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MACS Container RFID Lid Reader User's Operating Manual

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1. About This Manual

This user manual will guide you through the theory of operation, use and maintenance of the MACS Container RFID Lid Reader. The unit will be referred to as "Lid Reader" in the remainder of this manual. First, it explains how to install the system to read transponders attached to MACS charges, and then describes how to operate the Lid Reader. The maintenance, battery removal and troubleshooting are addressed last.

2. Theory of Operation

The Lid Reader is a Radio Frequency Identification (RFID) Reader designed to be installed on a Modular Artillery Charge (MACS) Container replacing the existing lid. When the button on the Lid Reader is pressed the Lid Reader radiates a magnetic field at 134.2 KHz. This field is used as an energy source by a transponder mounted on the charge inside the container. The transponder is a custom IC attached to a wire coil. The transponder is designed to read temperature and provide lot and serial # data. The transponder modulates its coil when powered by the radiated field. This modulation is received at the Lid Reader, demodulated, and decoded into a temperature that is displayed on the outside of the Lid. The displayed temperature will persist for 10 seconds after which the unit automatically shuts off unless the button is pressed again. The button may be pressed a second time while unit is on to read a temperature sensor located in the Lid Reader. The display will persist for a period of 10 seconds after which the Lid Reader automatically shuts off. If the button is pressed a third time within the 10 second persist time the unit shuts off immediately.

The temperature data is used to improve targeting accuracy of the projectile fired.

2.1 Lid Reader Component Locations

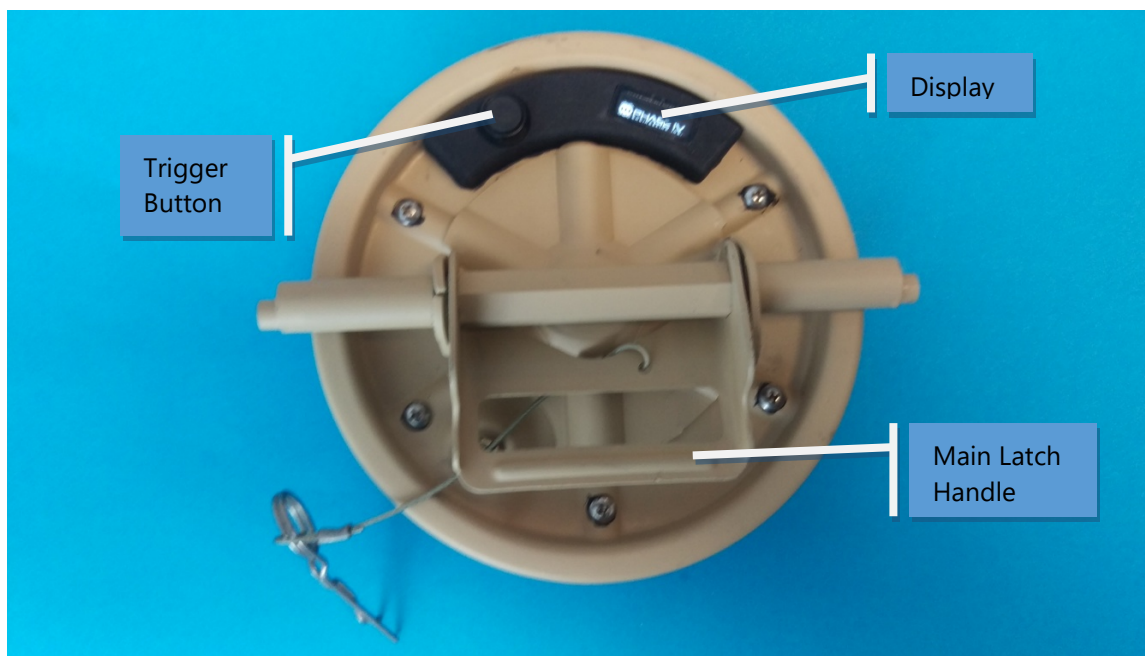


Figure 1 Lid Reader Top View



Figure 2 LID Reader Bottom View

3. Reader Operation

3.1 Pre test

1. Test Lid Reader battery by pressing the **“Trigger Button”** once. Make sure the reader is **not on a metal surface** and away from all transponders. (minimum distance from any transponder 6”)
2. The display will show one of the following screens for 12 seconds. Do not use the unit if the 0% battery image is displayed until the battery is replaced. (**See 3.3 Battery Replacement**)

