or base station.

1. Prepare the TD110

Make sure TD110 is in service mode. **Do not** press the Power ON [GREEN] button.

①



2. Prepare the base station

There are two methods to prepare the base station

- A. Using the magnet on the TD110 or wand (sold separately).
- B. Opening the base station housing and manually initiating the pairing state.

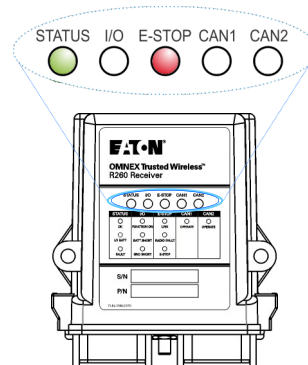
The following section deals with method A. Refer to Appendix A if you need to perform the manual method B then proceed to step 3 *Start Pairing*.

2.1. Power base station

Supply power to the base station. The base station is ready when the base station lights

Status: solid green

E-Stop: solid red



Light Legend

Solid



Slow Flash



Fast Flash



Red Solid



Green Solid



Yellow Solid



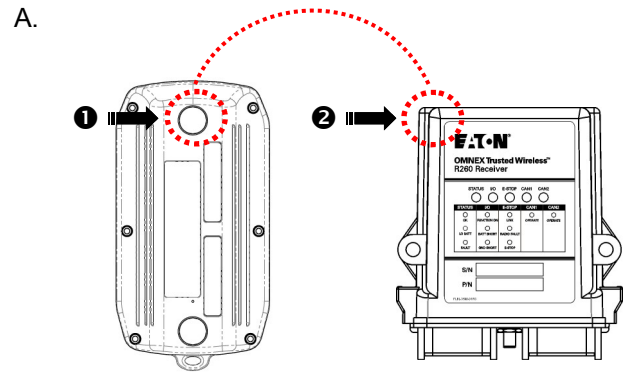
Red & Green Alternating



Service Mode: Pairing

2.2. Initiate base station Setup Mode

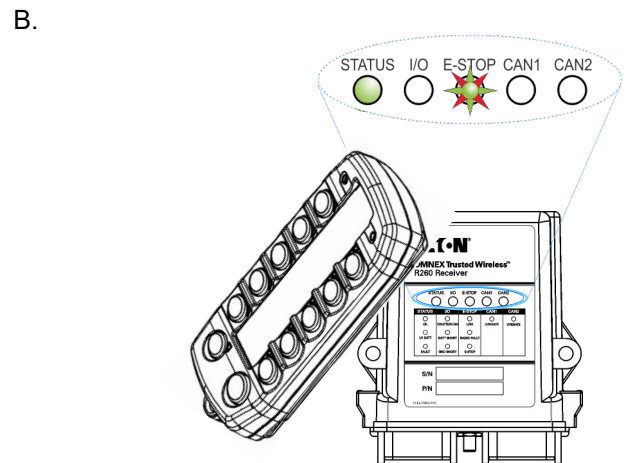
- A. Maneuver the rear of the TD110 so that its magnet **1** is placed over the top left corner **2** of the base station.



- B. Adjust the TD110 position until the base station **E-Stop** light slow flashes green.

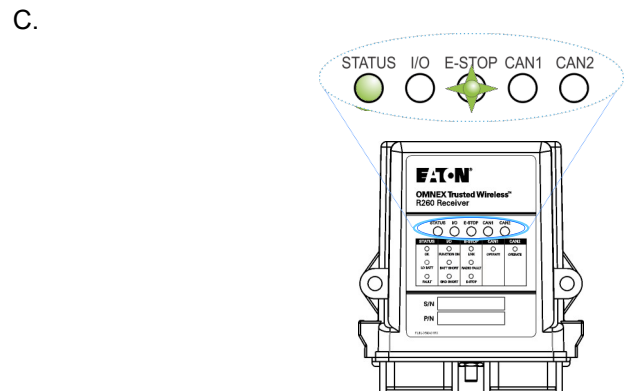
Status: solid green

E-Stop: slow flashing green



- C. Remove the TD110 when the base station **E-Stop** light slow flashes green quickly.