- **100% Charge**



- **67% Charge**



- **33% Charge**



- **0% Charge DO NOT USE UNTIL THE BATTERY IS REPLACED!**

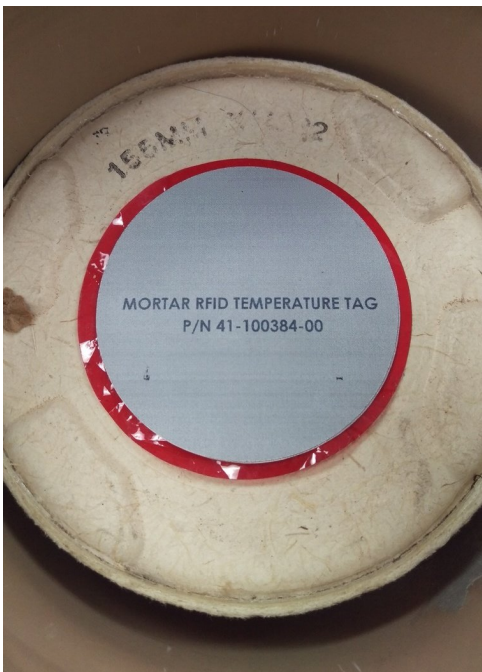


3.2 Installation and Use

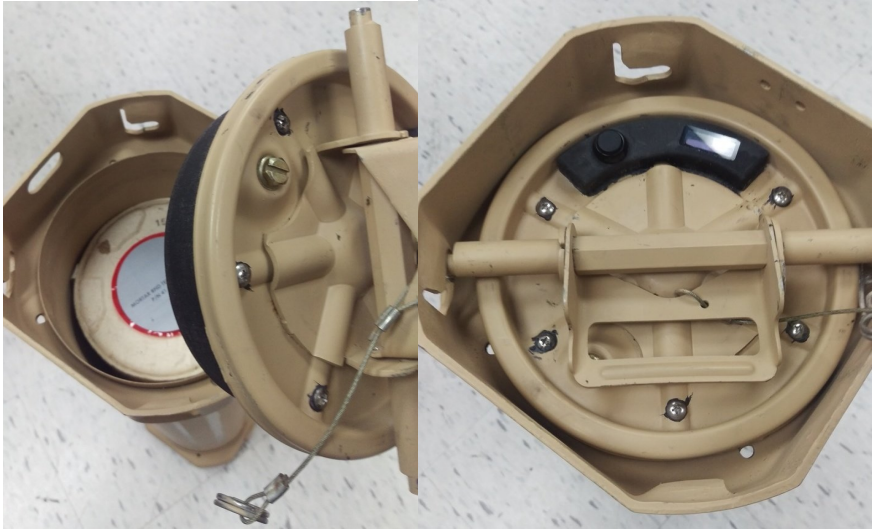
1. If the battery is OK. Locate MACS canister **(1)**, remove the existing lid **(2)** and packing **(3)** to reveal top MACS Charge.



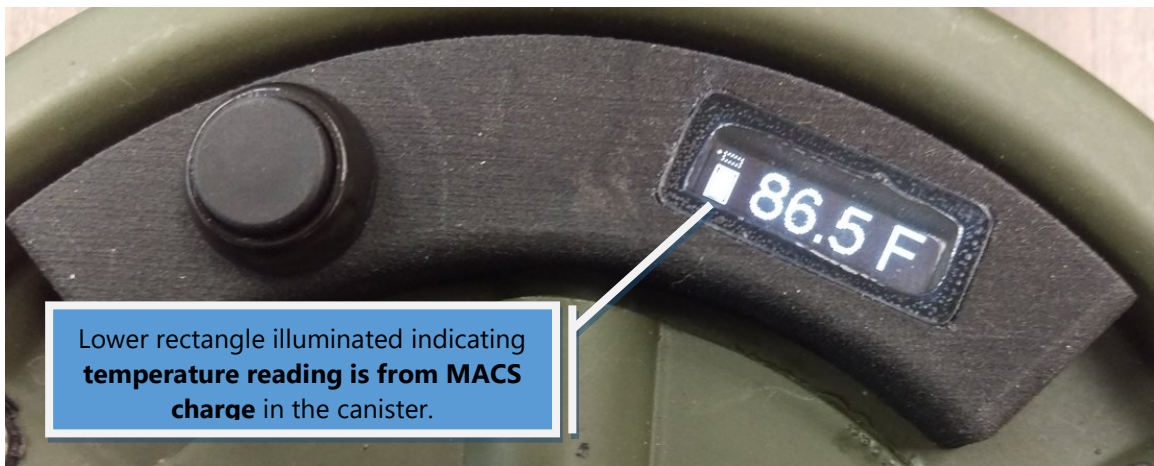
2. Verify the MACS charge has a transponder as shown below.