E-Stop: slow green



NOTE: If the base station is left in Setup Mode idle for over 30 seconds, the base station will time out. The **Status** light stays solid green and **E-Stop** light will flash red slowly and after Setup Mode times out. To return to Setup Mode repeat step 2.2.

Light Legend

Solid		Slow Flash		Fast Flash		Red Solid		Green Solid		Yellow Solid		Red & Green Alternating	
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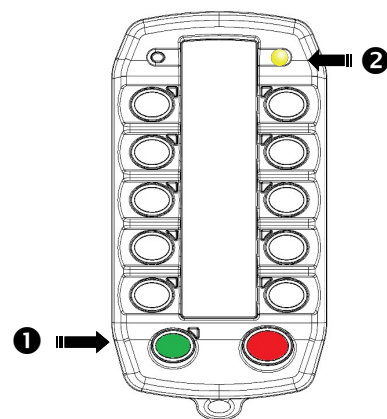
Service Mode: Start Pairing

3. Start Pairing

- A. Press the TD110 Power ON [GREEN] button **1** to start the pairing process.

The pairing will start and the COMM LED **2** on TD110 will turn on YELLOW

A.

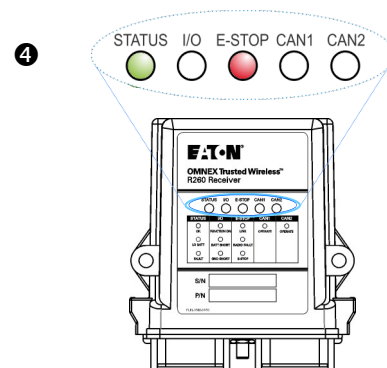
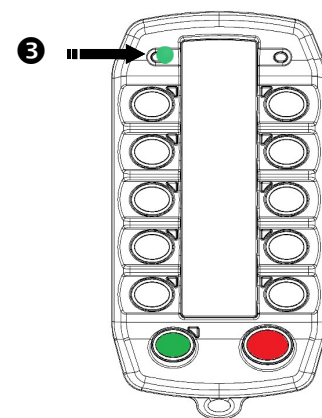


- B. Pairing is complete when

1. TD110 STATUS LED **2** turns GREEN
2. Base station E-Stop light will change from green to red **4**.

E-Stop: solid red

B.



NOTE: If the pairing fails the TD110 STATUS LED will turn ON RED. Correct any errors, power cycle the RCU and base station, and then repeat the pairing process.

If repeated attempts at pairing fails, contact your service representative for assistance as there may be a setup or hardware failure.

Light Legend

Solid		Slow Flash		Fast Flash		Red Solid		Green Solid		Yellow Solid		Red & Green Alternating	
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Service Mode: Modify RCU time out

RCU Timeout

As a battery saving feature the RCU has the ability to turn it self off after a defined period of inactivity.