3. Place the Lid Reader in canister and latch down.



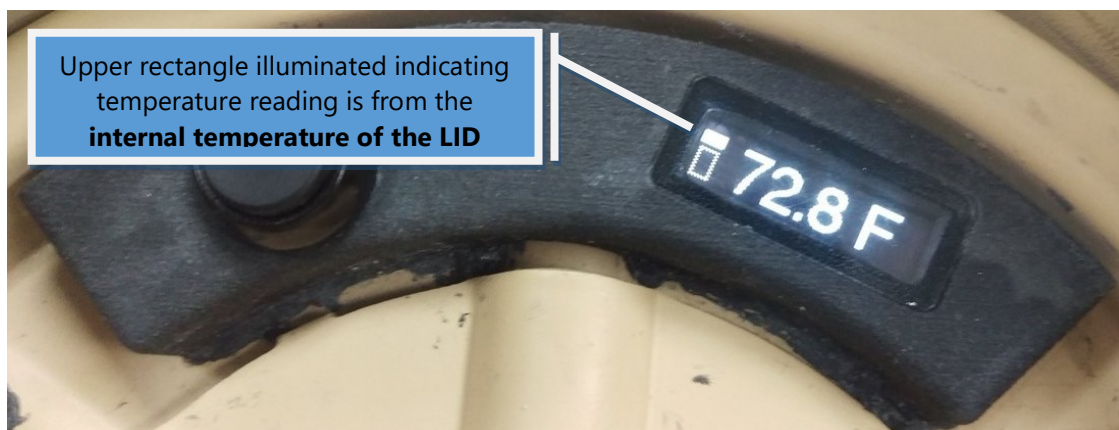
4. Verify transponder reads by depressing the "Trigger Button". Within 12 seconds the display should show a valid temperature. Note the display example below. The larger rectangle to the left of the reading should be illuminated indicating the reading is from the transponder located on the charge. If so continue with the fire mission. The Displayed temperature will persist for 10 seconds and then the unit will turn off.



5. If the transponder does not read or if there is no transponder, **"No Read"** is displayed.



6. Depressing the **"Trigger Button"** again gives the **internal temperature of the Lid Reader**. The Displayed temperature will persist for 10 seconds and then the unit will turn off.



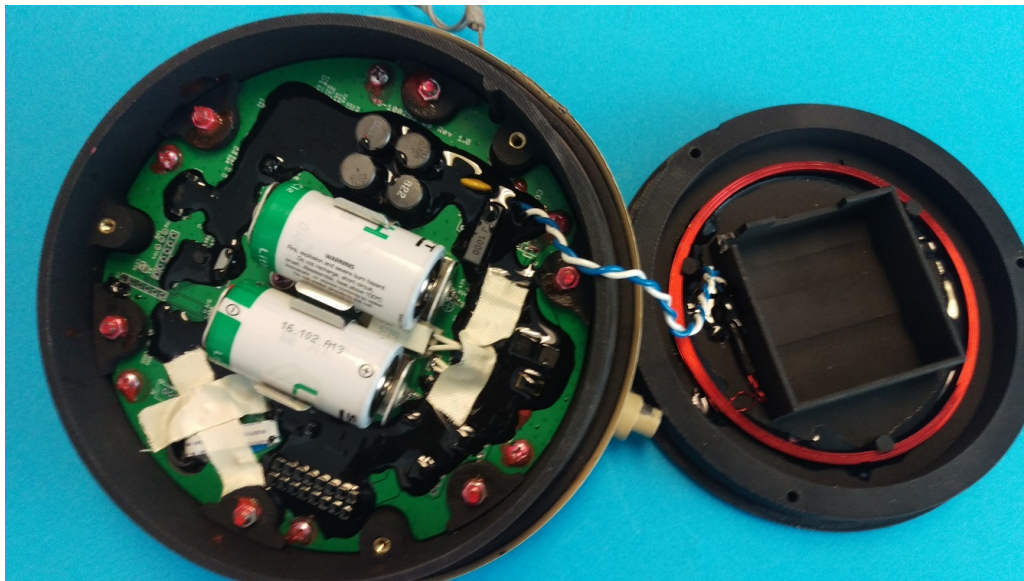
7. If the button is pressed a third time before the 10 second display persistence time out is up the unit will turn off immediately.

3.3 Battery Replacement

1. Find the three screws located on the lower cover of the Lid Reader. Remove all three screws. (See Below)



2. Remove lid to reveal batteries and replace with **Saft LSH14 Lithium batteries ONLY!** Note proper **polarity as indicated on battery clip!**



3. Replace cover and screws.
4. Verify proper operation in section **3.1 Pretest**.

4. Troubleshooting

Problem	Solution
No Read	Verify transponder in the read field.
	No more than 2" away from reader label side.
Battery Low	Replace Batteries
Unit does not start when button pressed	Replace Batteries
	Clean Battery contacts
	Unit temperature beyond 158F, Cool unit to 150F.
	Batteries are installed incorrectly, Check polarity.

5. Technical Support

For more information about our products and services, or for technical assistance:

Visit us at: www.phaseivengr.com
Tel: +(303) 443 6611 (USA – MST 9:00 a.m. to 5:00 p.m., Mon.-Fri.)
E-Mail: support@phaseivengr.com

If you need assistance, please provide the following information:

- Product part number
- Product serial number
- Version

5.1 Warranty