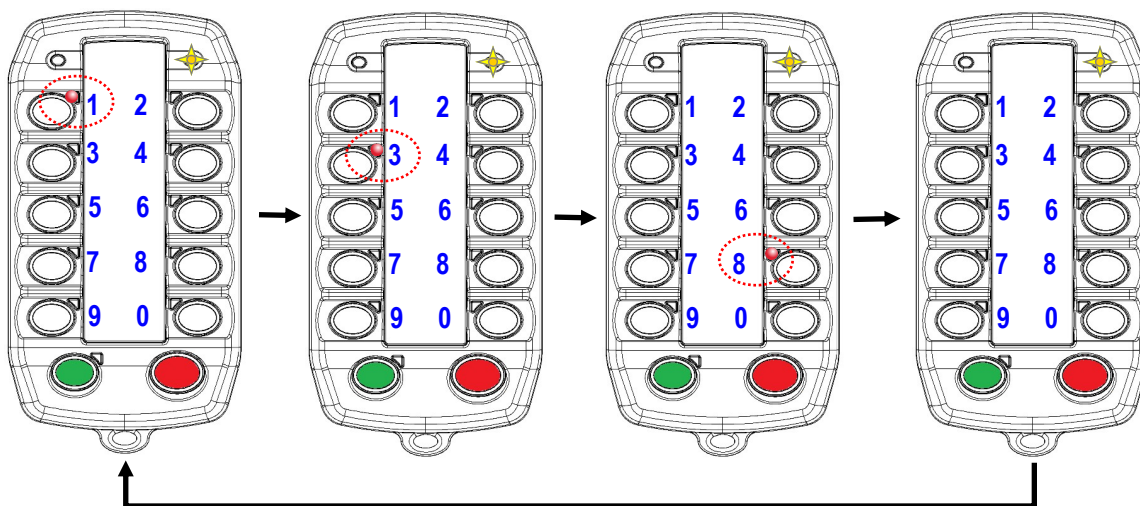
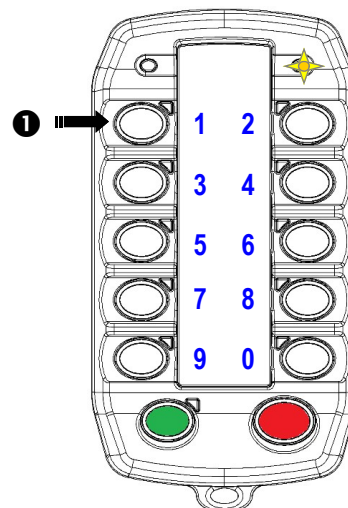
The RCU timeout is configurable from 1 to 999 minutes in increments of 1 minutes. The default value is 30 or timeout feature disabled.

To adjust the RCU timeout press button ①. T

10 user buttons represent numeric values from 1-9 as shown on the picture left. LEDs on the 10 user buttons will flash RED to display the current user settings.

First RED flash represent the 100's figure of RCU timeout. The second RED flash represent the 10's figure of RCU timeout. The third RED flash represent the 1's figure of RCU timeout.

For example, a time out of 138minutes is displayed as below.



Press three buttons in sequence to set the timeout. First button represent 100's , second button represent 10's, and third button represent 1's figure of RCU timeout. When each button is pressed, corresponding button LED will turn on GREEN momentarily. LEDs will display the new value once the button sequence is complete.

Press and release Power ON [GREEN] to save your changes. Press and release Power OFF [RED] to abort any changes and turn off unit.



CAUTION: When a RCU turns off due to inactivity it will cause the base station it is communicating with to go in to its safe state. The base station safe state by default is all functions off unless specified differently by your equipment supplier.

You must be aware of any behavior that may change due to adjusting the timeout and consider all safety aspects of operation. Consult with the supplier of your equipment if you are unsure of affected safety operation.

Failure to follow SAFETY PRECAUTIONS may result in equipment failure and serious personal injury.

Light Legend

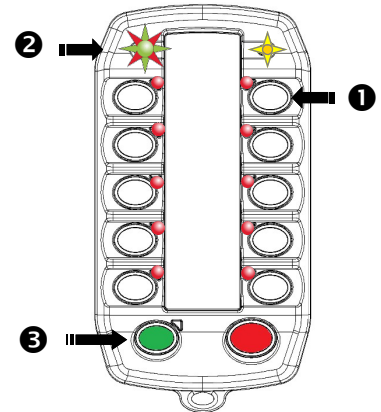
Solid		Slow Flash		Fast Flash		Red Solid		Green Solid		Yellow Solid		Red & Green Alternating	
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Service Mode: Run Diagnostics

Test Buttons and Vibrator

1. On the TD110 press top right Button ❶ to enter Diagnostic mode .
2. STATUS LED will blink RED and GREEN ❷. All LEDs will turn on RED.
3. Press each buttons to test. On each button press, the associated button LED which was RED will change to GREEN.
4. Press [GREEN] button ❸ to test Vibrator. This will activate Vibrator for 1 second.

Press and release Power OFF [RED] to exit diagnostic mode and turn off unit.



CAUTION: Only clean a button or the TD110 with a soft cloth lightly dampened with water.

DO NOT clean a button or the TD110 with any sharp instruments or objects that can cut or damage the button membrane or housing. **DO NOT** pour any liquids, use a hose, or pressured water directly on the TD110. Consult with the supplier of your equipment if you are unsure of correct cleaning procedures.

Failure to follow **CLEANING PROCEDURES** may result in equipment failure and serious personal injury.

Light Legend

Solid		Slow Flash		Fast Flash		Red Solid		Green Solid		Yellow Solid		Red & Green Alternating	
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Operations - TD110 RCU

Indicators / Items	Description
	Occurs whenever a function is pressed. Will also remain on momentarily on Power Up.
	RCU is in Operating mode. (Data is sent to and received from base station)
	Low Battery. (Note: Low batteries will last approximately 1 hour once the Low Battery light begins to flash). Action: Change or Recharge Batteries
	An internal error is preventing the RCU from operating (When available, a specific error message is displayed on the screen.)
Out of range vibrate notification	When the RCU moves out of radio range of the base station, the RCU vibrates to alert the operator. Move the RCU closer to the base station within radio range to re-link.
Other vibration notifications	Other vibration notifications can also be used (defined under application control) to alert the operator when warnings or alarms happen.

Light Legend	Solid 	Slow Flash 	Fast Flash 	Red Solid 	Green Solid 	Yellow Solid 	Red & Green Alternating 
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Operations - Charge Cradle

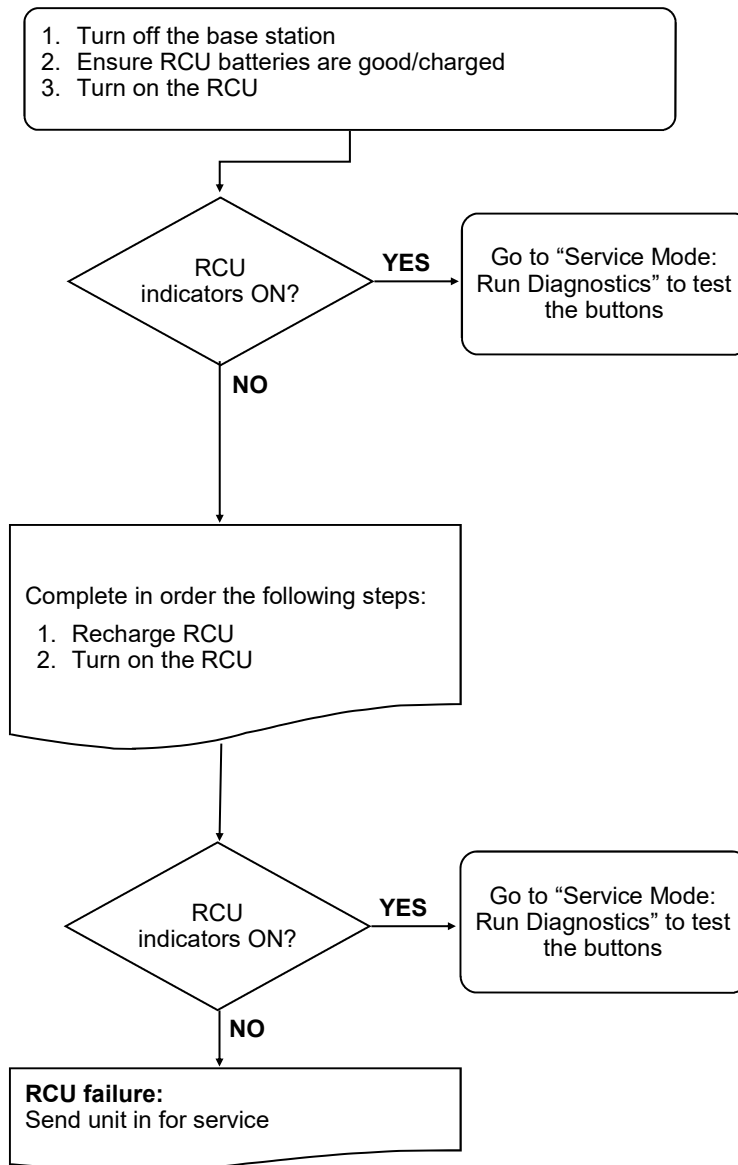
Items	Description																											
Charging	- The cradle will start charging the TD110 RCU when the vehicle battery voltage is above 12.25V with the RCU inserted. - During charging, if the vehicle battery voltage drops below 12.0V, the charging will be suspended. - If the charging is suspended, it will not resume charging until the battery is above 12.7V (Allowing time for the vehicle's battery to recharge and prevent draining the vehicle battery) - At any time when the battery voltage is above 12.25V, the RCU is removed and reinserted, the charging will start again.																											
LED Indicator	- OFF: Not charging, fully charged RCU or vehicle voltage too low - ON: Charging RCU - FLASHING: Error charging RCU. Possible causes: - Alkaline batteries in RCU (not rechargeable) - NiCad od Nickel Metal Hydride batteries in RCU (Cannot be contactlessly charged) - The cradle or the battery pack is too hot (over 35°C)..																											
Connector	<table><tr><th>Pin</th><th>Name</th><th>Description</th></tr><tr><td>1</td><td>Power</td><td>Vehicle power supply – (9-32VDC)</td></tr><tr><td>2</td><td>Ground</td><td>Vehicle power ground</td></tr><tr><td>3</td><td>CAN-H</td><td>CAN bus High</td></tr><tr><td>4</td><td>CAN-L</td><td>CAN bus Low</td></tr><tr><td>5</td><td>RLY-NO</td><td>RCU Present Relay – normally open. 0.5A max</td></tr><tr><td>6</td><td>RLY-NC</td><td>RCU Present Relay – normally closed. 0.5A max</td></tr><tr><td>7</td><td>RLY-COM</td><td>RCU Present Relay – common</td></tr><tr><td>8</td><td>PARK IN</td><td>“Vehicle in Park” input when > 6V</td></tr></table> RCU Present Outputs: - Connections 5-8 can be used to wire to an indicator to alert the vehicle operator if the RCU is not placed in the cradle. - The PARK-IN input is used to indicate when the vehicle is stationary (typically neutral or park indicator). - The “RCU Present” relay will be energized (RLY-NO connected to RLY-COM), after a 5 second delay, if the vehicle is NOT in park and the RCU is missing.	Pin	Name	Description	1	Power	Vehicle power supply – (9-32VDC)	2	Ground	Vehicle power ground	3	CAN-H	CAN bus High	4	CAN-L	CAN bus Low	5	RLY-NO	RCU Present Relay – normally open. 0.5A max	6	RLY-NC	RCU Present Relay – normally closed. 0.5A max	7	RLY-COM	RCU Present Relay – common	8	PARK IN	“Vehicle in Park” input when > 6V
Pin	Name	Description																										
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2	Ground	Vehicle power ground																										
3	CAN-H	CAN bus High																										
4	CAN-L	CAN bus Low																										
5	RLY-NO	RCU Present Relay – normally open. 0.5A max																										
6	RLY-NC	RCU Present Relay – normally closed. 0.5A max																										
7	RLY-COM	RCU Present Relay – common																										
8	PARK IN	“Vehicle in Park” input when > 6V																										
CAN operation	The cradle will transmit a status message every 250mSec. The status message has a PGN of 61439. The status message contains the following information: <table><tr><th>Position</th><th>Description</th></tr><tr><td>1.1</td><td>1 = RCU present</td></tr><tr><td>1.2</td><td>1 = charging RCU</td></tr></table> The default CAN ID of the cradle is 144 (90H). This can be changed by sending the following CAN message with PGN 61328. <table><tr><th>Position</th><th>Description</th></tr><tr><td>1</td><td>Change CAN ID command 70, 46H</td></tr><tr><td>2</td><td>Current CAN ID (typically 144 (90H).</td></tr><tr><td>3</td><td>New CAN ID.</td></tr></table> CAN priority must be 3 for all packets. CAN data rate is 250 kbps.	Position	Description	1.1	1 = RCU present	1.2	1 = charging RCU	Position	Description	1	Change CAN ID command 70, 46H	2	Current CAN ID (typically 144 (90H).	3	New CAN ID.													
Position	Description																											
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1	Change CAN ID command 70, 46H																											
2	Current CAN ID (typically 144 (90H).																											
3	New CAN ID.																											
CAN Termination	CN5 Jumper settings: NO YES																											

Light Legend

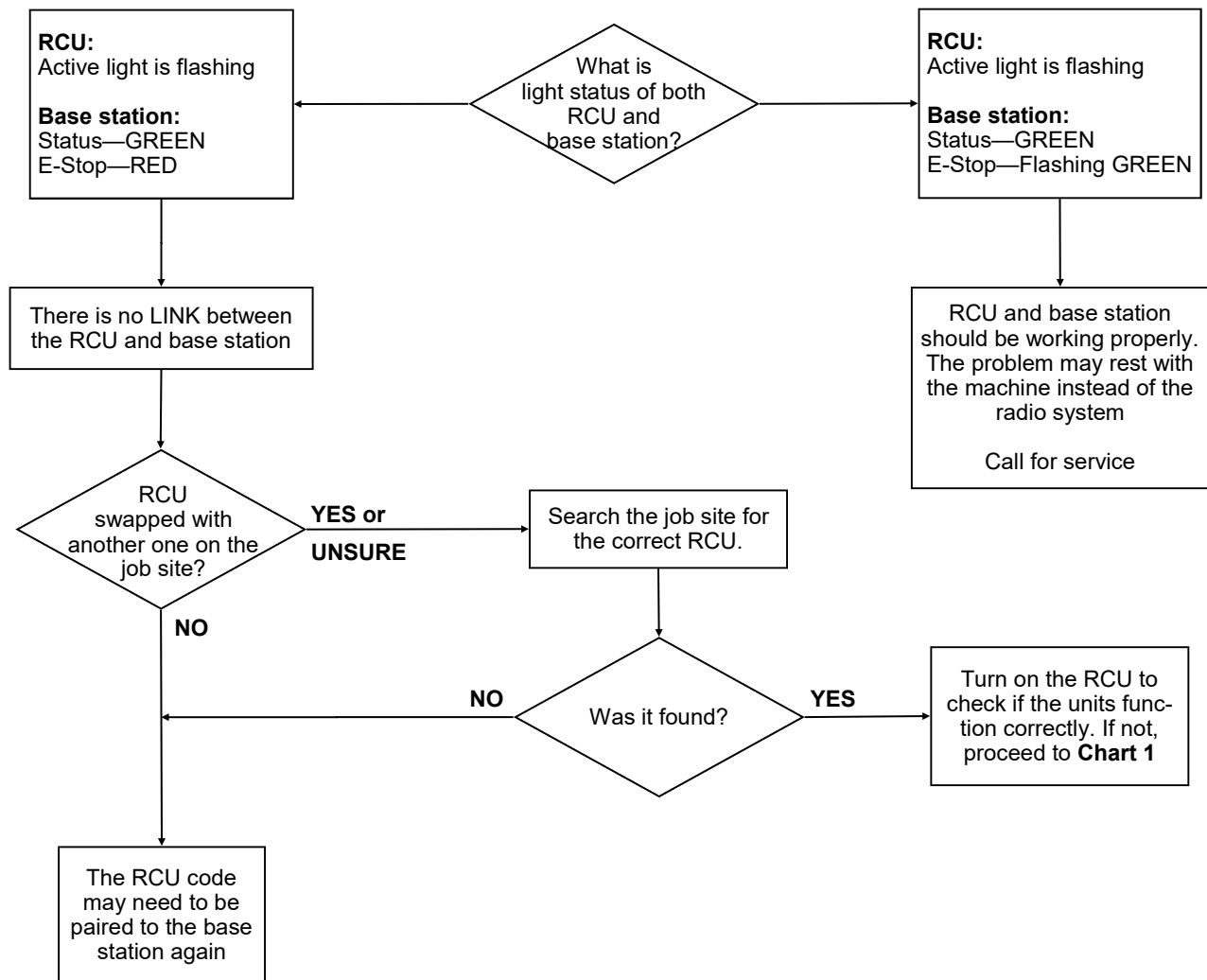
Solid 	Slow Flash 	Fast Flash 	Red Solid 	Green Solid 	Yellow Solid 	Red & Green Alternating 
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Test the Base station—Refer to the base station's manual

Test the RCU—TD110



Testing the RCU / Base Station Communication



Considerations when Pairing

Potential downloading issues

If testing of the base station and RCU both show the system as working (Chart 1 & 2), then the RCU and base station will both go into Pairing/Configuration mode.

Possible issues could arise during Step 4, the teaching phase of pairing. In this case there are 2 symptoms to look for:

1. The Link light on the base station will not turn GREEN when the power switch is toggled on the RCU to download
2. The base station will “time out” indicating that it didn’t receive a signal from the RCU within the 30 seconds from the time the base station was put into Setup Mode.

If all indications appear normal during the pairing phase, test the link by turning on the RCU (note: the RCU remains in service mode after pairing in Step 4).

1. If the Link light on the base station doesn’t turn GREEN, the base station didn’t receive all of the information that was sent from the RCU.

Possible Solutions

1. Try the Downloading steps again
2. If this doesn’t correct the problem, send both the RCU and base station in for service.



NOTE: If possible try to determine whether the fault lies with the RCU or base station by completing the Re-programming procedure with a different RCU. If this step works, then the fault lies with the original RCU. If not, the fault may lie with the base station.

Reprogramming Tips:

1. Be patient and deliberate when pressing the Power and E-Stop buttons in the correct order during power up in Configuration mode
2. Use a pointy instrument to depress the Setup button on the base station (i.e. a pen) as the button is relatively small
3. Follow each step as laid out in the procedure
4. Never lay the base station circuit board down on anything metallic (there are contact points on the back which could contact the metal and damage the base station)

Parts & Accessories

Eaton Part Number	Description
FMEC-3840-02	Plastic Holster, Black
ASSY-4041-01	Charge Cradle, Generic
ASSY-4041-02	Charge Cradle, charge only

Specifications

	TD110 RCU
Size	8.0" x 3.0" x 1.8" (203mm x 76mm x 46mm)
Weight	.95 lbs (434g)
Construction	Industrially robust, hardened plastic, chemical resistant
Input Power	2AA rechargeable Lithium Ion
Battery Life	30 hours
Operating Temperature Range	-4°F to +131°F (-20°C to +55°C)
Storage temperature Range	-40°F to +136°F (-40°C to +58°C)
Outputs	N/A
Antenna	Internal
Approvals	USA- FCC part 15.247 Canada- IC RSS 210 Issue 6, May. 2020

FCC Rules and Compliance

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

1. This device may not cause harmful interference.
 2. This device must accept any interference, including interference that may cause undesired operation of the device.
- Changes or modifications to this device, not expressly approved by Cooper Industries (Electrical) Inc. could void the user's authority to operate the equipment

Industry Canada Notifications

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage;
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Warranty

EATON, Controls and Power Conversion Division, Wireless Solutions, warrants to the original purchaser that the Eaton Wireless products are free from defects in materials and workmanship under normal use and service for a period of ONE YEAR, parts (EXCLUDING: SWITCHES, CRYSTALS, OR PARTS SUBJECT TO UNAUTHORIZED REPAIR OR MODIFICATION) and labor from the date of delivery as evidenced by a copy of the receipt. EATON entire liability and your exclusive remedy shall be, at EATON's option, either the (a) repair or (b) replacement of the EATON Wireless product which is returned within the warranty period to EATON Wireless freight collect by the EATON APPROVED carrier with a copy of the purchase receipt and with the return authorization of EATON Wireless. If failure has resulted from accident, abuse or misapplication, EATON shall have no responsibility to repair or replace the product under warranty. In no event shall EATON be responsible for incidental or consequential damage caused by defects in its products, whether such damage occurs or is discovered before or after replacement or repair and whether or not such damage is caused by the negligence of EATON.

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